International Joint Conference 2022

The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)
The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022)
The 5th International Conference on Culture Technology (ICCT 2022)

A joint conference organized by Artificial Intelligence Association of Thailand (AIAT) and Rajamangala University of Technology Lanna (RMUTL)

November 5-7, 2022
Chiang Mai, Thailand

https://isai-nlp-aiot2022.aiat.or.th/

http://icct.iacst.org/

TABLE OF CONTENTS

iSAI-NLP-AIoT 2022

ICCT 2022

HOST/SPONSOR

The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)
The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022)

The 5th International Conference on Culture Technology (ICCT 2022)

A joint conference organized by Artificial Intelligence Association of Thailand (AIAT) and Rajamangala University of Technology Lanna (RMUTL)

WELCOME MESSAGE FROM THE ISAI-NLP 2022 GENERAL AND CONFERENCE CHAIRS

From 2017, the Symposium on Natural Language Processing (SNLP2018) has been broadened to cover the topics of Artificial Intelligence in addition to natural language processing. Its name has been changed to the Joint International Symposium on Artificial Intelligence and Natural Language Processing series (iSAI-NLP). The first meeting was held in 1993 by Chulalongkorn University in Bangkok, Thailand. The following conferences were held by Kasetsart University in Bangkok (1995), Asian Institute of Technology in Phuket (1997), King Mongkut's University of Technology Thonburi in Chiang Mai (2000), SIIT, Thammasat University in Hua Hin (2002), Chulalongkorn University in Chiang Rai (2005), Kasetsart University in Pattaya (2007), Dhurakij Pundit University in Bangkok (2009), King Mongkut's Institute of Technology Ladkrabang in Bangkok (2011), SIIT in Phuket (2013), Thammasat University in Ayutthaya (2016), King Mongkut's University of Technology Thonburi and Rangsit University in Hua Hin (2017), Mahidol University in Pattaya (2018), Muban Chombueng Rajabhat University and Chiang Mai University in Chiang Mai (2019), NECTEC via online (2020) and Phranakhon Si Ayutthaya Rajabhat University via online (2021).

Artificial Intelligence and Internet of Things (AIoT) is a long-running collaboration between Tokyo Institute of Technology, Sirindhorn International Institute of Technology of Thammasat University, Kasetsart University, and the National Science and Technology Development Agency, Thailand. The collaboration includes a program of study under the virtual institute namely Thailand Advanced Institute of Science and Technology and Tokyo Institute of Technology, Japan (TAIST-Tokyo Tech), research collaboration, conferences, and related academic activities. The 3rd International Conference on Artificial Intelligence and Internet of Things is held at this event.

This year, the iSAI-NLP 2022 is jointly organized with the AIoT 2022, contributing to iSAI-NLP-AIoT 2022 hosted by Rajamangala University of Technology Lanna with great support from the Artificial Intelligence Association of Thailand (AIAT). This conference is organized in a hybrid form after two years affected by the COVID-19 pandemic. The aim of iSAI-NLP-AIoT 2022 is to promote artificial intelligence research in the seven main topics: (1) natural language processing, (2) robotics/IoT/ embedded system, (3) data analytics and machine learning, and (4) signal, image and speech processing (5) Smart Energy Industrial Technology (6) AIOT design and applications and (7) Management Technology. In addition, we are also pleased to have a joint event with

another conference, the 5th International Conference on Culture Technology. We are indebted to the keynote speakers, the invited speakers, the presenters, the reviewers, and the organizing team for their contributions.

The iSAI-NLP-AIoT 2022 General and Conference Co-Chairs

Thepchai Supnithi *(National Electronics and Computer Technology Center, Thailand)*
Mahasak Ketcham *(IEEE SMC Thailand)*
Thanaruk Theeramunkong *(SIIT, Thammasat University, Thailand)*
Tsuyoshi Isshiki, *(Tokyo Institute of Technology, Japan)*
Pisit Wimonthanasit, *(Rajamangala University of Technology Lanna, Thailand)*

WELCOME MESSAGE FROM GENERAL CO-CHAIRS

ASST.PROF.DR.JUTTURIT THONGPRON
Acting President
Rajamangala University of Technology Lanna, Thailand

On behalf of the Organizing Committee, we are pleased to announce that the 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022) and The International Conference on Artificial Intelligence and Internet of Things (AIoT 2022) will be held in Chiang Mai, Thailand from November 5 – 7, 2022. The conference is partnered and organized by many universities; Rajamangala University of Technology Lanna, Chiangmai University, Sirindhorn International Institute of Technology, Thammasat University, Mahidol University, Kasetsart University, Artificial Intelligence Association of Thailand, Tokyo Institute of Technology, Tokyo Tech Annex Bangkok and National Electronics and Computer Technology Center.

The objective of the conference is to facilitate technology and knowledge exchange among international researchers/scholars in the field of artificial intelligence and natural language processing, by covering a broad range of research topics in machine learning, smart internet, data science with health care applications, AI and languages. It also aims to bring together the community of Southeast Asian Countries' researchers interested in these areas.

This year, iSAI-NLP 2022 has scheduled three keynote speeches related to Advances IoT, Energy planning, Audio/Speech Information Hiding and two workshops on NLP R&D and AI R&D.

In addition, I would like to express my gratitude to the Organizing Committee, the Co-Chairs, Keynote Speakers, reviewers, authors, participants, other contributors and many more. Thank you for all your support and hard work since day one. Thank you all for making this event possible and successful.

Last but not least, The Organizing Committee wishes to extend its deepest appreciation to IEEE Thailand Section and IEEE System, Man and Cybernetics Chapter (Thailand). Your contribution to iSAI-NLP 2022 is essential to its success. I also congratulate and wish success to all participants for their dedication and participation.

Thank you.

WELCOME MESSAGE

TAE SOO YUN
The President of IACST

It is my great honor and pleasure to host ICCT2022 in the beautiful city of Chiang Mai, Thailand. In particular, I am incredibly grateful to be co-hosted with Thailand's renowned international conference, iSAI-NLP-AIoT 2022.

First, I would like to express my sincere gratitude to Chairman Depchai Supnithi and the officials of the Artificial Intelligence Association of Thailand (AIAT) and Rajamangala University of Technology Lanna (RMUTL) for willingly consenting to the co-hosting and for their heartflelt assistance in organizing the conference.

This conference will be a significant event for us. It will be an opportunity to make a fresh start and leap through a long dark tunnel due to the corona pandemic for over two years. In addition, in the era of the metaverse blooming on infrastructure based on mobile internet and hyper-connectivity, co-hosting a conference with AIAT association will be the best example of convergence in the era of the 4th industrial revolution.

The theme of this conference is "Digital Worlds and Metaverse". It will be a place to discuss a future where cutting-edge technologies such as artificial intelligence, block-chain, and big data combine to create interactions and infinite business models that cross the boundaries of virtual and reality.

Many excellent papers have been submitted from many countries, and I sincerely hope that open discussion and networking among researchers will occur at this joint conference.

Would you please enjoy the joint conference and all our events, sharing wonderful days of good memories in Chiang-mai Thank you very much.

iSAI-NLP-AIoT
ORGANIZING COMMITTEE

GENERAL CHAIRS

Thepchai Supnithi,
AIAT & NECTEC, Thailand
Mahasak Ketcham,
AIAT, IEEE SMC Thailand, KMUTNB, Thailand

HONORARY CO-CHAIRS

Jutturit Thongpron,
RMUTL, Thailand
Yoshinori Sagisaka,
WU, Japan
Nicolai Petkov,
UG, Netherlands
Chai Wutiwiwatchai,
NECTEC, Thailand
Gasinee Witoonchart,
Rector, TU, Thailand
Tatsuya Mizukoshi,
Director, Tokyo Tech ANNEX Bangkok

TECHNICAL PROGRAM COMMITTEE

Rachada Kongkachandra,
AIAT, IEEE SMC, TU, Thailand
Weena Janratchakool,
RMUTT, Thailand
Sanparith Marukatat,
AIAT & NECTEC, Thailand
Ekkarat Boonchieng,
CMU, Thailand
Teerasak Somsak,
RMUTL, Thailand
Dusit Thanapatay,
KU, Thailand
Supachai Vorapojpisut,
TU, Thailand
Seksan Laitrakun,
SIIT, TU, Thailand
Pisit Chanvarasuth,
SIIT, TU, Thailand

PUBLICATION CO-CHAIRS

Pokpong Songmuang,
AIAT, IEEE SMC, TU, Thailand
Pratch Piyawongwisal,
RMUTL, Thailand
Worawit Fankam-ai,
RMUTL, Thailand

ORGANIZING COMMITTEE

Uthen Kamnarn,
RMUTL, Thailand
Nopporn Patcharaprakiti,
RMUTL, Thailand
Nongnuch Ketui,
AIAT & RMUTL, Thailand
Waree Kongprawechnon,
AIAT & SIIT, TU, Thailand
Ekkarat Boonchieng,
CMU, Thailand
Vorapon Luantangsrisuk,
TU, Thailand
Somrudee Deepaisarn,
SIIT, TU, Thailand
Nattapong Tongtep,
PSU, Thailand

Kanyalag Phodong,
AIAT, IEEE SMC, ARU, Thailand
Worawut Yimyam,
AIAT, IEEE SMC, PBRU, Thailand
Thittaporn Ganokratanaa,
IEEE SMC, KMUTT, Thailand
Patiyuth Pramkeaw,
IEEE SMC, KMUTT, Thailand

LOCAL ORGANIZING COMMITTEE

Nopporn Phatcharaprakiti,
RMUTL, Thailand
Ekkarat Boonchieng,
CMU, Thailand
Vorapon Luantangsrisuk,
TU, Thailand
Somrudee Deepaisarn,
SIIT, TU, Thailand

PROGRAM CO-CHAIRS

Prasert Luekong,
RMUTL, Thailand
Chutima Beokhaimook,
AIAT & RSU, Thailand
Supachai Vorapojpisut,
TU, Thailand

CONFERENCE CO-CHAIRS

Thanaruk Theeramunkong
AIAT & SIIT, TU, Thailand
Tsuyoshi Isshiki,
Tokyo Tech, Japan
Pisit Wimonthanasit,
RMUTL, Thailand

INTERNATIONAL COMMITTEE

Atsuo Yoshikata,
JAIST, Japan
Colin De La Higuera,
UN, France
Cristina Tirnauca,
UC, Spain
Marios Sioutis,
JAIST, Japan
Nguyen Hoai Son,
VNU, Vietnam
Philippe Lenca,
IMT Atlantique, France
The-Bao Pham,
VNU, Vietnam
Trung-Hieu Huynh,
VGU, Vietnam
Thatsanee Chareonporn,
MU, Japan

FINANCIAL CHAIRS

Rachada Kongkachandra,
AIAT, IEEE SMC, TU, Thailand
Thepchai Supnithi,
NECTEC, Thailand
Choermath Hongakkaraphan,
AIAT, Thailand
Wirat Chinnan,
AIAT, Thailand

WEBMASTERS

Pratch Piyawongwisal,
RMUTL, Thailand
Chakkraphop Maisen,
RMUTL, Thailand
Natchasit Chukiatkhajorn,
RMUTL, Thailand
Suphitcha Thawornlimpaphong,
RMUTL, Thailand
Wirat Chinnan,
AIAT, Thailand

SECRETARY GENERALS

Nongnuch Ketui,
RMUTL, Thailand
Narumol Chumuang,
AIAT, IEEE SMC, MCRU, Thailand

HOST AND CO-HOST

Artificial Intelligence Association of Thailand (AIAT)
Rajamangala University of Technology Lanna (RMUTL, Thailand)
Graduate School, Chiangmai University (CMU, Thailand)
Tokyo Institute of Technology, Japan
Tokyo Tech Annex Bangkok
Sirindhorn International Institute of Technology (SIIT, Thammasat University, Thailand)
Thammasat University (TU, Thailand)
Mahidol University (MU, Thailand)
National Electronics and Computer Technology Center (NECTEC, Thailand)

SUPPORTERS

IEEE Thailand Section
IEEE System, Man and Cybernetics Chapter (Thailand)

ICCT-IACST
ORGANIZING COMMITTEE

TECHNICAL PROGRAM COMMITTEE
Dr. Dongkyun Kim
Kyungpook National University, Korea

ORGANIZING COMMITTEE
Dr. Pyeoungkee Kim
CEO of IACST, Silla University, Korea
Dr. SeHyun Park
Daegu University, Korea

CONFERENCE CO-CHAIR
Dr. Tae Soo Yun
President of IACST,
Dongseo University, Korea

PUBLICATION CO-CHAIRS
Prof. KyungSu Kwon
Dongseo University, Korea

LOCAL ORGANIZING COMMITTEE
Dr. Rattasit Sukkahuta,
Chiang Mai University, Thailand
Ajarn. Somchoke Ruengittinum
Kasetsart University, Thailand

HOST AND CO-HOST
International Association for Convergence,
Science and Technology (IACST)

KEYNOTE SPEAKER I

MASAKAZU URADE
SOCIONEXT Inc., Japan
RF-CMOS Technology Advances IoT

ABSTRACTS:
Recently, the number of IoT devices are increased, which adapted narrow band wireless technologies such as BLE, LPWA and so on. These intelligent IoT device has RF wireless technologies to communicate to other system, and the digital circuit technologies with low power consumption. We will introduce Socionext's RF-CMOS technology to address these requirements. And as an example, we will explain out active tag solution, "ZETag".

KEYWORDS:
IoT; RF-CMOS; Wireless

BIOGRAPHY

- Masakazu Urade had been working at embedded software for LSIs and many products in Panasonic. He has experiences worked with Microsoft to develop OS for Panasonic 32-bit CPU, later on worked with China Academy of Science to develop embedded linux for Panasonic 32-bit CPU.
- Now, he is Deputy Director, Connected Solution Team, IoT & Radar sensing BU, Socionext Inc. and also Director, ZETA alliance Japan.
- Currently his mission is business development of IoT & Radar sensing LSI. Especially he is interested in Narrow band IoT device., ZETA alliance Japan.

KEYNOTE SPEAKER II

ASSOC. PROF. DR. CHALIE CHAROENLARPNOPPARUT
Sirindhorn International Institute of Technology,
Thammasat University, Thailand

ABSTRACTS:
Since 2007, Thailand electricity generation planning has been overwhelming with flaws and prediction errors. Until this moment, there is still no clear direction on how it can meet the international commitment to reduce CO2 footprint by 20-40% in 2030 and becoming a CO2-neutral country by 2050. With the rising price of electricity, Thai government still struggles deeply by subsidizing electric bills for the poor and keep solving the problem on the superficial basis. In this presentation, Thailand electricity generation planning problem will be analyzed to the structure level. The research result for future of Thailand electricity plan to meet the decarbonization target will be explained with immediate action recommendation. It has been discovered that more than 250 GW of solar power capacity and 50 GW of grid energy storage would be required in 2050 to meet the CO2 target. The problems of high-level renewable generation integration to the grid and perhaps new energy market model are needed to be studied. Finally, other related future research topics will be proposed to challenge the audiences and call for participation.

KEYWORDS:
Energy planning; Power Development Plan; Smart Grid; Carbon Neutrality

BIOGRAPHY
Dr. Chalie Charoenlarpnopparut is Associate Professor at School of Information, Computer, and Communication Technology (ICT), Thammasat University, Thailand. He graduated the bachelor degree (1st Class Honor) in Electrical Engineering, Chulalongkorn University, Bangkok, Thailand, the master degree in Electrical Engineering, The Pennsylvania State University, University Park, PA, USA as well as the doctor degree. Now he is a Vice-Rector for Academic Affairs at Thammasat University, Thailand.

RESEARCH INTERESTS:
Multidimensional systems and signal processing, Robust control, Image processing, Wavelet and filter bank, Signal processing for communication, Convolutional code design.

KEYNOTE SPEAKER III

PROF. DR. MASASHI UNOKI
School of Information Science, JAIST, Japan

Audio/Speech Information Hiding
based on Human Auditory Characteristics

ABSTRACTS:
Audio information hiding (AIH) has recently been focused on as a state-of-the-art technique enabling copyrights to be protected and defended against attacks and tampering of audio/speech content. This technique has aimed at embedding codes as watermarks to protect copyrights in audio/speech content, which are inaudible to and inseparable by users, and at detecting embedded codes from watermarked signals. It has also aimed at verifying whether it can robustly detect embedded codes from watermarked signals (robust or fragile), whether it can blindly detect embedded codes from watermarked signals (blind or non-blind), whether it can completely restore watermarked signals to the originals by removing embedded codes from them (reversible or irreversible), and whether it can be secure against the publicity of algorithms employed in public or private methods. AIH methods, therefore, must satisfy some of the five following requirements to provide a useful and reliable form of watermarking: (a) inaudibility (inaudible to humans with no sound distortion caused by the embedded data), (b) robustness (not affected when subjected to techniques such as data compression and malicious attacks), (c) blind detectability (high possibility of detecting the embedded data without using the original or reference signal), (d) confidentiality (secure and undetectable concealment of embedded data), and (e) reversibility (removable embedded data from the watermarked signal and/or enable watermarking to be re-edited). In this talk, historical and typical AIH methods (including speech information hiding) are introduced and pointed out drawbacks. Then our proposed methods based on human auditory characteristics (cochlear delay, adaptive phase modulation, singular spectrum analysis with psychoacoustic model, formant enhancement, spread-spectrum with LP residue) are introduced. In addition, current research issues such as speech spoofing and deepfake detection will also be introduced.

KEYWORDS:
Audio/speech, Speech Spoofing, Deep Fake Detection

BIOGRAPHY
Masashi Unoki received his M.S. and Ph.D. in Information Science from the Japan Advanced Institute of Science and Technology (JAIST) in 1996 and 1999. His main research interests are in auditory motivated signal processing and the modeling of auditory systems. He was a Japan Society for the Promotion of Science (JSPS) research fellow from 1998 to 2001. He was associated with

the ATR Human Information Processing Laboratories as a visiting researcher from 1999-2000, and he was a visiting research associate at the Centre for the Neural Basis of Hearing (CNBH) in the Department of Physiology at the University of Cambridge from 2000 to 2001. He has been on the faculty of the School of Information Science at JAIST since 2001 and a full professor. Now, he is a Dean of School of Information Science, JAIST. Currently, he is an associate editor of Applied Acoustics and IEICE Fellow.

RESEARCH INTERESTS:
Speech security, Information hiding, Auditory signal processing, Speech signal processing

ICCT KEYNOTE SPEAKER

DR. KWANGYUN WOHN
Professor Emeritus of KAIST, South Korea
From Cave Paintings to Metaverse

ABSTRACT:
According to historian Yuval Harari, technological developments will inevitably lead to a social phenomenon in which the physical reality weakens while the fictitious reality becomes stronger. If this is the case, one day, the era of the metaverse in which the real world and the virtual world are difficult to distinguish, indistinguishable, and the distinction is meaningless will open.
If the mixing of the real world and the virtual world is called the metaverse, it can be said that the attempt to create the metaverse has started with the beginning of mankind. The cave paintings, which are a few prehistoric relics/relics today, are probably the oldest traces of the metaverse, and Venus of Willendorf may also be regarded as the oldest 3D avatar.
In this presentation, we will briefly introduce the development of the metaverse in the context of human history, will present a conceptual model of VR that is the most essential for realizing the metaverse, and will define the metaverse as a new (digital) medium, and discuss its feasibility.

BIOGRAPHY
Kwangyun Wohn is an honorary professor of KAIST, Korean and served as a Chairperson of National Research Council of Science and Technology (NST in short). NST is the governing organization that oversees the 25 major national research institutes, including KIST, ETRI, and KAERI. Before he accepted the Chairship of NST, he has been at KAIST as professor for 27 years. He started his professional career at Agency of Defense Development in Korea. Having completed the master's and Ph.D. studies at University of Wisconsin and University of Mary-land, respectively, he had been with Harvard University (USA) as Lecturer, and with University of Pennsylvania (USA) as Assistant Professor. Having returned back to his home country, Ko-rea, he had been with Computer Science Department for fifteen years, and founded a new grad-uate school, Graduate School of Culture Technology (GSCT) in 2005, and served as Dean. Hav-ing retired from KIAST, he still holds the Professor Emeritus of KAIST. Major activities and accomplishments include: Director of Virtual Reality Research Center which is a national cen-ter of research excellence, Founding President of Korean Society of Human-Computer Interac-tion (HCI), Founding President of Korean Society of Performing Art, and Editorial Board of British Computer Society. While his research interests span a broad range of the intersection between art and science – from theoretical aspects to practicalities – he focuses his research efforts to the application of virtual reality technology to various cultural artifacts such as stage performances, museum exhibitions and educationa contents.

INVITED SPEAKER
Workshop on NLP/AI R&D

Multilingual Machine Translation by Disentangling Language Dependency

PROF. TARO WATANABE
Nara Institute of Science and Technology (NAIST)

ABSTRACT:
Multilingual machine translation leverages the capacity of neural networks to encode multiple language representations into a single model. This leads to a success in zero-shot translation in which the model is capable of translating language pairs which are unseen during training. However, the zero-shot translation is unstable in that it is largely influenced by the dominant language, e.g., English, in training data, and decoupling the paired representations has been a challenging topic. In this work, we propose a simple, lightweight yet effective language-specific modeling by adapting to non-centered languages, i.e., non-English, and combining the shared information and the language-specific information to counteract the instability of zero-shot translation.

BIOGRAPHY
Taro Watanabe received his B.E. and M.E. degrees in information science from Kyoto University in 1994 and 1997, respectively, and obtained an M.S. degree in Language and Information Technologies from the School of Computer Science, Carnegie Mellon University in 2000. In 2004, he received a Ph.D. in informatics from Kyoto University. After working as a researcher at ATR, NTT and NICT, and as a software engineer at Google, he is a professor at the Nara Institute of Science and Technology starting in 2020. His research interests include natural language processing, machine learning and machine translation.

INVITED SPEAKER
Workshop on NLP/AI R&D

A Journey of NLP Researcher from Academia to Industry

DR. OHNMAR HTUN
Rakuten Institute of Technology, Rakuten Group Inc.

ABSTRACT:
Natural Language Processing (NLP) holds the ground for advances in current and future Artificial Intelligence (AI). I started my research in the sphere of NLP in 2008 as a fresh graduate student at Nagaoka University of Technology. My initial research focused on measuring and extracting phonetically similar words between two languages as an information extraction task, which is useful for various linguistic research and machine learning applications. One of my research papers proposed a technique for integrating human knowledge into stochastic models of string similarity. This approach has been utilized to extract Japanese synonyms from e-commerce item data to improve our e-commerce search engine and translation systems. As NLP is one of the core technologies behind AI applications, various deep learning NLP techniques are utilized and developed for many business solutions. In addition, Neural Machine Translation (NMT) is a major part of the research, and many experiments are carried out to improve the quality of the translation of R-Translate models. Augmenting paraphrase generation is the useful approach to improve translation quality of NMT; the current SOTA models (e.g., GPT-2, mT5, etc.) are used to generate multilingual synthetic data. Beyond that, the complexity of Japanese sentence levels from general conversation to business use cases has been considered in the translation from NMT system as well. Recently, my colleagues and I did some research on controlling the complexity of target Japanese text based on the vocabulary and kanji of JLPT levels. We have investigated some limitations of this approach in our workshop submission at TSAR2022.

Keywords:
Natural Language Processing; Neural Machine Translation

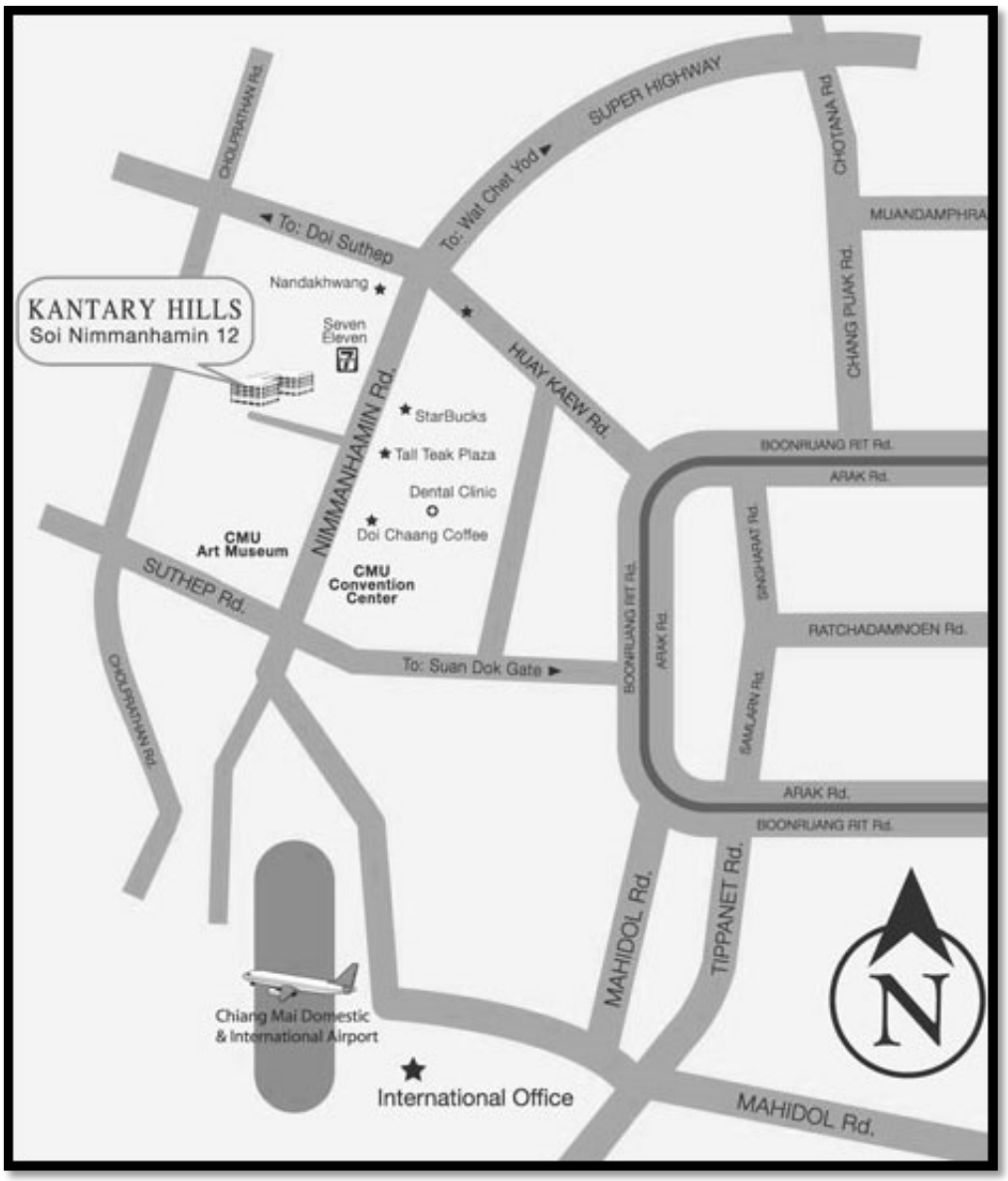
BIOGRAPHY

Ohnmar Htun is a research scientist at Rakuten Institute of Technology at Rakuten Group Inc., Tokyo-Japan, and Rakuten Asia Pte.Ltd., Singapore. She received her Doctorate in Information Science and Control Engineering from the Nagaoka University of Technology in 2013. She also holds a Master in e-Business Management from the International University of Japan in 2008 and a Bachelor of Honus in Computing and Information Systems from the London Guild Hill University (UK) in 2001. Her research engages in Natural Language Processing (NLP), Cross-Language Information Retrieval (CLIR), Machine Translation (MT), and Deep Learning AI. She has authored several papers in international journals, conferences, and workshops within these domains. She received the IEEE Shin-Etsu Young Researcher Paper Awards (Japan) in 2010. She joined Rakuten Inc., Tokyo, Japan as a research engineer in 2015 and was involved in several research and development projects. She is passionate about practical research innovation on real-world business for a multilingual society.

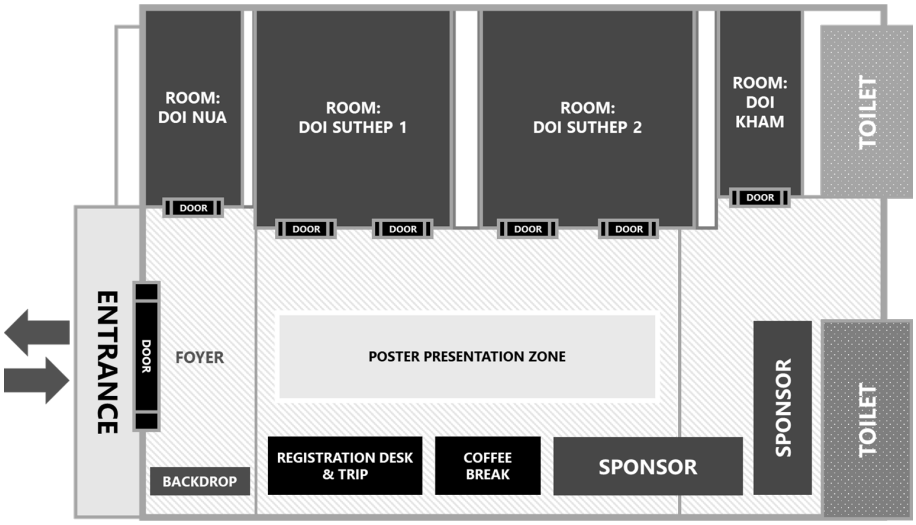
CONFERENCE VENUE

Kantary Hills, Chiang Mai,
44, 44/1-4 Nimmanhaemin Road, Soi
12, Suthep, Muang, Chiang Mai 50200, Thailand.

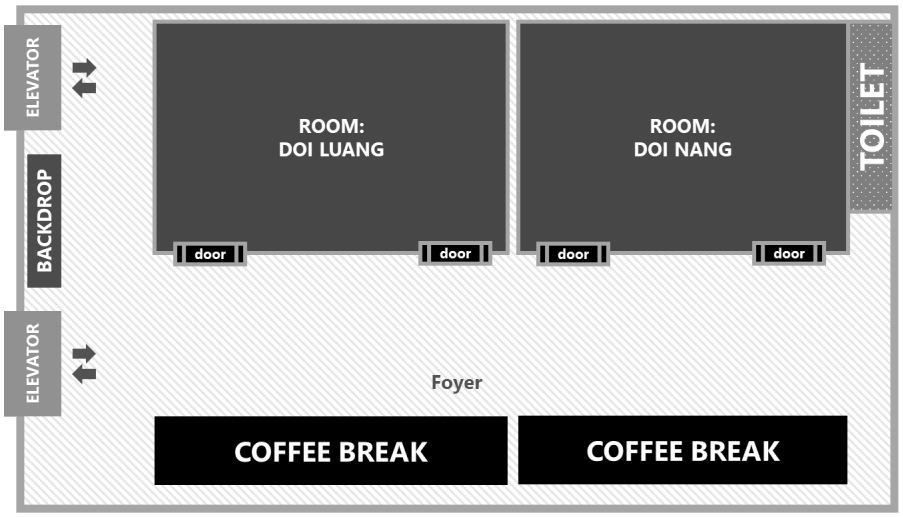
LOCATION


KANTARY HILLS
Soi Nimmanhamin 12
CHOLPRATHAN Rd.
To: Doi Suthep
To: Wat Chet Yod
SUPER HIGHWAY
CHOTANA Rd.
MUANDAMPHRA
CHANG PUAK Rd.
Nandakhwang
Seven Eleven
HUAY KAEW Rd.
NIMMANHAMIN Rd.
StarBucks
Tall Teak Plaza
Dental Clinic
Doi Chaang Coffee
CMU Art Museum
CMU Convention Center
SUTHEP Rd.
To: Suan Dok Gate
BOONRUANG RIT Rd.
ARAK Rd.
SINGHARAT Rd.
RATCHADAMNOEN Rd.
SAMJARN Rd.
MAHIDOL Rd.
TIPPANET Rd.
Chiang Mai Domestic & International Airport
International Office
N

SITE PLAN



1st FLOOR



2nd FLOOR

CHIANG MAI, THAILAND

ISAI-NLP-AIOT-ICCT 2022 PROGRAM SCHEDULE

INTERNATIONAL JOINT CONFERENCE 2022
The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)
The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022)
The 5th International Conference on Culture Technology (ICCT 2022)

	TENTATIVE SCHEDULE	
Time	Program	
	FRIDAY, NOVEMBER 4, 2022 Place: Kantary Hills Hotel, Chiang Mai Thailand	
Time	Program	
15.00-17.00	**Registration** @Reception Desk, Kantary Hills Hotel	
16.00-18.00	**Committee Meeting** @Kantary Hills Hotel	
	SATURDAY, NOVEMBER 5, 2022 Place: Kantary Hills Hotel, Chiang Mai Thailand	
Time	Program	
08.00-09.00	**Registration** Floor 1, @Kantary Hills Hotel	
09.00-10.20	**Oral Paper Presentation**	
	Session: iSAI-NLP-AIoT- 3A Room: Doi Nang Fl.2	Session: iSAI-NLP-AIoT- 4A Room: Doi Luang Fl.2
	Session: iSAI-NLP-AIoT- 2B Room: Doi Nang Fl.2	Session: ICCT-3C Room: Doi Khum Fl.1
09.00-10.20	**Tutorial**	
	Machine Learning Assoc. Prof. Dr.Ekarat Boonchieng Room: Doi Suthep 1 Fl.1	NLP Dr.Prachya Boonkwan Room: Doi Suthep 2 Fl.1
10.20-10.40	**Break**	

INTERNATIONAL JOINT CONFERENCE 2022
The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)
The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022)
The 5th International Conference on Culture Technology (ICCT 2022)

	TENTATIVE SCHEDULE		
Time	Program		
10.40-12.00	**Oral Paper Presentation**		
	Session: iSAI-NLP-AIoT-1A Room: Room: Doi Suthep2 Fl.1	Session: iSAI-NLP-AIoT-2A Room: Doi Suthep1 Fl.1	
	Session: ICCT-1 Room: Doi Luang Fl.2	Session: ICCT-1B Room: Doi Nang Fl.2	
12.00-13.30	**Lunch**		
13.30-13.45	**Opening Ceremony** Room: Doi Luang & Doi Nang Fl.2		
13.45-14.30	Keynote I: Dr. Kwangyun Wohn, Professor Emeritus of KAIST, South Korea		
	Chair: Assoc.Prof.Dr.Intiraporn Mulasastra IACST/Kasetsart University, Thailand		
14.30-14.45	**Break**		
15.00-17.00	**Oral Paper Presentation**		
	Session: ICCT-1C Room: Doi Luang Fl.2	Session: ICCT-1D Room: Doi Nang Fl.2	Session: iSAI-NLP-AIoT- 7A Room: Doi Suthep2 Fl.1
15.00-19.00	**Workshop**		
	NLP Keynote 1: Prof. Watanabe-san Keynote 2: Dr. Ohnmar, Rakuten Room: Doi Suthep 1 Fl.1		
	SUNDAY, NOVEMBER 6, 2022 Place: Kantary Hills Hotel, Chiang Mai Thailand		
Time	Program		
08.00-09.00	**Registration** Floor 1, @Kantary Hills Hotel		

INTERNATIONAL JOINT CONFERENCE 2022
The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)
The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022)
The 5th International Conference on Culture Technology (ICCT 2022)

	TENTATIVE SCHEDULE	
Time	Program	
08:00-09:00	**Setting Up for Poster Paper Presentation** Room: Foyer Fl.1	
09.00-09.40	**Keynote Presentation** Room: Doi Suthep 1-2 Fl.1	
	Keynote II: Masakazu Urade, SOCIONEXT, Japan Chair: Prof.Tsuyoshi Isshiki	
09.40-10.20	Keynote III: Assoc.Prof.Dr.Chalie Charoenlarpnopparut, SIIT, TU, Thailand Chair: Prof.Tsuyoshi Isshiki	
10.20-10.35	**Break**	
10.35-11.15	Keynote IV: Prof. Dr. Masashi Unoki, JAIST, Japan Chair: Dr.Thepchai Supnithi	
10.20-12.30	**Poster Paper Presentation** Room: Foyer Fl.1	
12.00-13.30	**Lunch**	
13.30-15.00	**Oral Paper Presentation**	
	Session: iSAI-NLP-AIoT-1B Room: Doi Suthep 2 Fl.1	Session: ICCT-2A Room: Suthep 1 Fl.1
13.30-15.00	**Online Paper Presentation** Session: ICCT-3A Room: Doi Kham Fl.1	
15.00-15.15	**Break**	
15.15-17.00	**Oral Paper Presentation**	
	Session: ICCT-2B Room: Doi Suthep 1 Fl.1	Session: iSAI-NLP-AIoT-4B Room: Doi Suthep 2 Fl.1
15.15-17.00	**Online Paper Presentation** Session: ICCT-3B Room: Doi Kham Fl.1	

INTERNATIONAL JOINT CONFERENCE 2022
The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)
The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022)
The 5th International Conference on Culture Technology (ICCT 2022)

	TENTATIVE SCHEDULE	
Time	Program	
18.00-21.00	**Banquet** Room: Doi Luang & Doi Nang Fl.2	
Monday, November 7, 2022 Place: Kantary Hills Hotel, Chiang Mai Thailand		
Time	Program	
08.00-09.00	**Registration** Floor 1, @Kantary Hills Hotel	
09.00-10.30	**Oral Paper Presentation**	
	Session: iSAI-NLP-AIoT-5A Room: Doi Nang Fl.2	Session: iSAI-NLP-AIoT-6A Room: Doi Nang Fl.2
	Session: iSAI-NLP-AIoT-3B Room: Doi Suthep 2 Fl.1	Session: iSAI-NLP-AIoT -4C Room: Doi Suthep 1 Fl.1
	Session: iSAI-NLP-AIoT-1C Room: Doi Luang Fl.2	
10.30-10.45	**Break**	
10.45-12.00	**Closing Ceremony** Room: Doi Luang & Doi Nang Fl.2	
12.00-13.30	**Lunch**	

[ISAI-NLP-AIOT 2022 TECHNICAL ORAL SESSIONS]

iSAI-NLP-AIoT- 1A: Natural Language Processing

Session Chair: Kwanchai Eurviriyanukul (RMUTL, Thailand)

Date: November 5, 2022 Time: 10:40-12:00

Room: Doi Suthep 2 (Fl.1)

1A.1: **9510- Graph-based Dependency Parser Building for Myanmar Language**
Zar Zar Hlaing, Ye Kyaw Thu, Thepchai Supnithi and Ponrudee Netisopakul

1A.2: **2440- The Evaluation of Interviewer's Presentation Styles for Interview Practice with a Communicative Robot**
Mako Komatsu, Masato Takeuchi, Teruhiko Unoki and Mikifumi Shikida

1A.3: **4813- Enhancing Thai Keyphrase Extraction Using Syntactic Relations: An Adoption of Universal Dependencies Framework**
Chanatip Saetia, Supawat Taerungruang and Tawunrat Chalothorn

1A.4: **9930- Question Answering over Knowledge Graphs for Thai Retail Banking Products**
Wirit Khongcharoen, Chanatip Saetia, Tawunrat Chalothorn and Pakpoom Buabthong

iSAI-NLP-AIoT-1B: Natural Language Processing

Session Chair: Rachada Kongkachandra (TU, Thailand)

Date: November 6, 2022 Time: 13:30-15:00

Room: Doi Suthep 2 (Fl.1)

1B.1: **0378- Syllable-to-Syllable and Word-to-Word Transducers for Burmese Dialect Translation**
Thazin Myint Oo, Thitipong Tanprasert, Ye Kyaw Thu and Thepchai Supnithi

1B.2: **9332- ThEconSum: An Economics-Domained Dataset for Thai Text Summarization and Baseline Models**
Sawittree Jumpathong, Akkharawoot Takhom, Prachya Boonkwan, Vipas Sutantayawalee, Peerachet Porkaew, Sitthaa Phaholphinyo, Charun Phrombut, Thepchai Supnithi, Khemarath Choke-Mangmi, Saran Yamasathien, Nattachai Tretasayuth, Kasidis Kanwatchara and Atiwat Aiemleuk

1B.3: **6600- Improving Neural Machine Translation for Low-resource English-Myanmar-Thai Language Pairs with Switch Out Data Augmentation Algorithm (Online)**
Mya Ei San, Ye Kyaw Thu, Thepchai Supnithi and Sasiporn Usanavasin

1B.4: **7286- Enhancing Response Relevance and Emotional Consistency for Dialogue Response Generation (Online)**
Mengmeng Gong, Hui Song, Haoran Zhou and Bo Xu

iSAI-NLP-AIoT- 1C: Natural Language Processing

Session Chair: Prachya Boonkwan (NECTEC, Thailand)

Date: November 7, 2022 Time: 09:00-10:40

Room: Doi Luang (Fl.2)

1C.1: **5659- Automatic Thai Text Summarization Using Keyword-Based Abstractive Method**

Parun Ngamcharoen, Nuttapong Sanglerdsinlapachai and Pikul Vejjanugraha

1C.2: **9292- Product and Industrial Classification Code Suggestion System for Thai Language**

Rungkarn Siricharoenchai, Panchapawn Chatsuwan, Paramet Tanwanont, Sarunruk Janbradab, Navaporn Surasvadi and Suttipong Thajchayapong

1C.3: **1050- A Construction of Thai WordNet through Translation Equivalence**

Dhanon Leenoi, Alongkorn Alongkornchai, Akkharawoot Takhom, Prachya Boonkwan and Thepchai Supnithi

iSAI-NLP-AIoT- 2A: Robotics, IoT and Embedded System

Session Chair: Weena Janratchakool (RMUTT, Thailand)

Date: November 5, 2022 Time: 10:40-12:00

Room: Doi Suthep 1 (Fl.1)

2A.1: **0530- Real-time Multiple Analog Gauges Reader for an Autonomous Robot Application**
Visarut Trairattanapa, Sasin Phimsiri and Chaitat Utintu

2A.2: **5310- The Effect of Beta-Carotene contain in The Pumpkin using IoT Technology in Polyhouse**
Kanitha Homjun, Kasree Namkane, Sirilux Kaewsirirung, Nongnuch Ketui and Worawit Fankam-Ai

2A.3: **4656- Smart Street Light Monitoring and Visualization Platform for Campus Management (Online)**
Somrudee Deepaisarn, Paphana Yiwsiw, Chanon Tantiwattanapaibul, Suphachok Buaruk and Virach Sornlertlamvanich

2A.4: **1178- Design and Construct Quadcopter to Detect Wild Elephant to Alert (Online)**
Jiranuwat Piriyasupakij and Ratchada Prasitphan

iSAI-NLP-AIoT- 2B: Robotics, IoT and Embedded System

Session Chair: Uraiwan Inyaem, RMUTT, Thailand

Date: November 5, 2022 Time: 9:00-10:20

Room: Doi Nang (Fl.2)

2B.1: **5291- Using the MQTT Broker as a Speech-Activated Medium to Control the Operation of Devices in the Smart Office**
Khanista Namee, Rudsada Kaewsaeng-On, Jantima Polpinij, Ghadeer Mohsen Albadrani, Kavin Rueagraklikhit and Areej Meny

2B.2: **9722- Development of Internet of Things System for Environment Control in Niam Hom (Strobilanthes nivea Craib) House (Online)**
Sancha Panpaeng, Natawut Payakkhin and Pipop Maneejamnong

iSAI-NLP-AIoT- 3A: Data Analytics and Machine Learning

Session Chair: Uraiwan Inyaem, RMUTT, Thailand

Date: November 5, 2022 Time: 9:00-10:20

Room: Doi Nang (Fl.2)

3A.1: **5787- Association of Serum Uric Acid and Lipid Parameters in Patients at Lamphun Hospital, Thailand**

Jiraporn Gatedee, Kanokwan Jaiping, Aungsana Yothinarak, Janjuree Netsawang, Summana Kasemsawasdi, Supanit Angsirikul and Rachasak Somyanonthanakul

3A.2: **4909- Forex Price Movement Prediction Using Stacking Machine Learning Models**

Thanapol Kurujitkosol, Akkharawoot Takhom and Sasiporn Usanavasin

iSAI-NLP-AIoT- 3B: Data Analytics and Machine Learning

Session Chair: Ekkarat Boonchieng (CMU, Thailand)

Date: November 7, 2022 Time: 09:00-10:30

Room: Doi Suthep 2 (Fl.1)

3B.1: **6127- Simulation of Homogenous Fish Schools in the Presence of Food and Predators using Reinforcement Learning**
Ravipas Wangananont, Norapat Buppodom, Sanpat Chanthanuraks and Vishnu Kotrajaras

3B.2: **5617- Anomaly Detection on Real-time Security Log using Stream Processing**
Wasit Limprasert and Patcharapon Jantana

3B.3: **3341- Fault Prediction Model for Motor and Generative Adversarial Networks for Acceleration Signal Generation**
Saran Deeluea, Chawalit Jeenanunta and Apinun Tunpan

3B.4: **2782- Source Code Plagiarism Detection Based on Abstract Syntax Tree Finger printings (Online)**
Vasin Suttichaya, Tunchanok Lurkraisit and Niracha Eakvorachai

iSAI-NLP-AIoT- 4A: Signal, Image, and Speech Processing

Session Chair: Nipat Jongsawat (RMUTT, Thailand)

Date: November 5, 2022 Time: 9:00-10:20

Room: Doi Luang (Fl.2)

4A.1: **6635- RAS-E2E: The SincNet end-to-end with RawNet loss for text-independent speaker verification**
Pantid Chantangphol, Theerat Sakdejayont and Tawunrat Chalothorn

4A.2: **9673- An Analysis of Acoustic Features for Attention Score in Thai MoCA Assessment**
Wirot Treemongkolchok, Dittaya Wanvarie, Proadpran Punyabukkana and Ploy N. Pratanwanich

4A.3: **9823- Image Captioning for Thai Cultures (Online)**
Sarin Watcharabutsarakham, Sanparith Marukatat, Kantip Kiratiratanapruk and Pitchayagan Temniranrat

iSAI-NLP-AIoT- 4B: Signal, Image, and Speech Processing

Session Chair: Sanparith Marukatat (NECTEC, Thailand)

Date: November 6, 2022 Time: 15:15-17:00

Room: Doi Suthep 2 (Fl.1)

4B.1: **2546- Sugarcane Classification for On-Site Assessment Using Computer Vision (Online)**
Prasertsak Pungprasertying

4B.2: **0535- Convolutional Time Delay Neural Network for Khmer Automatic Speech Recognition (Online)**
Nalin Srun, Sotheara Leang, Ye Kyaw Thu and Sethserey Sam

4B.3: **6707- A Comparative Study of Noise Augmentation and Deep Learning Methods on Raman Spectral Classification of Contamination in Hard Disk Drive (Online)**
Sarun Gulyanon, Somrudee Deepaisarn, Chayud Srisumarnk, Nattapol Chiewnawintawat, Angkoon Angkoonsawaengsuk, Seksan Laitrakun, Pakorn Opaprakasit, Pornchai Rakpongsiri, Thawanpat Meechamnan and Duangporn Sompongse

4B.4: **2537- Visual-based Musical Data Representation for Composer Classification (Online)**
Somrudee Deepaisarn, Suphachok Buaruk, Sirawit Chokphantavee, Sorawit Chokphantavee, Phuriphan Prathipasen and Virach Sornlertlamvanich

iSAI-NLP-AIoT- 4C: Signal, Image, and Speech Processing

Session Chair: Somrudee Deepaisarn (SIIT, TU, Thailand)

Date: November 7, 2022 Time: 09:00-10:30

Room: Doi Suthep 1 (Fl.1)

4C.1: **0748- Rice Leaf Diseases Identify Using Big Transfer**
Anurak Yutthanawa and Janya Onpans

4C.2: **3460- ThaiTC: Thai Transformer-based Image Captioning**
Teetouch Jaknamon and Sanparith Marukatat

4C.3.: **4703- Synthetic face generation from in-the-wild face components swapping**
Romrawin Chumpu, Pitchayagan Temniranrat and Sanparith Marukatat

iSAI-NLP-AIoT- 5A: Smart Energy Industrial Technologies

Session Chair: Seksan Laitrakun (SIIT, TU, Thailand)

Date: November 7, 2022 Time: 09:00-10:30

Room: Doi Nang (Fl.2)

5A.1: **9147- Long-Term Energy Demand Forecasting in Thailand with Ensemble Prediction Model (Online)**

Isariyanatre Chatunapalak, Waree Kongprawechnon and Jasada Kudtongngam

iSAI-NLP-AIoT- 6A: AIoT Design and Applications

Session Chair: Seksan Laitrakun (SIIT, TU, Thailand)

Date: November 7, 2022 Time: 09:00-10:30

Room: Doi Nang (Fl.2)

6A.1: **1255- Modeling of Manufacturing Processes using Hidden Semi-Markov Model and RSSI Data**
Supachai Vorapojpisut and Karishma Agarwal

6A.2: **9958- Shrimp-growth Estimation Based on ResNeXt for an Automatic Feeding-tray Lifting System Used in Shrimp Farming**
Chanon Nontarit, Toshiaki Kondo, Warakorn Khamkaew, Jaroenmit Woradet and Jessada Karnjana

6A.3: **1061- Smartphone-Based Human Activity and Fall Recognition Using Deep Feature Extraction and Machine-Learning Classifiers (Online)**
Laksamee Nooyimsai, Onnicha Pakdeepong, Tipkasem Phiakhan, Supajitra Chatchawalvoradech and Seksan Laitrakun

iSAI-NLP-AIoT- 7A: Management Technology

Session Chair: Pisit Chanvarasuth (SIIT, TU, Thailand)

Date: November 5, 2022 Time: 15:00-17:00

Room: Doi Suthep2 (Fl.1)

7A.1: **5907- Factors Affecting Purchase Intention to Coffee Shop**
Prapavarin Burananonont, Aussadavut Dumrongsiti and Pisit Chanvarasuth

7A.2: **6474- Portfolio Optimization and Rebalancing with Transaction Cost: A Case Study in the Stock Exchange of Thailand**
Apichat Chaweewanchon and Rujira Chaysiri

7A.3: **6607- Factors Affecting Acceptance of Dental Appointment Application among Users in Bangkok and Metropolitan Area (Online)**
Kasidit Eiam-O-Pas, Nuchjarin Intalar and Chawalit Jeenanunta

7A.4: **9218- Spherical Fuzzy AHP-VIKOR Model Application in Solar Energy Location Selection Problem: A Case Study in Vietnam (Online)**
Viet Tinh Nguyen and Rujira Chaysiri

[ICCT 2022 TECHNICAL ORAL SESSIONS]

ICCT-1A: 5G and Beyond Communication Systems

Session Chair: Sang-Joong Jung (Dongseo University, Korea)

Date: November 5, 2022 Time:10.40-12.00

Room: Doi Luang (Fl.2)

1A.1: **Firewall Logs Classification Based on Ensemble Voting using Sequential Feature Selection Method**
Qazi Waqas Khan, Rashid Ahmad, Atif Rizwan, Anam Nawaz Khan, DoHyeun Kim (Jeju National University, Korea)

1A.2: **Network Slicing: Enabling Technologies and Solutions for 5G-Advanced Use-cases**
Muhammad Ashar Tariq, Mahnoor Ajmal, Dongkyun Kim (Kyungpook National University, Korea)

1A.3: **Smart Farm enabled with WiFi & LoRa based multi-interface**
Malik Muhammad Saad, Junho Seo, Muhammad Ashar Tariq, Ayesha Siddiqa, Boomi Jeong (Kyungpook National University, Korea); Jaeyoung Kim (Electronics and Telecommunications Research Institute); Dongkyun Kim (Kyungpook National University, Korea)

1A.4: **Dynaminc selection of child nodes for constrained Wi-SUN**
Sungwon Lee (Daegu Haany University, Korea); Sunghyun Kim (Kyungpook National University, Korea); Donghyun Jeon (Daegu Haany University, Korea); Dongkyun Kim (Kyungpook National University, Korea)

ICCT- 1B: Artificial Intelligence

Session Chair: Tae-Young Byun (Daegu Catholic University, Korea)

Date: November 5, 2022 Time: 10.40-12.00

Room: Doi Nang (Fl.2)

1B.1. **Multilevel Board Game - A Sim-2-Real Testbed for Reinforcement Learning on Labyrinth Game**
Hammed Obasekore, Bo-Yeong Kang (Kyungpook National University, Korea)

1B:2 **Underground cavity recognition from GPR image using DNN**
Pyeoungkee Kim (Silla University, Korea); YoungIl Park
(Unique Human Systems, Korea)

1B.3: **A Study on Aerial Compting: A Novel Promising Technologies in 6G**
Shahnila Rahim, Ke Zhao, Muhammad Fawad Khan, Limei Peng
(Kyungpook National University, Korea)

1B.4: **Cyberbullying Type Classification Across Thai Social Media Platforms using Machine Learning Analysis**
Supattanawaree Thipcharoen, Teerawich Wongsa (Chiang Mai University, Thailand); Piyanush Tooptompong, Worapong Bumrungsri (Minerva Consultants Co.,LTD., Thailand); Rattasit Sukhahuta (Chiang Mai University, Thailand)

ICCT- 1C: Information Communication

Session Chair: Somchoke Ruengittinun (Kasetsart University, Thailand)

Date: November 5, 2022 Time: 15.00-17.00

Room: Doi Luang (Fl.2)

1C.1: **The Approach of Mental Healthcare Digital Twin Platform Architecture**
Kang-Yoon Lee (Gachon University, Korea)

1C.2: **A Robust approach to small object detection for Digital Twin in the Industries**
Faisal Saeed, Anand Paul (Kyungpook National University, Korea); Gwanggil Jeom (Incheon National University, Korea)

1C.3: **A Study on Semantic Communications**
ZiJian Chen, Limei Peng (Kyungpook National University, Korea)

1C.4: **Statistical Characteristic of IMU Rate Gyro Uncertainty**
Chanasorn Nutsathaporn, Sakchai Chomkokard, Wiwat Wongkokua, Noparit Jinuntuya, Somchoke Ruengittinun (Kasetsart University, Thailand); Siriporn Sasimontonkul (Kasetsart University Kamphaeng Saen Campus, Thailand)

ICCT- 1D: Landscape and Architecture

Session Chair: Kwan-Seon Hong (Dongseo University, Korea)

Date: November 5, 2022 Time: 15.00-17.00

Room: Doi Nang (Fl.2)

1D.1: **IRRIDIUM MAGAZINE: The first Narrative Magazine**
Clément Fedou, Sunghoon Cho, Yong-Ki Lee (Dongseo University, Korea)

1D.2: **Research on the Application of SITES in University Campus Landscape -Take Dell Medical District-University of Texas at Austin as an Example**
Li Wu, Kwan-Seon Hong (Dongseo University, Korea)

1D.3: **Difference between Service Design and Product Service System**
Xuan-na Xie, Zhen-Xiang Liu, Sung-pil Lee (Dongseo University, Korea)

1D.4: **A comparative study of Korean Metro service quality based on Servicescape**
Jia-Xing Long, Yi-Yu Yang, Sung-Pil Lee (Dongseo University, Korea)

ICCT- 2A: Social Networks

Session Chair: Rolly Intan (Petra Christian University, Indonesia)

Date: November 6, 2022 Time: 13.30-15.00

Room: Doi Suthep 1 (Fl.1)

2A.1: **Innovations in ODL through Virtual Reality technologies**
Chen Zhen (Jiangsu Open University, China); Jiawei Yin, Sojin Kim, Yong-Ki Lee (Dongseo University, Korea)

2A.2: **Book Cover Design Using Short-Form Animation: Focusing on Korean Classical Literature**
Seong Eun Park, Kim lo a, Jihye Kim, Haeyoon Kim (Dongseo University, Korea)

2A.3: **Data validation of cultural data collection based on the citizen science concept**
Watchira Burnasing, Pattaraporn Meekali, Petchwadee Pattarathananan (National Electronics and Computer Technology Center, Thailand)

2A.4: **Quality Factors for Generative Toolkits in a Participatory Design Approach to give Users a Voice in Social Innovation**
Punyotai Thamjamrassri, Hanbi Cha, Eunjin Kim, Yong-Ki Lee (Dongseo University, Korea)

ICCT- 2B: Big Data

Session Chair: Bonghwan Kim (Daegu Catholic University, Korea)

Date: November 6, 2022 Time: 15.15-17.00

Room: Doi Suthep 1 (Fl.1)

2B.1: **Development of Location-based Big Game Applications using the Interest-inducing Factors of Gamification**
GyuHyeok Choi, JuYoung Chang, Mijin Kim (Dongseo University, Korea)

2B.2: **Development of Racing Game using Multi-View Method**
YuGyeong Jeong, Wooyoung Jung, GyuHyeok Choi, Mijin Kim (Dongseo University, Korea)

2B.3: **Real-time Object Reconstruction for Spatial Augmented Reality Platform**
Aye Chan Zay Hta, YunLi Lee, Wai Chong Chia (Sunway University, Malaysia)

2B.4: **Smart Analysis of Twitter Data to Advance Future Tourism**
Muhammad Shaheryar, Jae Cheon Jeon, Soon Ki Jung (Kyungpook National University, Korea)

[ICCT 2022 ONLINE SESSION]

ICCT- 3A: Art and Design-I

Session Chair: Yun Li Lee (Sunway University, Malaysia)

Date: November 6, 2022 Time: 13.30-15.00

Room: Doi Khum (Fl.1)

3A.1: **The Integrated Operation Called "Structure +" in Landscape Structure Design**
Wang Yu (Nanjing University of Aeronautics and Astronautics, China);
Chen Zhen (Jiangsu Open University, China)

3A.2: **Research on the Computational Structure and Content System of Metaverse Design**
Cheng Qiaoming (Nanjing University of Aeronautics and Astronautics, China)

3A.3: **Rural area cultural Cultural Landscape Measurement Method Based on Square Grid-cube Model**
Zhongjian Zhao, Cailing Shang (Nanjing University of Aeronautics and Astronautics, China)

3A.4: **Impact from prefabricated building to modern architecture design**
Yueqian Li (University of Melbourne, Australia);
Li, Wei (Nanjing University of Aeronautics and Astronautics, China)

3A:5 **Analysis on the Characteristics of Exhibition Design in the Information Age – Taking Milan EXPO as an Example**
Wei Li, Ding Kexin (Nanjing University of Aeronautics and Astronautics, China)

ICCT- 3B: Social Computing

Session Chair: Sunghoon Cho (Dongseo University, Korea)

Date: November 6, 2022 Time: 15.15-17.00

Room: Doi Khum (Fl.1)

3B.1: **Analysis of Reproduction using 3D scanning Technology and Vehicle Relics Data Preservation**
Jiawei Yin, Sojin Kim, Yong-Ki Lee (Dongseo University, Korea)

3B.2: **Marketing of Medium and Low-budget Films in the New Media Environment**
Siwen Shi, Sunghoon Cho, Yong-Ki Lee (Dongseo University, Korea)

3B.3: **Analysis of Development of Virtual Idols Based on Game Characters**
Lyu Yin, Soojin Kim, Yong-Ki Lee (Dongseo University, Korea)

3B.4: **Defining types & elements of film space in suspense films**
Chuxuan Wang, Sunghoon Cho, Yong-Ki Lee (Dongseo University, Korea)

3B.5: **Pneumonia Detection from X-Ray Images through Voting Ensemble method**
Harsha B M, Sibu Cyriac, Yong Woon Kim (CHRIST Deemed to be University, India)

ICCT- 3C: Art and Design-II

Session Chair: Rattasit Sukhahuta (Chiang Mai University, Thailand)

Date: November 5, 2022 Time: 09.00-10.20

Room: Doi Khum (Fl.1)

3C.1: **A Study of University Education Methods in the Metaverse Era**
Chun Hyunjin, Sun jiaqin, Shi yanan (Nanjing University of Aeronautics and Astronautics, China)

3C.2: **Real-time Object Reconstruction for Spatial Augmented Reality Platform**
Aye Chan Zay Hta, YunLi Lee, Wai Chong Chia (Sunway University, Malaysia)

3C.3: **AI-Based Online Proctoring: A Review of the State-of-the-Art Techniques and Open Challenges**
Sagaya Aurelia. P, Yong-Woon Kim (CHRIST Deemed to be University, India); Felcy Judith (T John College, India)

3C.4: **Analysis of the causes of cyber violence harm and solution**
Kaicheng Zhang, Sunghoon Cho, Yong-Ki Lee (Dongseo University, Korea)

[ICCT 2022 POSTER SESSION]

ICCT- 1A: Communications and Networks

Session Chair: Sehyun Park (Daegu University, Korea)

Date: November 06, 2022

Floyer Fl.1, Time: 10.20-12.30

1A.1: **A Study on Object Detection Methods Using Image Binarization**
Young-Jin Kang, Ji Yeon Kim, Eun Sung Choi, Eun Sung Choi, Seok Chan Jeong (Dong Eui University)

1A.2: **An Improved YOLOv5 Model Based on the Scene-Specific Head Models**
Jin Ho Lee, In Su Kim (Kyungpook National University, Korea); Hyeong Bok Kim, Seung Won Lee (Testworks, Korea); Soon Ki Jung (Kyungpook National University, Korea)

1A.3: **Dueling Double Deep Q Networks for Agricultural Crop Price Prediction**
Ohnmar Khin, Sung Keun Lee Jin Gwang Koh (Sunchon National University, Korea)

1A.4: **BetterCog : Computerized Cognitive Training System for Mild Cognitive Impairment**
Tae-Young Byun (Daegu Catholic University, Korea); Joo-Hwan Seo, Sun-Woo Lee (M3Solutions Ltd., Korea)

1A.5: **Implementation of Mobile Boat for Measuring Water Quality over LTE Networks**
Tae-Young Byun (Daegu Catholic University, Korea); Chang-Hak Cho, Jin-Hyun Seol (Institute of Technology Water Korea Ltd, Korea); Bonghwan Kim (Daegu Catholic University, Korea)

1A.6: **Audio Quality Restoration Method using Convolutional Neural Network**
Hong-Jin Kim, Sehyun Park, Kyuman Jeong (Daegu University, Korea)

1A.7: **Cow Delivery Detection System using Deep Learning-based Object Recognition Algorithm**
Sung-Wook Chae, Donghwa Lee (Daegu University, Korea)

1A.8: **Development of handwriting generation and classification model based on deep learning algorithm**
Jae-Jung Kim, Ji-Yun Seo, Sang-Joong Jung, Do-Un Jeong (Dongseo University, Korea)

1A.9: **Development of Advanced Visual Function Training System using VR Content**
Yong-Ju Kim, Sang-Joong Jung (Dongseo University, Korea)

WORKSHOP

SUBMISSION: WS-06

TITLE: An Optimal Mathematics Learning – an Online Mathematics Learning Platform using 10-levels of Thai Student Behavior Model

AUTHORS: *Narabodee Rodjananant, Phurinat Polasa, Nattapol Kritsutikul, and Nattapon Buaurai*

SUBMISSION: WS-05

TITLE: A Personalized Learning Platform to Improve English Pronunciation at Word Level for Thai EFL Learners based on End-to-End Automatic Speech Recognition

AUTHORS: *Kongpop Boonma, Phongsatorn Ousakulwattana, Nattapol Kritsuthikul, Jirapond Muangprathub, and Tirapond Jaroensak*

SUBMISSION: WS-03

TITLE: Ensemble Decoding for Neural Machine Translation between Burmese and English

AUTHORS: *Ye Kyaw Thu, Hlaing Myat Nwe, Thepchai Supnithi*

SUBMISSION: WS-08

TITLE: mySentence: Sentence Segmentation for Myanmar Language using Neural Machine Translation Techniques

AUTHORS: *Thura Aung, Ye Kyaw Thu, Zar Zar Hlaing*

SUBMISSION: WS-10

TITLE: Neural Spelling Checker for Khmer

AUTHORS: *Sokheang Hal, Duk Vandeth, Ye Kyaw Thu, Dona Valy, Sethserey Sam*

SUBMISSION: WS-12

TITLE: Sentiment Polarity Classification for Khmer

AUTHORS: *Khim Sokheng, Ye Kyaw Thu, Sethserey Sam*

iSAI-NLP-AIOT 2022

iSAI-NLP-AIOT-378

Syllable-to-Syllable and Word-to-Word Transducers for Burmese Dialect Translation

Thazin Myint Oo ,Thitipong Tanprasert,
Ye Kyaw Thu, Thepchai Supnithi

Assumption University Bangkok, Thailand queenofthazin@gmail.com
Assumption University Bangkok, Thailand thitipong@scitech.au.edu
NECTEC Pathumthani, Thailand yekyaw.thu@nectec.or.th
NECTEC Pathumthani, Thailand thepchai.supnithi@nectec.or.th

Abstract
Weighted Finite State Transducers (WFST) can be very efficient to implement Burmese dialects translation. We illustrate this on two Burmese dialect language pairs, Burmese-Beik and BurmeseRakhine. In this study, we examine syllable and word segmentation schemes and their effect on alignment and transducing between dialect language pairs. We performed alignments with Anymalign, fastalign, pialign, Hieralign, eflomal and GIZA^{++} approaches and implemented WFST based machine translation system with OpenFst library. From the overall results, syllable segmentation achieved higher BLEU and chrF scores for Burmese-Rakhine and Rakhine-Burmese translations. However, word segmentation achieved better translation performance for Burmese-Beik and Beik-Burmese translation directions. Alignment techniques fastalign, Hieralign, eflomal and GIZA^{++} are working well for low-resource Burmese dialects.

Keywords
WFST, Machine Translation, Word Alignment, Myanmar Dialects, Low-resource Languages

iSAI-NLP-AIOT-530

Real-time Multiple Analog Gauges Reader for an Autonomous Robot Application

Visarut Trairattanapa, Sasin Phimsiri, Chaitat Utintu, Riu Cherdchusakulcha, Teepakorn Tosawadi, Ek thamwiwatthana, Suchat Tungjitnob, Peemapol Tangamonsiri, Aphisit Takutruea, Apirat Keomeesuan, Tanapoom Jitnaknan, Vasin Suttichaya

AI and Robotics Ventures Co.,Ltd Bangkok, Thailand

Abstract

With the development of robotic technology, au-tonomous robots have been extended to production industries to substitute manual tasks like routine operations. In the general manufacturer, analog gauges are the most commonly utilized and required operators for manual reading. Accordingly, an analog gauge reading can be considered a fundamental feature for the operator robots to be fully automated for inspection purposes. This paper presents the methods for reading multiple analog gauges automatically using a camera. The processing pipeline consists of two main stages: 1) gauge detector for extracting individual gauges and 2) gauge reader for estimating gauge values. For gauge detectors, we propose three different YOLOv5 architecture sizes. The gauge readers are mainly categorized into computer-vision approach (CV), and deep learning regression approaches. The deep learning approaches consist of two CNN-based backbones, ResNet50 and EfficientNetV2B0, and one transformer-based SwinTransformer. Finally, we introduce the feasibility of the combination of each gauge detector and reader. As a result, the YOLOv5m detector with EfficientNetV2B0 CNN backbone reader theoretically achieves the best performance but is not practical for industrial applications. In contrast, we introduce the YOLOv5m detector with the CV method as the most robust multiple gauge reader. As a result, it reaches the comparative performances to the EfficientNetV2B0 backbone and is more compatible with robotic applications.

Keywords

Analog Gauge Reader, Computer Vision, Image Processing, Object Detection, Image Regression

iSAI-NLP-AIOT-535

Convolutional Time Delay Neural Network for Khmer Automatic Speech Recognition

Nalin Srun , Sotheara Leang , Ye Kyaw Thu , Sethserey Sam

Institute of Digital Research and Innovation Cambodia Academy of Digital Technology Phnom Penh, Cambodia
nalin.srun@cadt.edu.kh
Cambodia Academy of Digital Technology, Cambodia Laboratoire d'Informatique de Grenoble, France
sotheara.leang@cadt.edu.kh
Institute of Digital Research and Innovation Cambodia Academy of Digital Technology Phnom Penh, Cambodia
yktnlp@gmail.com
Institute of Digital Research and Innovation Cambodia Academy of Digital Technology Phnom Penh, Cambodia
sethserey.sam@cadt.edu.kh

Abstract

Convolutional Neural Networks have been proven to successfully capture spatial aspects of the speech signal and eliminate spectral variations across speakers for Automatic Speech Recognition. In this study, we investigate the Convolutional Neural Network with Time Delay Neural Network for an acoustic model to deal with large vocabulary continuous speech recognition for Khmer. Our idea is to use Convolutional Neural Networks to extract local features of the speech signal, whereas Time Delay Neural Networks capture long temporal correlations between acoustic events. The experimental results show that the suggested network outperforms the Time Delay Neural Network and achieves an average relative improvement of 14% across test sets.

Keywords

Khmer ASR, Time Delay Neural Network, Convolutional Neural Network, Low-resource Language

iSAI-NLP-AIOT-748

Rice Leaf Diseases Identify Using Big Transfer

Anurak Yutthanawa, Janya Onpans

Faculty of Informatics Burapha University Chonburi, Thailand yutt.anurak@gmail.com
Faculty of Informatics Burapha University Chonburi, Thailand janyao@go.buu.ac.th

Abstract

In Thailand and numerous other Southeast Asian countries, Rice is one of the most income country products. Rice leaf disease control must be improved in order to enhance rice production. But it is a complicated process dependent on the farmer's experience and local knowledge. Artificial intelligence solutions will become one of the options for resolving this problem and informing all new and existing farmers about the diseases of their products. Big Transfer (BiT) is a deep learning model proposed in this paper for identifying rice leaf disease. BiTM prediction performance is notable, with 100% prediction accuracy after 19 epochs of training.

Keywords

argiculture, computer vision, artificial intelligence, rice diseases, classification

iSAI-NLP-AIOT-1050

A Construction of Thai WordNet through Translation Equivalence

Dhanon Leenoi, Alongkorn Alongkornchai, Akkharawoot Takhom,
Prachya Boonkwan, Thepchai Supnithi

Language and Semantic Technology Research Team National Electronics and Computer Technology Center Pathum Thani, Thailand dhanon.leenoi@nectec.or.th
Language and Semantic Technology Research Team National Electronics and Computer Technology Center Pathum Thani, Thailand alongkorn.alo@ncr.nstda.or.th
Language and Semantic Technology Research Team National Electronics and Computer Technology Center Pathum Thani, Thailand akkharawoot.tak@ncr.nstda.or.th
Language and Semantic Technology Research Team National Electronics and Computer Technology Center Pathum Thani, Thailand prachya.boonkwan@nectec.or.th
Language and Semantic Technology Research Team National Electronics and Computer Technology Center Pathum Thani, Thailand thepchai.supnithi@nectec.or.th

Abstract

WordNet is a crucial language resource associated with artificial intelligence activities, for instance, constructing building models for advancement of computational linguistics and natural language processing, or representing statistical insights through knowledge graphs that emulate cognition and human understanding. Thai WordNet has been developed in many approaches, e.g., a merge approach in gold standard, and semi-auto construction with a bilingual dictionary. However, existing Thai WordNet is not easy to find words fit with the definition of synsets; and cover cultural gaps between the different languages of which needed to be aware. This paper presents a methodology of Translation Equivalence in order to construct Thai language resource, called LST22 Thai WordNet.

Keywords

WordNet, Language Resources, Computational Linguistic, Natural Language Processing, Translation Equivalence

iSAI-NLP-AIOT-1061

Smartphone-Based Human Activity and Fall Recognition Using Deep Feature Extraction and Machine-Learning Classifiers

Laksamee Nooyimsai, Onnicha Pakdeepong, Supajitra Chatchawalvoradech,
Tipkasem Phiakhan, Seksan Laitrakun

Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand
6222782722@g.siit.tu.ac.th
6222782128@g.siit.tu.ac.th
6222782490@g.siit.tu.ac.th
6222782078@g.siit.tu.ac.th
seksan@siit.tu.ac.th

Abstract

Human activity recognition (HAR) and fall detection using smartphone sensors are currently popular because they can be extended to many useful applications especially when a person needs an urgent treatment such as a fall. Several methods based on machine learning (ML) and deep learning (DL) have been proposed to improve classification performances. In this work, we propose hybrid models of convolutional neural network (CNN) models and ML algorithms to classify human activities and falls using smartphone-sensor data. The CNN model will be used as feature extraction to extract a set of features. Thereafter, the ML algorithm will apply this set of features to predict the corresponding activity and fall. Several combinations of CNN models and ML algorithms are investigated on two public datasets: UniMiB SHAR and UMAFall. Their accuracy scores are compared in order to determine the best hybrid model. On the UniMiB SHAR dataset, the hybrid model based on the AlexNet model and the extra trees algorithm achieves the highest accuracy score of 95.27%. On the UMAFall dataset, the hybrid model based on the Xception model and the support vector machine/k-nearest neighbors/extra trees algorithms offer the highest accuracy score of 82.24%.

Keywords

convolutional neural network (CNN), deep learning, fall detection, human activity recognition (HAR), machine learning

iSAI-NLP-AIOT-1178

Design and Construct Quadcopter to Detect Wild Elephant to Alert.

Jiranuwat Piriyasupakij, Ratchada Prasitphan

Huahin Vitthayalai School Prachuap Khiri Khan Thailand jiranuwatpiriyasupakij@gmail.com
Huahin Vitthayalai School Prachuap Khiri Khan Thailand meteemaker@gmail.com

Abstract

The encroachment of wild elephants in farming areas and villagers' habitats has caused conflicts among communities resulting to violence in preventing and driving elephants out of the area. The organizers have seen the impact of this problem and aims to solve it by designing and building a prototype Quadcopter that can survey and detect these wild elephants to warn villages and prevent further damage. The model takes crisp image of the detected wild elephants at a distance of 1M to 80% and alerts the forest technicians via the application. The test results showed that there were problems in the controls for it requires GPS signal. In the future, improvements and fixes in various parts shall be made to further develop innovative approaches that solve real-world problems.

Keywords

Quadcopter, Raspberry Pi, Ai Cam

iSAI-NLP-AIOT-1255

Modeling of Manufacturing Processes using Hidden Semi-Markov Model and RSSI data

Supachai Vorapojpisut, Karishma Agrawal

Dept. of Electrical and Computer Engineering Thammasat University Pathumthani, Thailand vsupacha@engr.tu.ac.th
Dept. of Electrical and Computer Engineering Thammasat University Pathumthani, Thailand
karishma.agra@dome.tu.ac.th

Abstract

Temporal behaviors, e.g., cycle time and throughput, are among essential key performance indicators for the management of manufacturing processes. This paper presents a statistical model that captures the processing time spent throughout a production line using RSSI data acquired from Bluetooth Low Energy (BLE) network. First, a Hidden Semi-Markov Model (HSMM) is formulated based on the characteristics of production processes. Then, a learning problem is discussed for the re-estimation of state duration probability distribution using the forward-backward algorithm. The Kullback-Leibler Divergence is used to verify the accuracy by comparing between the original and estimated state duration probability distribution with a score of 0.0573. Finally, physical experiment was performed to evaluate the proposed method.

Keywords

Hidden Semi-Markov Model, Bluetooth Low Energy, Received Signal Strength Indicator, Learning problem

iSAI-NLP-AIOT-440

The Evaluation of Interviewer's Presentation Styles for Interview Practice with a Communicative Robot

Mako Komatsu, Masato Takeuchi, Teruhiko Unoki, Mikifumi Shikida

School of Information Kochi University of Technology Kochi, Japan 255106r@gs.kochi-tech.ac.jp
School of Information Kochi University of Technology Kochi, Japan
College of Foreign Studies Kansai Gaidai University Osaka, Japan
School of Information Kochi University of Technology Kochi, Japan

Abstract

The impact of COVID-19 has led to the shift of job interviews online. There is now a return to face-to-face interviews in important situations, such as the final interview. However, it is still difficult to practice face-to-face interviews, and there is a growing need to practice face-to-face interviews alone or remotely. The problems with practicing interviews alone are that there is no listener in front of the practitioner, so the practitioner does not feel the nervousness about being watched and evaluated. In this paper, we aim to support these issues by using a small communication robot. We conduct experiments under six conditions: practicing alone, with a person face-to-face, with an autonomous robot, with a teleoperated robot, with an avatar remotely, and with a person remotely. Then we examine the influence of the practice style, such as the practitioner's nervousness. The results suggest that the most effective practice is possible when practicing with a person, regardless of whether it is face-to-face or remotely, but that the interview practice support with a small communicative robot is useful in the current social situation.

Keywords

communicative robot, interview, communication, practice support

iSAI-NLP-AIOT-2537

Visual-based Musical Data Representation fornComposer Classification

Somrudee Deepaisarn, Suphachok Buaruk, Sirawit Chokphantavee, Sorawit Chokphantavee, Phuriphan Prathipasen, Virach Sornlertlamvanich

Sirindhorn International Institute of Technology,Thammasat University Pathum Thani, Thailand somrudee@siit.tu.ac.th Corresponding Author
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand d6522300067@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand 6222782250@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand 6222782227@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand 6222780619@g.siit.tu.ac.th
Faculty of Engineering, Thammasat University Pathum Thani, Thailand Faculty of Data Science, Musashino University Tokyo, Japan virach@gmail.com

Abstract

Automated classification for musical genres and composers is an artificial intelligence research challenge insofar as music lacks a rigidly defined structure and may result in varied interpretations by individuals. This research collected acoustic features from a sizable musical database to create an image dataset for formulating a classification model. Each image was constructed by combining pitch, temporal index length, and additional incorporated features of velocity, onset, duration, and a combination of the three. Incorporated features underwent Sigmoid scaling, creating a novel visual-based music representation. A deep learning framework, fast.ai, was used as the primary classification instrument for generated images. The results were that using velocity solely as an incorporated feature provides optimal performance, with an F1-score of 0.85 using the ResNet34 model. These findings offer preliminary insight into composer classification for heightening understanding of music composer signature characterizations.

Keywords

Music, Data Representation, Composer, Deep Learning, Artificial Intelligence

iSAI-NLP-AIOT-2546

Sugarcane Classification for On-Site Assessment Using Computer Vision

Piyapoj Kasempakdeepong, Pittipol Kantavat, Prasertsak Pungprasertying

Pondsulee Ponchaiyapruek Pattamon Viriyothai Anuwat Songchumrong Onionshack Co., Ltd. piyapoj@onionshack.com
Pondsulee Ponchaiyapruek Pattamon Viriyothai Anuwat Songchumrong Onionshack Co., Ltd.
pondsulee@onionshack.com
Pondsulee Ponchaiyapruek Pattamon Viriyothai Anuwat Songchumrong Onionshack Co., Ltd.
pattamon@onionshack.com Pondsulee Ponchaiyapruek Pattamon Viriyothai Anuwat Songchumrong Onionshack Co., Ltd. anuwat@onionshack.com
Department of Computer Engineering Chulalongkorn University Bangkok, Thailand pittipol.k@chula.ac.th
Independent Researcher pprasertsak@gmail.com

Abstract

In this paper, we present a machine intelligent system that can automatically classify sugarcane images into predefined categories. This system is developed in order to facilitate the operation in sugar manufacturing factories and can be beneficial to the sugar industry as a whole. The software system consists of the core computer vision module and other compounds, such as user interfaces and database management. To develop the core module, we apply deep learning models based on convolutional neural networks, which are currently state-of-the-art models for computer vision. The best models trained and evaluated on our sugarcane datasets achieve more than 90% multi-class accuracy in almost all settings. We have incorporated the trained model into the prototype system and successfully installed the system to test operating at one of the major sugar manufacturing facilities in the previous sugarcane harvesting season.

Keywords

agricultural technology, agritech, agtech, sugar-cane, computer vision, convolutional neural networks

iSAI-NLP-AIOT-2782

Source Code Plagiarism Detection Based on Abstract Syntax Tree Finger printings

Vasin Suttichaya, Niracha Eakvorachai, Tunchanok Lurkraisit

Department of Computer Engineering Faculty of Engineering, Mahidol University 25/25 Salaya, Phuttamonthon, Nakhon Pathom, 73170 Thailand vasin.sut@mahidol.ac.th
Department of Computer Engineering Mahidol University International College 999 Salaya, Phuttamonthon, Nakhon Pathom, 73170 Thailand niracha.eak@student.mahidol.edu
Department of Computer Engineering Mahidol University International College 999 Salaya, Phuttamonthon, Nakhon Pathom, 73170 Thailand tunchanok.lur@student.mahidol.edu

Abstract
Abstract Syntax Tree (AST) is an abstract logical structure of source code represented as a tree. This research utilizes information of fingerprinting with AST to locate the similarities between source codes. The proposed method can detect plagiarism in source codes using the number of duplicated logical structures. The structural information of program is stored in the fingerprints format. Then, the fingerprints of source codes are compared to identify number of similar nodes. The final output is calculated from number of similar nodes known as similarities scores. The result shows that the proposed method accurately captures the common modification techniques from basic to advance.

Keywords
Source Code Similarities, Plagiarism Detection, MOSS, Abstract Syntax Tree, Fingerprinting

iSAI-NLP-AIOT-3341

Fault Prediction Model for Motor and Generative Adversarial Networks for Acceleration Signal Generation

Saran Deeluea, Chawalit Jeenanunta, Apinun Tunpun

School of Information, Computer, and Communication Technology Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand saran.deeluea@gmail.com
School of Management Technology Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand chawalit@siit.tu.ac.th
SMART Sense Industrial Design Co., Ltd, Bangkok, Thailand apinun@smartsensedesign.com

Abstract

The manufacturing process must continuously be improved. One of the most efficient strategies is maintenance scheduling by predictive maintenance for early fault detection and assisting with real-time decisions. The major concern of developing a predictive maintenance system is the lack of abnormal data and the cost of a highspecification sensor device for collecting data. This paper introduces the unsupervised learning model called Generative Adversarial Networks (GANs) for generating abnormal data in the form of acceleration signals to provide a dataset for developing an early fault prediction model and assisting a real-time decision on a low-frequency sensor device. The prediction model dataset is labeled on ISO10816 to classify the label of data by Velocity Vibration (mm/s). The machine learning classifier model implements a hyperparameters optimization framework called OPTUNA to provide the best model performance. The proposed system aims to assist in real-time decision and maintenance schedules for the injection molding machine and offer the prediction model based on low-frequency sensor data from a drive motor.

Keywords

generative adversarial network, acceleration signal, machine learning, OPTUNA

iSAI-NLP-AIOT-3460

ThaiTC:Thai Transformer-based Image Captioning

Teetouch Jaknamon and Sanparith Marukatat

School of Engineering King Mongkut's Institute of Technology Ladkrabang Bangkok, Thailand 65010478@kmitl.ac.th
Image Processing and Understanding Research Team, AI Research Group, NECTEC Pathum Thani, Thailand
sanparith.marukatat@nectec.or.th

Abstract

For problems with image captioning is a technique that has been used for a long time. In the past, there was a way to use convolutional neural network (CNN) for feature extraction and recurrent neural network (RNN) for generating text, and especially in Thai language, It has to be developed further in the era of the popular use of transformers. This paper proposes an end-to-end image captioning with pretrained vision Transformers (ViT) and text transformers in Thai language models namely ThaiTC, Which leverages the transformer architecture both. We has experiment pretrained vision transformer and text transformer in Thai language that best for Thai image captioning and tested on 3 Thai image captioning datasets 1) Travel 2) Food 3) Flickr30k(translate) with different challenges. Includes freeze vision transformers weight training for image captioning dataset training with less image features, From the experiment, We found that ThaiTC performed much better in the Food and Flickr30k datasets than the Travel datasets, Which allowed us to automatically create subtitles about food and travel.

Keywords

Thai image captioning, Thai caption generation, Thai image description, Food image captioning, Travel image captioning

iSAI-NLP-AIOT-4656

Smart Street Light Monitoring and Visualization Platform for Campus Management

Somrudee Deepaisarn, Paphana Yiwsiw, Chanon Tantiwattanapaibul, Suphachok Buaruk, Virach Sornlertlamvanich

Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand somrudee@siit.tu.ac.th Corresponding Author
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand 6222780379@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand chanon.tanti@gmail.com
Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand d6522300067@g.siit.tu.ac.th
Faculty of Engineering, Thammasat University Pathum Thani, Thailand Faculty of Data Science, Musashino University Tokyo, Japan virach@gmail.com

Abstract

As a recent trend in urbanization and intelligent technologies, smart lighting systems have been implemented in many major cities to support smart urban environments. This research developed a web application platform for data visualization and lighting device monitoring at Thammasat Uni-versity, Rangsit Campus, Thailand. This implementation provides administrative and operative staff with an all-in-one platform through a convenient interface for monitoring, controlling, and collecting data from area devices and sensors. Platform devel-opment was divided into two sections: back-end application, providing application programming interface (API) endpoints, and front-end application, offering an interface for interacting with on-campus staff. Finally, the web application was deployed on a cloud platform so that responsible persons may access it on any device and acquire data in real time. Given the platform's capabilities, further data analytics may be proposed for building a smarter lighting system.

Keywords

Smart City, Light, Data Visualization, Internet of Things (IoT), Web Application

iSAI-NLP-AIOT-4703

Synthetic face generation from in-the-wild face components swapping

Romrawin Chumpu, Pitchayagan Temniranrat, Sanparith Marukatat

Image Processing and Understanding Research Team, Artificial Intelligence Research Group,
National Electronics and Computer Technology Center Pathum Thani, Thailand romrawin.chu@ncr.nstda.or.th
Image Processing and Understanding Research Team, Artificial Intelligence Research Group,
National Electronics and Computer Technology Center Pathum Thani, Thailand pitchayagan.temniranrat@nectec.or.th
Image Processing and Understanding Research Team, Artificial Intelligence Research Group,
National Electronics and Computer Technology Center Pathum Thani, Thailand sanparith.marukatat@nectec.or.th

Abstract

Facial identification has recently been a legal concern for protecting one's identity and personal confidentiality. Many face synthesis techniques were used to safeguard individual users' data. This work presents a technique for generating synthetic faces from in-the-wild face components. The face components, such as the eyes, eyebrows, nose, and mouth, were extracted from a facial landmark of in-the-wild images and randomly replaced with the original image. Generative Adversarial Networks (GANs) for face restoration were then used to denoise the swapped image while preserving the original colorization. The experiments on face swapping with ten thousand of wild images demonstrate an average of 0.723 difference from the source image. The result shows that our face component swapping technique could be an effective lawful way to use facial data in the future.

Keywords

Face generation, Face component swapping, Face restoration

iSAI-NLP-AIOT-4813

Enhancing Thai Keyphrase Extraction Using Syntactic Relations: An Adoption of Universal Dependencies Framework

Chanatip Saetia, Supawat Taerungruang ,Tawunrat Chalothorn

Innovation Research and Development, Kasikorn Labs Kasikorn Business Technology Group Bangkok, Thailand chanatip.sae, tawunrat.c@kbtg.tech
Department of Thai, Faculty of Humanities Chiang Mai University Chiang Mai, Thailand supawat.t@cmu.ac.th
Innovation Research and Development, Kasikorn Labs Kasikorn Business Technology Group Bangkok, Thailand chanatip.sae, tawunrat.c@kbtg.tech

Abstract

Topical phrases representing the document and used in various fields are called keyphrases. Various methods are proposed to extract keyphrases automatically. However, most methods rely on candidate selection using linguistic heuristics in the English language. In this work for Thai keyphrases extraction, the candidate selection based on Universal Dependencies (UD) is proposed rather than using only POS sequence to make this step language independent. To enhance candidate selection, tree-based keyphrases extraction is also adapted to keep only logical candidates based on the cohesiveness index (CI). Besides that, the score filtering is proposed to combine linguistic heuristics, like stop words and the phrase's position. In the experiments, our method gained the double averaged F1 score of the state-of-the-art method, even though the UD was trained by only 1,781 EDUs and achieved 84% labeled attachment score. In addition, ablation studies on each factor in score filtering revealed which factor is important for keyphrase extraction.

Keywords

keyphrase extraction, universal dependencies (UD), Thai, syntactic relations

iSAI-NLP-AIOT-4909

Forex Price Movement Prediction Using Stacking Machine Learning Models

Thanapol Kurujitkosol, Akkharawoot Takhom, Sasiporn Usanavasin

Sirindhorn International Institute of Technology (SIIT) Thammasat University Pathum Thani, Thailand
m6422040037@g.siit.tu.ac.th
Language and Semantic Technology Research Team National Electronics and Computer Technology Center
Pathum Thani, Thailand akkharawoot.tak@ncr.nstda.or.th
Sirindhorn International Institute of Technology (SIIT) Thammasat University Pathum Thani, Thailand
sasiporn.us@siit.tu.ac.th

Abstract

Forex is an attractive choice for investors who admire any making profit challenges in the fluctuating market. But on the other hand, it means investors can lose money at the same time. Many investors look for ways to reduce the risks by finding price movement prediction tools. Therefore, this paper proposes the Stacking Machine Learning Models to predict the future price direction to help investors to decide and plan strategies. We experimented with comparing baseline models to evaluate the accuracy performance. In addition, we improve the accuracy performance using Technical Analysis and Fibonacci Retracements to gain an accuracy of 90%.

Keywords

Forex, Foreign Exchange, Machine Learning, Technical Analysis, Fibonacci Retracements

iSAI-NLP-AIOT-5291

Using the MQTT Broker as a Speech-Activated Medium to Control the Operation of Devices in the Smart Office

Khanista Namee, Rudsada Kaewsaeng-On, Jantima Polpinij, Ghadeer Mohsen Albadrani, Kavin Rueagraklikhit, Areej Meny

Faculty of Industrial Technology and Management King Mongkut's University of Technology North Bangkok Bangkok, Thaialnd Khanista.N@fitm.kmutnb.ac.th
Faculty of Humanities and Social Sciences Prince of Songkla University Songkla, Thailand rudsada.k@psu.ac.th
Intellect Laboratory, Department of Computer Science Faculty of Informatics Mahasarakham University Mahasarakham, Thailand Jantima.P@msu.ac.th
School of Science Princess Nourah Bint Abdulrahman University Riyadh, Saudi Arabia Gmalbadrani@pnu.edu.sa
Faculty of Industrial Technology and Management King Mongkut's University of Technology North Bangkok Bangkok, Thaialnd esred@gmail.com
Collage of Applied Medical Sciences King Saud bin Abdulaziz University for Health Sciences Jeddah, Saudi Arabia Menya@ksau-hs.edu.sa

Abstract

This research is applying the MQTT broker protocol as a medium for various work orders in smart office management. It is an experiment and development of all functions of MQTT broker whether publishing, chatting and subscribing both globally and locally. The results are able to perform all commands correctly. In addition, in this research, the command procedure was added. This is a human speech command to operate all MQTT Brokers functions. However, there are still some weaknesses in the matter of voice commands are delayed response. It might not be a very good user experience. In this experiment, many functions were woven into the smart office. Regardless of whether the bulb acts as an IoT bulb internally connected to the MQTT broker, the camera performs the function of recognizing a person's face which is internally connected to MQTT broker. Speech also serves voice commands, lamp and feedback are connected to MQTT broker. Air conditioner acts as IoT air conditioner switch externally connected to cloud server. In addition, dashboard It also acts as an IoT visual light switch that connects externally to the cloud.

Keywords

MQTT broker, Internet of Things, smart office, Edge computing

iSAI-NLP-AIOT-5310

The Effect of Beta-Carotene contain in The Pumpkin using IoT Technology in Polyhouse

Kanitha Homjun, Kasree Namkane, Sirilux Kaewsirirung,
Nongnuch Ketui, Worawit Fankam-ai

Department of Computer Science Faculty of Science and Aricultural Technology,
Rajamangala University of Technology Lanna, Nan Nan, Thailand kanithahomjun@rmutl.ac.th
Department of Science Faculty of Science and Aricultural Technology,
Rajamangala University of Technology Lanna, Nan Nan, Thailand namkane@rmutl.ac.th
Department of Computer Science Faculty of Science and Aricultural Technology,
Rajamangala University of Technology Lanna, Nan Nan, Thailand siriluxk@rmutl.ac.th
Department of Computer Science Faculty of Science and Aricultural Technology,
Rajamangala University of Technology Lanna, Nan Nan, Thailand nongnuchketui@rmutl.ac.th
Department of Computer Science Faculty of Science and Aricultural Technology,
Rajamangala University of Technology Lanna, Nan Nan, Thailand worawit@rmutl.ac.th

Abstract

Pumpkins contain a significant amount of beta-carotene.Beta-Carotene has numerous biological functions in the human body and because human is not able to synthesize any of them, it is necessary to supply these valuable compounds with food or pharmaceuticals. Internet of thing (IoT) in agriculture is not only reduce the man efforts but also improve the productivity and the efficiency. This research is primarily about the study of effect of beta-carotene in pumpkin between polyhouse and outdoor, because polyhouse is a closed structure protect the plants from weather conditions, insect and pest attacks. The irrigation in polyhouse using automatic drip irrigation, which operate according to the soil moisture threshold. Air temperature control using Fan based on temperature threshold. Analysis of beta carotene contain in pumpkin samples with polyhouse and outdoor process were determined by the samples were collected for three time periods found that the linear regression equation of the curve was y = 0.2111x-0.09161, with a coefficient r 2 = 0.9975. The result show that, plants growing in the green house most are higher than the outdoor.

Keywords

IoT, Smart Farm, Polyhouse, Automation, Internet of Thing, β-Carotene, pumpkin

iSAI-NLP-AIOT-5617

Anomaly Detection on Real-time Security Log using Stream Processing

Wasit Limprasert, Patcharapon Jantana, Avirut Liangsiri

College of Interdisciplinary Studies Thammasat University Pathum Thani, Thailand wasit@tu.ac.th
Patcharapon Jantana Storemesh Research Pathum Thani, Thailand patcharapon@storemesh.com
Bay Computing Nonthaburi, Thailand avirut@baycoms.com

Abstract

Many critical tasks such as document approval and banking services, which are now hosted on cloud infrastructure. This transformation introduces stress on cloud security from the physical layer of the data center to the application layer of web application. All data access and service access need to be monitored and responded to in real-time. In this paper, we study methods to detect anomaly incidents such as spikes from network volume, malicious incidents from API scanning, error messages from internal systems and timeout from Slowloris attack[1]. We select machine learning based anomaly detection algorithms, such as LOF, Isolation Forest and Elliptic Envelope, to find suitable methods to detect incidents in real-time using stream processing tools including Kafka and message ingression. The result shows that LOF is fast and robust in most of the cases. However, when log messages have unseen words, which normally need to be hashed to preprocess, the Isolation Forest shows better results. This study shows the possibility of applying stream processing with machine learning to detect anomaly behavior for cloud services.

Keywords

Anomaly Detection, Stream Processing, Security Log, Log Analysis

iSAI-NLP-AIOT-5659

Automatic Thai Text Summarization Using Keyword-Based Abstractive Method

Parun Ngamcharoen , Nuttapong Sanglerdsinlapachai, Pikul Vejjanugraha

National Electronics and Computer Technology Center National Science and Technology Development Agency Pathum Thani, Thailand parun.nga@ncr.nstda.or.th
National Electronics and Computer Technology Center National Science and Technology Development Agency Pathum Thani, Thailand nuttapong.sanglerdsinlapachai@nectec.or.th
Department of International College Thai-Nichi Institute of Technology Bangkok, Thailand pikul@tni.ac.th

Abstract

Traditionally, the training phase of abstractive text summarization involves inputting two sets of integer sequences; the first set representing the source text, and the second set representing words existing in the reference summary, into the encoder and decoder parts of the model, respectively. However, by using this method, the model tends to perform poorly if the source text includes words which are irrelevant or insignificant to the key ideas. In order to address this issue, we propose a new keywords-based method for abstractive summarization by combining the information provided by the source text and its keywords to generate summary. We utilize a bi-directional long short-term memory model for keyword labelling, using overlapping words between the source text and the reference summary as ground truth. The results obtained from our experiments on ThaiSum dataset show that our proposed method outperforms the traditional encoder-decoder model by 0.0425 on ROUGE-1 F1, 0.0301 on ROUGE-2 F1 and 0.0140 on BERTScore F1.

Keywords

Abstractive Text Summarization, Encoder-Decoder, Dual-Encoder, Natural Language Processing, Deep Learning

iSAI-NLP-AIOT-5787

Association of Serum Uric Acid and Lipid Parameters in Patients at Lamphun Hospital, Thailand

Jiraporn Gatedee, Kanokwan Jaiping, Sumana Kasemsawasdi, Aungsana Yothinarak, Janjuree Netsawang, Supanit Angsirikul, Rachasak Somyanonthanakul

Faculty of Medical Technology Rangsit University Pathum Thani, Thailand jiraporn.g@rsu.ac.th
Medical Laboratory Lamphun Hospital Lamphun, Thailand s157@hotmail.com
College of Digital Innovation Technology Rangsit University Pathum Thani, Thailand sumana.k@rsu.ac.th
Faculty of Medical Technology Rangsit University Pathum Thani, Thailand aungsana.y@rsu.ac.th
Faculty of Medical Technology Rangsit University Pathum Thani, Thailand janjuree.n@rsu.ac.th
College of Digital Innovation Technology Rangsit University Pathum Thani, Thailand supanit.a@rsu.ac.th
College of Digital Innovation Technology Rangsit University Pathum Thani, Thailand ratchasak.s@rsu.ac.th

Abstract

Dyslipidemia leads to cardiovascular disease with several complications which include sudden cardiac death, acute myocardial infarction, and strokes. The primary evaluation tool for dyslipidemia is a fasting lipid panel which consists of total cholesterol (TC), (LDL-C), (HDL-C), and triglycerides (TG). However, the relationship between a fasting lipid panel and elevated uric acid has not been comprehensively investigated. This work investigates the relationship between serum uric acid (SUA) and a fasting lipid panel in the elderly patients in Thailand. A rule-based machine learning technique called association rule mining was used to define patterns in the rules discovered. The results showed a significant positive relationship for SUA with TG, TC and LDL levels, and an inverse relationship for SUA with HDL. Early prevention of hyperuricemia and dyslipidemia may be helpful to reduce the incidence of associated cardiovascular diseases.

Keywords

association rule mining, clinical chemistry, dys-lipidemia, interestingness measure, lipid profile, ser

iSAI-NLP-AIOT-5907

Factors Affecting Purchase Intention to Coffee Shop

Prapavarin Burananananont, Aussadavut Dumrongsiri, Pisit Chanvarasuth, Pornpimol Chongphaisal

School of Management Technology, Sirindhorn International Institute of Technology, Thammasat University Pathum Thani 12121, Thailand m6322040285@g.siit.tu.ac.th
School of Management Technology, Sirindhorn International Institute of Technology, Thammasat University Pathum Thani 12121, Thailand aussadavut@siit.tu.ac.th
School of Management Technology, Sirindhorn International Institute of Technology, Thammasat University Pathum Thani 12121, Thailand pisit@siit.tu.ac.th
International College, Panyapiwat Institute of Management Nonthaburi 11120, Thailand c.pornpimol@gmail.com

Abstract

In Thailand, the coffee shop business grows continuously. A coffee shop is where coffee is served as the primary beverage with food, and other drinks are only available as sub-component. The coffee shop can be described as a third place besides the working place and home where people go to meet, relax, and socialize with others. This research aims to study the factors that affect consumers' purchase intention in the coffee shop. The sample group of the study was 385 respondents. The data was collected through an online questionnaire survey given. This research was analyzed using a multiple regression method with the IBM SPSS Statistics (Statistical Package for the Social Science) version 26 to collect the data to produce the statistical analysis result. More importantly, this research has value for the organizations that want to maintain consumers for their coffee shops with a better understanding.

Keywords

coffee shop, coffee shop in Thailand purchase intention, marketing mix, healthiness, hygiene

iSAI-NLP-AIOT-6127

Simulation of Homogenous Fish Schools in the Presence of Food and Predators using Reinforcement Learning

Ravipas Wangananont, Norapat Buppodom,
Sanpat Chanthanuraks, Vishnu Kotrajaras

International School of Engineering Chulalongkorn University Bangkok, Thailand wangananontr@gmail.com
International School of Engineering Chulalongkorn University Bangkok, Thailand new17353@gmail.com
International School of Engineering Chulalongkorn University Bangkok, Thailand sanpatchanthanuraks@gmail.com
Department of Computer Engineering Chulalongkorn University Bangkok, Thailand vishnu@cp.eng.chula.ac.th

Abstract

We utilized Deep Reinforcement Learning to incur-porate schooling, foraging, and predator avoidance behaviors into a single fish behavior model. We used Proximal Policy Optimization (PPO) with Intrinsic Curiosity Reward (ICR) to make fish agents learn in our Unity Environment. We created an interactive control system on Unity that allows users to visualize and manipulate the simulation using only a mouse and keyboard. We compared our model with three variations: one without schooling reward, one without foraging reward, and one without predator avoidance reward. Our original model (schooling, foraging, and predator avoidance) clearly illustrated the unification of all three behaviors.

Keywords

deep reinforcement learning, fish school, forag-ing, predator avoidance

iSAI-NLP-AIOT-6474

Portfolio Optimization and Rebalancing with Transaction Cost: A Case Study in the Stock Exchange of Thailand

Apichat Chaweewanchon, Rujira Chaysiri

School of Management Technology Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand apchaweewanchon@gmail.com
School of Management Technology Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand rchaysiri@siit.tu.ac.th

Abstract

Portfolio optimization is one of the most intriguing topics in the field of finance. The purpose is to maximize return while minimizing risk. In this paper, we investigate the experimental performance of the classical Markowitz portfolio optimization with and without rebalancing based on the minimum risk in terms of portfolio return, portfolio risk, and Sharpe ratio, and compare the results to the experiments with transaction cost. The importance of this work stems from the fact that, while the MV model is extensively utilized, its use in the Thai stock market is limited. This analysis uses the historical close prices of 50 stocks from the Stock Exchange of Thailand 50 Index (SET50) between January 2018 and December 2021. The experiment showed that a portfolio with a rebalancing approach outperforms a portfolio without a rebalancing strategy.

Keywords

portfolio optimization, mean-variance, optimization, asset allocation, portfolio analysis.

iSAI-NLP-AIOT-6600

Improving Neural Machine Translation for Low-resource English-Myanmar-Thai Language Pairs with SwitchOut Data Augmentation Algorithm

Mya Ei San, Ye Kyaw Thu, Thepchai Supnithi, Sasiporn Usanavasin

TAIST Tokyo Tech, AIoT Program Sirindhorn International Institute of Technology,
Thammasat University, Pathum Thani, Thailand m6322040889@g.siit.tu.ac.th
National Electronics and Computer Technology Center, National Science and Technology Development Agency,
Pathum Thani, Thailand yktnlp@gmail.com
National Electronics and Computer Technology Center, National Science and Technology Development Agency,
Pathum Thani, Thailand thepchai.supnithi@nectec.or.th
School of Information, Computer and Communication Technology, Sirindhorn International Institute of Technology,
Thammasat University, Pathum Thani, Thailand sasiporn.us@siit.tu.ac.th

Abstract

To improve the data resource of low-resource English-Myanmar-Thai language pairs, we build the first parallel medical corpus, named as En-My-Th medical corpus which is composed of total 14,592 parallel sentences. In our paper, we make experiments on the English-Myanmar language pair of new En-My-Th medical corpus and in addition, English-Thai and Thai-Myanmar language pairs from the existing ASEANMT corpus. The experiments of SwitchOut data augmentation algorithm and the baseline attention-based sequence to sequence model are trained on the aforementioned language pairs in both directions. Experimental results show that combination of SwitchOut algorithm with the baseline model outperforms the baseline only model in the translation of most language pairs for both corpora. Furthermore, we investigate the performance of the baseline model and baseline+SwitchOut model by adding or removing word dropout at the recurrent layers, at which baseline+SwitchOut model with the dropout increases around (+1.0) BLEU4 and GLEU scores in some of language pairs.

Keywords

SwitchOut, Data Augmentation, Neural Ma-chine Translation, Low-resourc

iSAI-NLP-AIOT-6607

Factors Affecting Acceptance of Dental Appointment Application among Users in Bangkok and Metropolitan Area

Kasidit Eiam-o-pas, Nuchjarin Intalar, Chawalit Jeenanunta

Business Innovation, Master of Business Administration, Thammasat University Pathumthani, Thailand kasidit_fighter@hotmail.com
Department of Computer Science, Faculty of Science and Technology, Thammasat University Pathumthani, Thailand njrin@tu.ac.th
School of Management Technology, Sirindhorn International Institute of Technology, Thammasat University Pathumthani, Thailand chawalit@siit.tu.ac.th

Abstract

This paper examines the main factors affecting dental-related users' acceptance of dental appointment technology as a means for receiving dental appointment services. A questionnaire was developed based on the Technology Acceptance Model (TAM) and incorporated perceived useful features to understand user characteristics, acceptance, and usage behavior of a dental appointment application. A proposed research model and hypotheses were tested with a sample of 555 customers of a dental clinic in Bangkok and Metropolitan area using descriptive analysis, factor analysis, and multiple regression. The findings show that perceived ease of use, perceived usefulness and perceived value have significant effects on the acceptance of a dental appointment application. However, the application feature has no direct effect on the intention to use. Results can be used as a reference to develop dental appointment services that align with the needs of the users.

Keywords

dental appointment service, e-Health, technology acceptance model I

iSAI-NLP-AIOT-6635

RAS-E2E: The SincNet end-to-end with RawNet loss for text-independent speaker verification

Pantid Chantangphol, Theerat Sakdejayont, Tawunrat Chalothorn

Kasikorn Labs Kasikorn Business–Technology Group Nontaburi, Thailand Pantid.c@kbtg.tech
Kasikorn Labs Kasikorn Business–Technology Group Nontaburi, Thailand theerat.s@kbtg.tech
Kasikorn Labs Kasikorn Business–Technology Group Nontaburi, Thailand Tawunrat.c@kbtg.tech

Abstract

Despite reaching satisfactory verification perfor-mance, variousness utterance duration and phonemes and the robustness of the system remain a challenge in speaker ver-ification tasks. To deal with this challenge, we propose RAS-E2E, a novel fully cross-lingual speaker verification system that discovers meaningful information from input raw waveforms of various duration utterances, including short utterance duration, to determine whether an utterance matches the target speaker by merging two powerful paradigms: SincNet and Rawnet training scheme with Bi-RNN. The conducted experiments on Voxceleb, Gowajee and internal call-center datasets demonstrate that RAS-E2E achieves better performance compared to the recent verification systems on waveforms.

Keywords

speaker verification, text-independent, raw waveform, end-to-end loss, cross-lingual trials

iSAI-NLP-AIOT-6707

A Comparative Study of Noise Augmentation and Deep Learning Methods on Raman Spectral Classification of Contamination in Hard Disk Drive

Sarun Gulyanona, Somrudee Deepaisarn, Chayud Srisumarnk, Nattapol Chiewnawintawat , Angkoon Angkoonsawaengsuk, Seksan Laitrakun, Pakorn Opaprakasitb, Pornchai Rakpongsiri, Thawanpat Meechamnan, Duangporn Sompongse

College of Interdisciplinary Studies, Thammasat University, Pathum Thani, Thailand sarung@tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University, Pathum Thani, Thailand somrudee@siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University, Pathum Thani, Thailand 222781922@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University, Pathum Thani, Thailand 6222781922@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University, Pathum Thani, Thailand 6222771725@g.siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University, Pathum Thani, Thailand seksan@siit.tu.ac.th
Sirindhorn International Institute of Technology, Thammasat University, Pathum Thani, Thailand pakorn@siit.tu.ac.th
Western Digital Storage Technologies (Thailand) Ltd., Ayutthaya, Thailand Pornchai.Rakpongsiri@wdc.com
Western Digital Storage Technologies (Thailand) Ltd., Ayutthaya, Thailand hawanpat.Meechamnan@wdc.com
Western Digital Storage Technologies (Thailand) Ltd., Ayutthaya, Thailand Duangporn.Sompongse@wdc.com

Abstract
Deep neural networks have become state-of-the-art for many tasks in the past decade, especially Raman spectral classification. However, these networks heavily rely on a large collection of labeled data to avoid overfitting. Although labeled data is scarce in many application domains, there are techniques to help alleviate the problem, such as data augmentation. In this paper, we investigate one particular kind of data augmentation, noise augmentation that simply adds noise to input samples, for the Raman spectra classification task. Raman spectra yield fingerprint-like information about all chemical components but are prone to noise when the material's particles are small. We study the effectiveness of three noise models for noise augmentation in building a robust classification model, including noise from the background chemicals, extended multiplicative signal augmentation (EMSA), and statistical noises. In the experiments, we compared the performance of 11 popular deep learning models with the three noise augmentation techniques. The results suggest that RNN-based models perform relatively well with the increase in augmented data size compared to CNN-based models and that robust noise augmentation methods require characteristics of random variations. However, hyperparameter optimization is crucial for taking optimal advantage of noise augmentation.

Keywords
Raman spectroscopy, Deep learning, Data augmentation, Noise models, Spectral classification

iSAI-NLP-AIOT-7286

Enhancing Response Relevance and Emotional Consistency for Dialogue Response Generation

Mengmeng Gong, Hui Song, Haoran Zhou, Bo Xu

School of Computer Science and Technology, Donghua University Shanghai, China 2202441@mail.dhu.edu.cn
School of Computer Science and Technology, Donghua University Shanghai, China songhui@mail.dhu.edu.cn
Haoran Zhou School of Computer Science and Technology, Donghua University Shanghai, China
2202423@mail.dhu.edu.cn
School of Computer Science and Technology, Donghua University Shanghai, China xubo@mail.dhu.edu.cn

Abstract

VAE (Variational Autoencoder) and CVAE (Conditional VAE) encode the sentence with the latent variable to generate response in Dialogue. However, studies have shown that the latent variables obtained are more inclined to remember the first words and the length of the sentence, and only represents limited local features. In order to alleviate this problem, we propose to involve contrastive learning to generate positive and negative samples for training process, which enriches the latent variables representation with the global information of sentence and generates more relevant response. On the other hand, those generative models do not consider emotional information of dialogue, a sentiment discrimination module is introduced in our model to maintain the emotional consistency. Experiments on two public datasets - DailyDialog and PERSONA-CHAT demonstrate the effectiveness of our method, the evaluation results of BLEU and Rouge are both improved. The sentiment discrimination network also forces the model to generating emotional consistency response with share embedding.

Keywords

Response Generation, CVAE, Contrastive Learning, Emotional Consistency

iSAI-NLP-AIOT-9147

Long-Term Energy Demand Forecasting in Thailand with Ensemble Prediction Model

Isariyanatre Chatunapalak, Assoc. Prof. Dr. Waree Kongprawechnon, Dr. Jasada Kudtongngam

Sirindhorm International Institute of Technology Thammasat University Pathum Thani, Thailand isariyanatrec@gmail.com
Sirindhorm International Institute of Technology Thammasat University Pathum Thani, Thailand waree@siit.tu.ac.th
National Electronics and Computer Technology Center (NECTEC) National Science and Technology Development Agency, Ministry of Higher Education, Science, Research and Innovation Pathum Thani, Thailand jasada.kudtongngam@nectec.or.th

Abstract

This research has proposed to utilize the combination of Machine Learning models (ML models) to optimally forecast the energy demand in Thailand. The various ML models are explored in which the individual and the combination of ML models are each optimized and evaluated for their best achievable performances. Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE) are utilized to compare models' performances. A total of 4 ML models are executed, which include Artificial Neural Network (ANN), Decision Tree (DT), Random Forest (RF) Ensemble and proposed Vote Ensemble models. The results show that, by means of ensemble or model combination, the Vote Ensemble model could perform well with the lowest RMSE for training and testing of 613.63 and 666.52 and the lowest MAPE of 3.59% accordingly while also using less execution time of 3 minutes and 56 seconds.

Keywords

Ensemble Learning, LTLF, Forecasting, Energy Demand, Machine Learning

iSAI-NLP-AIOT-9218

Spherical Fuzzy AHP-VIKOR Model Application in Solar Energy Location Selection Problem: A Case Study in Vietnam

Viet Tinh Nguyen, Rujira Chaysiri

School of Management Technology Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand d6522300034@g.siit.tu.ac.th
School of Management Technology Sirindhorn International Institute of Technology, Thammasat University Pathum Thani, Thailand rchaysiri@siit.tu.ac.th

Abstract

In the last decade, the threat of climate change and energy insecurity has put pressure on governments to search for alternatives energy sources to replace fossil fuels. As such, when more and more renewable energy projects have been developed, the number of related decision-making problems also increase. For solar energy projects, location selection is one of the most important and complex decision-making problems which involve both quantitative and qualitative criteria. This study aims to introduce a Spherical Fuzzy based MCDM model, utilizing Analytic Hierarchy Process (AHP) and Višekriterijumsko kompromisno rangiranje (VIKOR) methods. The proposed model is applied to case study in Vietnam to demonstrate its feasibility. The results suggests that, among the eights potential locations, Soc Trang (SP06) is the optimal location.

Keywords

MCDM, Spherical Fuzzy, AHP, VIKOR, Solar energy.

iSAI-NLP-AIOT-9292

Product and Industrial Classification Code Suggestion System for Thai Language

Rungkarn Siricharoenchai, Panchapawn Chatsuwan, Paramet Tanwanont, Sarunruk Janbradab, Navaporn Surasvadi, Suttipong Thajchayapong

Product and Industrial Classification Code Suggestion System for Thai Language rungkarn@nectec.or.th
Product and Industrial Classification Code Suggestion System for Thai Language panchapawn.cha@nectec.or.th
Product and Industrial Classification Code Suggestion System for Thai Language paramet.tanwanont@nectec.or.th
Product and Industrial Classification Code Suggestion System for Thai Language sarunruk.jan@nectec.or.th
Product and Industrial Classification Code Suggestion System for Thai Language navaporn.surasvadi@nectec.or.th
Product and Industrial Classification Code Suggestion System for Thai Language suttipong.thajchayapong@nectec.or.th

Abstract

In this work, a system is created to suggest product/ service code and industrial classification code for Thai language. The system can suggest UNSPSC and TSIC codes relevant to query terms via indexing search. Techniques used in this work are based on knowledge of text processing and text similarity, as well as indexing. Through a complexity analysis, the system has been proved efficient as it can retrieve data about 1,000 times faster than traditional methods. Furthermore, Mean Reciprocal Rank (MRR) was employed to evaluate the search results of 1,000 products and services. The results showed that the proposed system achieved the MRR of 0.46, indicating the relevant search result is approximately in the second or third rank. Currently, the proposed system has been implemented as a part of SMEs registration process in the OSMEP website to support Thai SMEs to access government procurement.

Keywords

suggestion system, indexing search, Elastic-search, N-gram, UNSPSC, TSIC

iSAI-NLP-AIOT-9332

ThEconSum: an Economics-domained Dataset for Thai Text Summarization and Baseline Models

Sawittree Jumpathong, Akkharawoot Takhom, Prachya Boonkwan, Vipas Sutantayawalee, Peerachet Porkaew, Sitthaa Phaholphinyo,Charun Phrombut, Thepchai Supnithi, Khemarath Choke-mangmi, Saran Yamasathien, Nattachai Tretasayuth, Kasidis Kanwatchara, Atiwat Aiemleuk

Language and Semantic Technology Laboratory National Electronics and Computer Technology Center (NECTEC), Pathumthani, Thailand sawittree.jumpathong@nectec.or.th
Language and Semantic Technology Laboratory National Electronics and Computer Technology Center (NECTEC), Pathumthani, Thailand akkharawoot.tak@ncr.nstda.or.th
Language and Semantic Technology Laboratory National Electronics and Computer Technology Center (NECTEC), Pathumthani, Thailand prachya.boonkwan@nectec.or.th
Language and Semantic Technology Laboratory National Electronics and Computer Technology Center (NECTEC), Pathumthani, Thailand thepchai.supnithi@nectec.or.th

Abstract

Language resources as datasets are an essential component in developing an effective automatic text summarization (ATS) system. Some public datasets are relatively uncommon when compared with popular languages, due to the complexity of language preprocessing resulting in a labor-intensive annotation by linguists. ATS techniques are to condense the size of text into a shorter output and reduce the time for finding the information from the huge textual data. This paper presents the Thai ATS construction with Economicsdomain data, called ThEconSum, which manifests some linguistic challenges for Thai summarization. Existing public public datasets were employed for developing the ATS system in Thai economic news articles.

Keywords

Automatic Text Summarization, Neutral Language Processing, Abstractive Text Summarization, Public Dataset

iSAI-NLP-AIOT-9510

Graph-based Dependency Parser Building for Myanmar Language

Zar Zar Hlaing, Ye Kyaw Thu, Thepchai Supnithi, Ponrudee Netisopakul

School of Information Technology King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand zarzarhlaing.it@gmail.com
National Electronics and Computer Technology Center, NECTEC Pathum Thani, Thailand yktnlp@gmail.com
National Electronics and Computer Technology Center, NECTEC Pathum Thani, Thailand thepchai.supnithi@nectec.or.th
School of Information Technology King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand ponrudee@it.kmitl.ac.th

Abstract

Examining the relationships between words in a sentence to determine its grammatical structure is known as dependency parsing (DP). Based on this, a sentence is broken down into several components. The process is based on the concept that every linguistic component of a sentence has a direct relationship to one another. These relationships are called depen-dencies. Dependency parsing is one of the key steps in natural language processing (NLP) for several text mining approaches. As the dominant formalism for dependency parsing in recent years, Universal Dependencies (UD) have emerged. The various UD corpus and dependency parsers are publicly accessible for resource-rich languages. However, there are no publicly available resources for dependency parsing, especially for the low-resource language, Myanmar. Thus, we manually extended the existing small Myanmar UD corpus (i.e., myPOS UD corpus) as myPOS version 3.0 UD corpus to publish the extended Myanmar UD corpus as the publicly available resource. To evaluate the effects of the extended UD corpus versus the original UD corpus, we utilized the graph-based neural dependency parsing models, namely, jPTDP (joint POS tagging and dependency parsing) and UniParse (universal graph-based parsing), and the evaluation scores are measured in terms of unlabeled and labeled attachment scores: (UAS) and (LAS). We compared the accuracies of graph-based neural models based on the original and extended UD corpora. The experimental results showed that, compared to the original myPOS UD corpus, the extended myPOS version 3.0 UD corpus enhanced the accuracy of dependency parsing models.

Keywords

universal dependency, dependency parsing, neu-ral network, Myanmar language

iSAI-NLP-AIOT-9673

An Analysis of Acoustic Features for Attention Score in Thai MoCA Assessment

Wirot Treemongkolchok, Proadpran Punyabukkana,
Dittaya Wanvarie, Ploy N. Pratanwanich

Department of Computer Engineering Faculty of Engineering Chulalongkorn University Bangkok, Thailand
wirotpop.t@gmail.com
Department of Computer Engineering Faculty of Engineering Chulalongkorn University Bangkok, Thailand
proadpran.p@chula.ac.th
Department of Mathematics and Computer Science Faculty of Science Chulalongkorn University Bangkok, Thailand
Dittaya.W@chula.ac.th
Department of Mathematics and Computer Science Faculty of Science Chulalongkorn University Bangkok, Thailand
naruemon.p@chula.ac.th

Abstract

Screening tests like the Montreal Cognitive Assessment (MoCA) can help diagnose mild cognitive impairment (MCI). MoCA comprises subtests that span various cognitive domains. Numerous researchers attempt to detect MCI by employing speech-related features such as acoustic, linguistic, and prosodic features. However, the features can distinguish patients with MCI from healthy people but do not describe each patient's specific cognitive domain impairment. This study focuses on Digit Backward Span (DBS) and Digit Forward Span (DFS), subtests related to the cognitive attention domain in MoCA. We develop a model and identify the most relevant speech features for the domain from a recorded voice from these subtests in the Thai MoCA. We rank features by their importance and found that using a subset of important features has higher predictive power than using the entire feature set in impairment in the attention domain. The most important features in both tests are the median duration of voice and the duration of voice.

Keywords

MoCA, mild cognitive impairment, feature importance, attention domain, classification

iSAI-NLP-AIOT-9722

Development of Internet of Things System for Environment Control in Niam Hom (Strobilanthes nivea Craib) House

Sancha Panpaeng, Natawut Payakkhin, Pipop Maneejamnong

Information and Communication Technology Maehongson College, Chiangmai Rajabhat University Maehongson, Thailand Email: sancha@g.cmru.ac.th
Maejo University Phrae Campus, Maejo University Phare, Thailand Email: nattapong@mju.ac.th
Nan College, Uttaradit Rajabhat University Nan, Thailand Email: pipopmanee@uru.ac.th

Abstract

This research aims to 1) Study the use of IoT technology to measure soil moisture and air humidity and control water spraying and brightness values in Niam Hom Houses, and 2) Develop systems and tools for users to monitor and record the house's temperature, soil moisture, air humidity, and brightness values. The development tool uses Arduino MEGA and NodeMCU ESP8266 to connect the sensors to obtain data from a specific environment. Design and control the measurement circuit system in the farmhouse with a size of 4 x 6 meters using black shading nets of 50% and 70%. The IoT system helps to control soil moisture, and the air humidity is good, making onion trees grow well. Good yield and different physiology in black shading net 50% in combination with chemical fertilizer application.

Keywords

Internet of Things, Niam Hom, NodeMCU, Control system, Temperature, Humidity

iSAI-NLP-AIOT-9823

Image Captioning for Thai Cultures

Sarin Watcharabutsarakham, Sanparith Marukatat,
Kantip Kiratiratanapruk, Pitchayagan Temniranrat

Artificial Intelligence Research GroupNational Electronics and Computer Technology Center Thailand Science Park, Pathum Thani, Thailand sarin.watcharabutsarakham@nectec.or.th
Artificial Intelligence Research GroupNational Electronics and Computer Technology Center Thailand Science Park, Pathum Thani, Thailand sanparith.marukatat@nectec.or.th
Artificial Intelligence Research GroupNational Electronics and Computer Technology Center Thailand Science Park, Pathum Thani, Thailand kiratiratanapruk@nectec.or.th
Artificial Intelligence Research GroupNational Electronics and Computer Technology Center Thailand Science Park, Pathum Thani, Thailand pitchayagan.temniranrat@nectec.or.th

Abstract

Before each trip, tourists generally gather information or photos from different places. This work aims at providing additional information about touristic sites in Thailand via automatic image captioning. Image captioning is the process of generating a textual description for given images. In recent years, the development of Artificial Intelligence in combining image processing and natural language processing has gained attention worldwide. Image captioning can be regarded as a sequence-to-sequence modeling problem, as it converts images, which are considered a sequence of pixels, to a sequence of words. This work proposed a finetuned model that combined CNNs and LSTM to generate the image description. In the experiment part, we use BLEU to evaluate the model.

Keywords

image caption, RNNs, LSTM, BLEU,Greedy

iSAI-NLP-AIOT-9930

Question Answering over Knowledge Graphs for Thai Retail Banking Products

Wirit Khongcharoen, Chanatip Saetia, Tawunrat Chalothorn, Pakpoom Buabthong

Kasikorn Labs Kasikorn Business-Technology Group Bangkok, Thailand o wirit.k@kbtg.tech
Kasikorn Labs Kasikorn Business-Technology Group Bangkok, Thailand chanatip.s@kbtg.tech
Kasikorn Labs Kasikorn Business-Technology Group Bangkok, Thailand tawunrat.c@kbtg.tech
Faculty of Science and Technology Nakhon Ratchasima Rajabhat University Nakhon Ratchasima, Thailand
pakpoom.b@nrru.ac.th

Abstract

Question Answering over Knowledge Graphs (KGQA) extracts the answer entity directly from the graph, given a natural language question, offering scalability to applications that need to readily provide information to the end users, such as chatbots. Nevertheless, KGQA specifically designed for Knowledge Graphs in Thai has not yet been well investigated. In this paper, we adapt multi-hop KGQA using Graph Embedding to handle Thai dataset while being able to extract answer entities that do not have explicit relation to the head node. We also construct a Thai Knowledge Graph with the ontology based on retail banking products. The model achieves a HITS@1 score of 80.8 on our annotated dataset. The results confirm that, aside from reaching multi-hop answers, using Graph Embedding in KGQA helps improve the overall score, especially in sparse Knowledge Graphs. Moreover, augmenting the training questions to include more entities in the graph can further help increase the performance.

Keywords

knowledge graph question-answering, graph embedding, multi-hop KGQA, KGQA, banking products

iSAI-NLP-AIOT-9958

Shrimp-growth Estimation Based on ResNeXt for an Automatic Feeding-tray Lifting System Used in Shrimp Farming

Chanon Nontarit, Toshiaki Kondo, Warakorn Khamkaew,
Jaroenmit Woradet, Jessada Karnjana

Sirindhorn International Institute of Technology Thammasat University Pathum Thani, Thailand 0000-0002-5517-2761
Sirindhorn International Institute of Technology Thammasat University Pathum Thani, Thailand tkondo@siit.tu.ac.th
National Electronics and Computer Technology Center National Science and Technology Development Agency Pathum Thani, Thailand 0000-0002-3925-6156
National Electronics and Computer Technology Center National Science and Technology Development Agency Pathum Thani, Thailand 0000-0001-8110-5848
National Electronics and Computer Technology Center National Science and Technology Development Agency Pathum Thani, Thailand 0000-0001-9168-0096

Abstract

The shrimp agriculturists monitor shrimp growth by observing the size of shrimps in the feeding tray with the naked eye. This approach is time-consuming and needs experienced workers. This study proposes an automatic approach for estimate-ing shrimp size using images. A mask region-based convolutional neural network with ResNeXt was trained to detect shrimps in an image. The detection model achieved an overall precision of 74.45%, recall of 72.20%, F1 score of 73.31%, and AP of 69.04%. The two unique methods were proposed for estimating shrimp size. The first method achieved a mean absolute error of 0.30 cm and a mean absolute percentage error of 3.97%. The second method achieved a mean absolute error of 0.35 cm and a mean absolute percentage error of 4.59%. The proposed system achieved an automatic shrimp size estimation from the image and provided helpful information for agriculturists.

Keywords

shrimp farming, shrimp-growth monitoring, Mask R-CNN, ResNeXt, object detection

iSAI-NLP-AIoT-ICCT

November 5 - 7 2022
Chiang Mai, Thailand

ICCT2022

ICCT2022- Oral-1A.1

Firewall Logs Classification Based on Ensemble Voting using Sequential Feature Selection Method

Qazi Waqas Khan, Rashid Ahmad, Atif Rizwan,
Anam Nawaz Khan, DoHyeun Kim

Department of Computer Engineering, Jeju National University, Korea, waqasqazi19@stu.jejunu.ac.k
Department of Computer Engineering, Jeju National University, Korea, rashid.ahmad@ciit-attock.edu.pk
Department of Computer Engineering, Jeju National University, Korea, atifrizwan@jejunu.ac.kr
Department of Computer Engineering, Jeju National University, Korea, anamnawaz@jejunu.ac.kr
Department of Computer Engineering, Advanced Technology Research Institute, Jeju National University, Korea, kimdh@jejunu.ac.kr

Abstract

The importance of analyzing firewall logs and regulating network traffic based on end-user behavior cannot be overstated. It aids in enhancing network security and reducing network overhead in order to take essential actions on network user traffic. Using Machine Learning approaches, patterns are analyzed and the appropriate actions are taken based on the input patterns. This study conducted experiments using a publicly available dataset of Firewall log files. Sequential Feature Selection (SFS) is employed to choose pertinent characteristics. To resample minority classes, the Synthetic Minority Oversampling Technique is utilized. Gradient Boosting, Support Vector Machine, and Adaboost classifiers are implemented and compared to our proposed weighted voting ensemble classifier to accurately classify firewall log files.

Keywords

Firewall, log file analysis, Machine Learning, SFS, SMOTE, Ensemble Learning

ICCT2022- Oral-1A.2

Network Slicing: Enabling Technologies and Solutions for 5G-Advanced Use-cases

Muhammad Ashar Tariq, Mahnoor Ajmal, Dongkyun Kim

School of Computer Science and Engineering, Kyungpook National University, Korea, tariqashar@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, mahnoor.ajmal@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, dongkyun@knu.ac.kr

Abstract

The increasing number of smart mobile devices and the advanced use cases nowadays have strict requirements in terms of Quality-of-Service (QoS). The traditional networking architectures were insufficient to fulfil these service requirements. Therefore, the 5G Service Based Architecture (SBA) played a revolutionary role and enhanced the mobile networks by introducing the service-oriented approach. Network Slicing was an inevitable product of service-oriented approach which led to the fulfillment of stringent service demands by using the concept of virtualization and softwarization. In this manuscript, we discuss the concept of network slicing in 5G diving deep into the standard architecture. We further entail some key enabling technologies for network slicing. Finally, we discuss the future of network slicing for 5G-Advanced use cases by presenting some machine learning based solutions.

Keywords

5G, 5G-Advanced, Network Slicing, Network Softwarization, Orchestration, Network management, NFV, SDN, MANO, Mobile Networks, AI.

ICCT2022- Oral-1A.3

Smart Farm enabled with WiFi & LoRa based Multi-interface

Malik Muhammad Saad, Junho Seo, Muhammad Ashar Tariq,
Ayesha Siddiqa Boomi Jeong, Jaeyoung Kim, Dongkyun Kim

School of Computer Science and Engineering, Kyungpook National University, Korea, maliksaad@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, tariqashar@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, asiddiqa@knu.ac.kr
Electronics and Telecommunications research Institute (ETRI), Korea
School of Computer Science and Engineering, Kyungpook National University, Republic of Korea dongkyun@knu.ac.kr

Abstract

The tremendous growth in internet-of-things (IoT) technology has opened gateways to various applications in health, agriculture, industrial and automation sectors. IoT brings ease and comfort to our lives. In industries utilizing IoT technology, we can control machines and robots remotely. Similarly, in agricultural domain the crops could be monitor remotely and proactive measures could be taken for the optimal growth of the crops. In this paper, we proposed the smart farm architecture enabled with multiple interfaces. In this work, we designed the gateway enabled with both LoRa and WiFi interfaces. WiFi technology could be utilized for sending video data whereas LoRa technology could be used for low data rate transmission while consuming low power. Moreover, we proposed the adhoc macro network and the sensors data is stored over the local database. The nodes are configured with two-way communication protocol. The control commands could be send from the server to turn the actuators on/off to obtain the optimal temperature for the farm.

Keywords

Smart Farm, IoT, WiFi, LoRa, Gateways

ICCT2022- Oral-1A.4

Dynamic selection of child nodes for constrained Wi-SUN

Sungwon Lee, Sunghyun Kim, Donghyun Jeon, Dongkyun Kim

Department of Computer Engineering, Daegu Haany University, Korea, lsw5359@dhu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, sunghyunkim@knu.ac.kr
Faculty of Medical Industry Convergence, Daegu Haany University, Korea, jdh0830@dhu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, dongkyun@knu.ac.kr

Abstract

According to the development of the IoT market, research on smart cities and smart grids aiming at data collection and resource monitoring and efficient management according to the needs of various applications is being actively conducted. The Wi-SUN network is one of the networks that can provide services suitable for the needs of these various applications, which a constrained network is a lot of use the RPL an optimal routing protocol for networks with limited resources.

In RPL that sets the route in the above way the data transmission of child nodes can be concentrated to the parent node of the route with a good routing metric value. In this case, the parent node may have a bottleneck and excessive energy consumption due to data transmission requests from many child nodes. To solve this problem the existing research proposes the N_max technique that limits the number of child nodes and the detailed explanation is as follows.

However, in existing studies, there is a problem of continuously using the selected N_max without changing the selected N_max according to the change of the network. In this paper to overcome this problem we propose a method to dynamically change N_max according to changes in network traffic and load balancing and verify it through simulation.

Keywords

Wi-SUN, RPL, Load Balancing, Dynamic Traffics

ICCT2022- Oral-1B.1

Multilevel Board Game - A Sim-2-Real Testbed for Reinforcement Learning on Labyrinth Game

Hammed Obasekore, Bo-Yeong Kang

Department of Robot and Smart System Eng., Kyungpook National University, Korea, obasekore.hammed@knu.ac.kr
Department of Robot and Smart System Eng., Kyungpook National University, Korea, kby09@knu.ac.kr

Abstract

Recently, artificial intelligence agents are becoming highly successful in applications ranging from autonomous driving, and object manipulation, or complex board games. In particular, reinforcement learning (RL) agents now have state-of-the-art (SOTA) performance in games, for example, AlphaGO in GO games and more than half of the Atari 2600 games. However, most of these are in a perfectly encoded digital domain as video/computer games. Playing these games end-to-end (E2E) in the real-world/dynamic environment drastically degrades performance. The achievements in these domains are mostly boosted by the accessibility to a repertoire of computer game emulators tailored as RL testbeds, such as Atari 2600. Therefore, this work aims at proposing an RL testbed for labyrinth games to extend the superhuman achievements of agents beyond computer games. This environment exists with varying complexity configurations in a dynamic physics simulator as well as a 3D printable real-world replica for Sim-2-Real transfer. Training the Deep Q-Network algorithm on the least difficult level resulted in an agent achieving 70% in the simulated environments, while real-world environments are still ongoing.

Keywords

Ball-in-maze, Labyrinth Games, Reinforcement Learning

ICCT2022- Oral-1B.2

Underground Cavity Recogniton from GPR Images using DNN

Pyeoungkee Kim, YoungIl Park

Dept. of Computer Engineering, Silla Univeristy, Korea, pkkim@silla.ac.kr
Unique Human Systems, Korea, youngkisanele@hanmail.net

Abstract

Traditionally, underground cavity has been searched by human experts without any help of detection software. It has many problems such as uneven recognition rate, long detection time, labor managements, and thus high detection cost. In this paper, we showed an CNN based automatic underground cavity recognition system and its experimental result. We found the proposed system could resolve most traditional difficulties and its performance was enough to be used instead of human experts.

Keywords

GPR, Underground Cavity, Yolo5, DNN, Introduction

ICCT2022- Oral-1B.3

A Study on Aerial Compting: A Novel Promising Technologies in 6G

Shahnila Rahim, Ke Zhao, Muhammad Fawad Khan, Limei Peng

School of Computer Science and Engineering, Kyungpook National University, Korea, shahnila.rahim@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, kezhao@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, m.fawadkhan@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, auroraplm@knu.ac.kr

Abstract

Several existing applications and practical situations are mainly unavailable or only partially enabled in existing computer platforms, such as edge computing and cloud computing.
To address the limitations that prohibit such applications, both academics and industry have focused on the creation of a reliable computing paradigm. However, because of the scarcity of study, there is a research gap, and a comprehensive computing paradigm has yet to be systematically devised and analyzed. This article discusses aerial computing, which seeks to bridge the gap by combining aerial radio access networks with edge computing. First, we will look at the computing architecture, which is made up of satellite computing platforms, low-altitude computing(LAC), and high-altitude computing (HAC). Second, we go through important technologies that make aerial computing possible, such as energy recharging, intelligent reflecting surface, big data, and artificial intelligence. Finally, we outline some factors that must be considered as well as potential solutions.

Keywords

Aerial Computing, Edge Computing, Sixth Generation(6G), Key Technologies, Aerial Computing Networks.GPR, Underground Cavity, Yolo5, DNN, Introduction

ICCT2022- Oral-1B.4

Cyberbullying Type Classification Across Thai Social Media Platforms using Machine Learning Analysis

Supattanawaree Thipcharoen, Teerawich Wongsa, Piyanush Tooptompong, Worapong Bumrungsri, Rattasit Sukhahuta

Department of Data Science and Digital Innovation, Faculty of Innovation Technology and Creativity
The Far Eastern University Chiang Mai, Thailand supattanawaree@feu.edu
Independent Researcher Chiang Rai, Thailand teerawichwongsa43@gmail.com
Minerva Consultant Co.,LTD. Bangkok , Thailand Piyanust@gmail.com
Minerva Consultant Co.,LTD. Bangkok, Thailand b.worapong@gmail.com
Department of Computer Science Faculty of Science Chiang Mai University Chiang Mai, Thailand rattasit.s@cmu.ac.th

Abstract

Bullying on social media is a major problem that affects many people who have been referred to or accused, can be a victim, ranging from the level of cause of terror. This research presents an analytical concept by classifying the types of cyberbullying through textual social media (Exclusion, Gossip, Harassment, and Hate Speech) from Thai social media sources. These include Facebook, YouTube and Twitter using the concept of data scraper. Natural language processing for data preparation as well as machine learning using the Naïve Bayes Algorithm. During the training model, model prediction performance is measured using the k-fold Cross Validation method. The results of the test showed that the model for classifying bullying messages. It has an efficiency of 84.2% (F-measure=0.842) and a bully type classification model is 77.7% effective (F-measure=0.777). This research continues to evolve. This is still early research in the field of bullying data analysis to be used to find deeper relationships. This will lead to cognition and prevention. Bullying is considered as a computer crime that might occur in the future.

Keywords

Cyberbullying Type Classification, Thai Cyberbullying, Machine learning, Naïve bayes classifier, Thai Text Mining

ICCT2022- Oral-1C.1

The Approach of Mental Healthcare Digital Twin Platform Architecture

Kang-Yoon Lee

Department of Computer Engineering, Gachon University, Seong-nam, Korea, keylee@gachon.ac.kr

Abstract

The mental healthcare management of emotional workers has limitations in existing mental healthcare management because it is difficult to consider the emotional response at the time of a stressful situation and the individual's underlying state is not reflected. In this study, we construct a mental health care digital twin solution architecture for a personalized stress risk management solution and present an effective mental healthcare management method through each layer technology. In the digital twin structure, for mental health risk management due to emotional labor, individual stress risk factors such as emotion/body reaction and environment are extracted with various modalities, and stress risk is precisely predicted through synchronization/modeling of dynamic objects in a virtual space. Perform solution exploration simulation. It provides a mental health care digital twin solution for personalized mental health risk prediction that can be configured according to the emotional worker's environment by providing an intervention tailored to the customer and can be improved according to the user's feedback.

Keywords

Mental Healthcare; Digital Twin; Medical Twin; Simulation; Stress Reduction

ICCT2022- Oral-1C.2

A Robust approach to small object detection for Digital Twin in the Industries

Faisal Saeed, Anand Paul, Gwanggil Jeom

Department of Computer Science and Engineering, Kyungpook Natioanl University, Korea, scsfaisal821@gmail.com
Department of Computer Scinece and Engineering, Kyungpook National University, Korea, paul.editor@gmail.com
Department of Embedded Systems Engineering, Incheon National University, Korea, ggjeon@outlook.com

Abstract

Nowadays, the sharp development in cyber-physical system and the use of Internet of Things in the Industries have enabled an emerging technology named as Digital Twin (DT). DT acts as a bridge between physical and virtual world by establishing connections and integration. DT can plays an important role on industrial sector. As, the industrial environment is under pressure to keep impulsive downtime, concert loss, and safety hazards to a minimum. This calls for an effective solution to quickly identify and address any potential requirements. The processes used in industrial settings to produce industrial goods are extremely quick and produce goods quickly, occasionally resulting in substandard goods.. In order to detect the faults in the industrial products, in this study we proposed a Faster R-CNN based model using the product images. We took this as small object detection problem and proposed a center loss to the original multiloss function. We implement our model on custom dataset which includes the four classes of objects i.e., screws, labels, missing screws and untighten screws. The results show that our model performs very efficiently.

Keywords

Digital Twin, Industries, Small Objects, Faster R-CNN

ICCT2022- Oral-1C.3

A Study on Semantic Communications

ZiJian Chen, Limei Peng

School of Computer Science and Engineering, Kyungpook National University, Korea, chenzijian0@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, auroraplm@knu.ac.kr

Abstract

Semantic communication is considered to be a breakthrough beyond the Shannon paradigm, where the main goal of semantic communication is to successfully convey the semantic information of the source rather than accurately conveying each symbol or bit sent by the source without respect to its meaning. This paper provides an overview study of semantic communications, and after a simple comparison between semantic communication and conventional communication, we show the recent research progresses in semantic communications and elaborate on the performance metrics that are commonly used in semantic communication. The paper concludes with a discussion of the problems in semantic communication research and future research directions.

Keywords

Semantic Communication, Machine Learning.

ICCT2022- Oral-1C.4

Statistical Characteristic of IMU Rate Gyro Uncertainty

Chanasorn Nutsathaporn, Sakchai Chomkokard, Wiwat Wongkokua,
Noparit Jinuntuya, Somchoke Ruengittinun, Siriporn Sasimontonkul

Department of Physics, Faculty of Science, Kasetsart University, Bangkok, Thailand, chanasorn.nut@ku.th
Department of Physics, Faculty of Science, Kasetsart University, Bangkok, Thailand, fscisсc@ku.ac.th
Department of Physics, Faculty of Science, Kasetsart University, Bangkok, Thailand, wiwat.w@ku.ac.th
Department of Physics, Faculty of Science, Kasetsart University, Bangkok, Thailand, fscinpr@ku.ac.th
Department of Computer Science, Faculty of Science, Kasetsart University, Bangkok, Thailand, somchoke.r@gmail.com
Faculty of Sports Science, Kasetsart University Kamphaeng Saen Campus, Nakhon Pathom, Thailand, fedusrs@ku.ac.th

Abstract

The statistical distribution of rate gyro data from an IMU sensor is measured and analyzed (mpu6050). Six sensors are set on a still table, rate gyro data is recorded, and the data is examined up to the fourth instant. We discover that the mean values of each sensor differ. These parameters are used to calculate the sensor offsets. The standard deviations of each sensor, on the other hand, are roughly identical. The standard deviation may be used to indicate the sensor's uncertainty, which is the reason of the recorded sensor orientation drift. The data skewness and kurtosis indicate that the rate gyro data are Gaussian distributed. This information is critical because it may be used to forecast the uncertainty of the sensors' orientation. Because of the characteristics of the integrated rate gyro sensor, we can use these results as a criterion to select a suitable IMU, especially in applications such as vehicle tracking or posture warning for elderly/disabled people, where precise sensor orientation is required for a long period of operation.

Keywords

Inertia Measurement Unit, Rate Gyro, Uncertainty, Rate Gyro Sensor, Uncertainty Distribution, Calibration

ICCT2022- Oral-1D.1

IRRIDIUM MAGAZINE: The first narrative magazine

Clément Fedou, Sunghoon Cho, Yong-Ki Lee

Dept. of Visual Contents, Dongseo University, Korea, clement.fedou@protonmail.com
Dept. of Visual Contents, Dongseo University, Korea, mattcho@gdsu.dongseo.ac.kr
Dept. of Design, Dongseo University, Korea, ykll77@gdsu.dongseo.ac.kr

Abstract

Magazines are one of the best support to share and display images, words and ideas. Being passionated by music, cinema and alternative culture, I wish to propose a prototype of underground magazine "Irridium", with a brand new concept to overcome the dying state of the indie press industry : fusing my magazine and articles with an original novel story, all packed with unseen format, design and esthetics in the history of magazines.

Keywords

Underground Culture, Magazine, Print, Press, Design, Narration, Alternative Music

ICCT2022- Oral-1D.2

Research on the Application of SITES in University Campus Landscape-Take Dell Medical District-University of Texas at Austin as an Example-

Li Wu, Kwan-Seon Hong

Department of Design, Dongseo University, Korea, 635496938@qq.com
Department of Design, Dongseo University, Korea, cigahks@naver.com

Abstract

With the development of the economy, the advance in science and technology, and the acceleration of urbanization, the environmental and resource problems encountered by human beings are becoming increasingly serious. Therefore, the concept of sustainable development has been widely recognized in the world and affected the field of landscape design. This study takes the Dell Medical District-University of Texas at Austin as the research object, analyzes how the Sustainable Sites Initiative (SITES) is applied in the actual project of the campus landscape, tries to explore the sustainable landscape design elements of the campus landscape, and lays a theoretical foundation for the sustainable landscape design of campus landscape. The researcher used two research methods: literature review and case study. Firstly, through theoretical investigation, the theoretical data of SITES are mastered. Then, the first-level indicators of the SITES v2 version in the pilot study are used to analyze the landscape project cases that have obtained SITES certification. Finally, this research proves the value of SITES, provides a good model for the subsequent landscape design of university campuses, and has important inspiration and reference value for the promotion and practice of the concept of SITES and sustainable landscape design.

Keywords

Sustainable Landscapes Design, Sustainable Sites Initiative (SITES), SITES Rating System (RS), SITESv2

ICCT2022- Oral-1D.3

Difference between Service Design and Product Service System

Xuan-na Xie, Zhen-Xiang Liu, Sung-pil Lee

Graduate School of Design, Dongseo University, Busan, Korea, 904012849@qq.com
Graduate School of Design, Dongseo University, Busan, Korea, jongsyang@hotmail.com
Graduate School of Design, Dongseo University, Busan, Korea, Sungplee@gdsu.dongseo.ac.kr

Abstract

From the perspective of a post-industrial society, the main purpose of this study is to clarify the theoretical principles that distinguish service design from Product Service System (PSS) and to propose a new integrated design strategy. Service design is a user-centered design technique for improving or innovating existing services and solving problems in a continuous exploration and iteration process. On the other hand, PSS is a cutting-edge business approach for organizations looking to boost their competitiveness by providing integrated product and service capabilities to clients while also enhancing system operations. This paper discusses the concepts of service design and PSS, the present state of research, and design methodologies using a literature search. The distinctions between service design and PSS are examined and summarized during the design process. The ultimate content proposed in this study is to incorporate user experience into the PSS design process and propose a systematic process to meet users' needs to effectively implement the service design concept.

Keywords

Service Design, Product Service System (PSS), Design Methods, Theoretical Research, Design Strategy

ICCT2022- Oral-1D.4

A comparative study of Korean Metro service quality based on Servicescape

Jia-Xing Long, Yi-Yu Yang, Sung-Pil Lee

Graduate School, Design major, Dongseo University, Korea, 1317722749@qq.com
Graduate School, Design major, Dongseo University, Korea, 395061556@qq.com
Graduate School, Design major, Dongseo University, Korea, sungplee@gdsu.dongseo.ac.kr

Abstract

Metro has improved and alleviated urban surface transportation problems while driving the development of metro-related industries. It has a huge impact on the development of the whole country with both economic and social benefits. This study aims to apply the definition of Servicescape to metro, establish the definition of Metro Servicescape and propose the constituent elements. For this purpose, the service space and service facilities of metro are analyzed, and previous domestic and international literature related to Servicescape is studied first. Firstly, this study defines Metro Servicescape. Secondly, the 10 components of Metro Servicescape were derived from the domestic and international studies on Servicescape. Thirdly, the ranking of the Metro Servicescape in Korea is 203 in Seoul, 197 in Busan, 192 in Daegu, 178 in Gwangju, and 172 in Daejeon, based on the field survey of five metros in Seoul, Busan, Daegu, Daejeon, and Gwangju. Among them, the four elements of comfort, sociality, cleanliness, and safety in the five metros are the same, which proves that they all meet the unified standard. However, the data of 6 elements of aesthetics, spatiality, convenience, entertainment, openness, and information are different.

Keywords

Metro, Servicescape, Metro Servicescape (MSS), Service Quality

ICCT2022- Oral-2A.1

Innovations in ODL through Virtual Reality technologies

Chen Zhen, Wang Yu

School of Design, Jiangsu Open University, Nanjing, Jiangsu 210037, China
School of Art, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu 211106, China

Abstract

For the theory course of art history, the Open and Distance Learning (ODL) mode in past, lacks the necessary interactivity, experience, vivid sense and reality sense, which leads to the low degree of student participation. As a result, it is difficult to achieve basic training such as work analysis, phenomenon description, data excavation and sorting. The "virtual" is the counterpart of the "real", which adds a new dimension to perception. This paper studies the Open and Distance Learning (ODL) mode of art history, creates virtual reality teaching resources, constructs historical scene nodes with "virtual reality" technology, guides students to participate in exploration, observes and compares works in the virtual reality environment, and realizes teaching interaction. The results indicated that "virtual reality" technology adds a new dimension to open learning courses and could become an option in the future. "Virtual reality" technology can provide high quality, accessible online learning for mass open distance learning courses, and solve the problem of low participation rate among people with less education.

Keywords

Virtual Reality, E-Learning, Art Theory, Innovation, Art History

ICCT2022- Oral-2A.2

Book Cover Design Using Short-Form Animation: Focusing on Korean Classical Literature

Seong Eun Park, Kim lo a, Jihye Kim, Haeyoon Kim

Dept. of Design, College of Design, Dongseo University, Korea, tjddms4869@naver.com
Dept. of Design, College of Design, Dongseo University, Korea, dew__design@naver.com
Asia Design Center for Future, Dongseo University, Korea, gkim81@gdsu.dongseo.ac.kr
Dept. of Design, College of Design, Dongseo University, Korea, kimhaeyoon@dongseo.ac.kr

Abstract

In this study, we plan and produce Short-Form animation that induces interest in Korean Classical Literature. The purpose of this study is to facilitate access to Korean classical literature. Breaking away from the existing universal design emphasizing only tradition. It is expected that the reading rate will rise through the proposal of a modern and differentiated book cover design and the creation of content that emphasizes uniqueness and aesthetics.

Keywords

E-book, Korean Classical Literature, Short-form animation, Book Cover Design

ICCT2022- Oral-2A.3

Data validation of cultural data collection based on the citizen science concept

Watchira Burnasing, Pattaraporn Meeklai, Petchwadee Pattarathananan

National Electronics and Computer Technology Center, Pathum Thani, Thailand watchira.buranasing@nectec.or.th
National Electronics and Computer Technology Center, Pathum Thani, Thailand pattaraporn.mee@nectec.or.th
National Electronics and Computer Technology Center, Pathum Thani, Thailand petchwadee.pat@ncr.nstda.or.th

Abstract

Culture is now seen as a significant and very influential soft power, both socially and economically. Soft power is therefore an important tool to add value creative economy At the present, the concept of "Citizen Science" is becoming increasingly relevant in the field of information work across several fields. This concept has been used to help communities in the area collect data so that they can have their own knowledge of the area. However, the process of gathering local data with local citizens requires a process of managing the data from the source, as well as a process of verifying the correctness of the data in order to have the data available for future use. In this paper, we researched and developed a framework for collecting data on biodiversity and cultural practices. By focusing on the process of data collection and verification in order to assure the accuracy and quality of data for future development. This paper uses the method of verifying data as follows: 1) Data verification by experts. 2) Verification of non-expert information with expert knowledge. 3) Checking the data for similarity using expert data 4) Data validation using expert data and 5) Data validation using open data. Due to the fact that experts demand extremely high data quality and data integrity, it was discovered that the data examined by the expert had the lowest number of audited data. This is a guarantee of the data's quality. However, when the data is verified with data from an expert and an open archive, and then the expert and non-expert are reviewed again, the rate at which the data is accepted by experts and non-experts has increased due to the elimination of inconsistent data, but data from other viewpoints or opinions may be lost as well. Location data provides the highest accuracy of more than 90% and it is the most widely accepted since it delivers the site information from the real location.

Keywords

Component, Formatting, Style, Styling, Insert

ICCT2022- Oral-2A.4

Quality Factors for Generative Toolkits in a Participatory Design Approach to give Users a Voice in Social Innovation

Punyotai Thamjamrassri, Hanbi Cha, Eunjin Kim, Yong-Ki Lee

Department of Design, Dongseo University, Korea, punyotai@gmail.com
Department of Design, Dongseo University, Korea, bii1119@naver.com
Department of Design, Dongseo University, Korea, peace0825@naver.com
Department of Design, Dongseo University, Korea, ykl77@gdsu.dongseo.ac.kr

Abstract

Traditional design research methods rely on studying what people say or do. However, to gain insights into people's tacit needs, designers should also study what people' make'. For this, generative techniques have great potential to engage users' voices in participatory design research. Nevertheless, developing generative toolkits and workshops can be challenging for designers. The paper aims to give practical insights into creating a generative toolkit. As a case study, we introduced a generative workshop on the topic of 'city and youth well-being.' Based on our reflections on the toolkit, we propose that designers should consider the three quality factors of (1) modularity, (2) segmentation, and (3) physicality. Our contribution is to inspire designers to incorporate participatory design research into their design processes.

Keywords

Generative Toolkit, Generative Workshop, User Experience, Participatory Design, Social Innovation

ICCT2022- Oral-2B.1

Development of Location-based Big Game Applications using the Interest-inducing Factors of Gamification

GyuHyeok Choi, JuYoung Chang, Mijin Kim

Asia Design Center for Future, Researcher, Dongseo University, Korea, choi8603@hanmail.net
Dept.of Design, College of Design, Professor, Dongseo University, Korea, jychang@dongseo.ac.kr
Dept. of Game, College of Media Contents, Professor, Dongseo University, Korea, mjkim@dongseo.ac.kr

Abstract

Gamification, which motivates users by using game mechanics, accessibility and continuity of learning content can be expected when applied to the education field. In this paper, a location-based big game mobile application was developed based on the interest inducement factors of gamification. It can be used as a design tool for experiential learning contents by allowing the learner to use the GPS-based realworld terrain as a learning space and recognizing a QR code located in a specific spot in the learning space.

Keywords

Gamification, GPS, QR Code, Big Game, Application

ICCT2022- Oral-2B.2

Development of Racing Game using Multi-View Method

YuGyeong Jeong, Wooyoung Jung, GyuHyeok Choi, Mijin Kim

Dept. of Game, College of Media Contents, Dongseo University, Korea, tkdwlsqkfkrl@naver.com
Dept. of Game, College of Media Contents, Dongseo University, Korea, YeonLi.work@gmail.com
Asia Design Center for Future, Researcher, Dongseo University, Korea, choi8603@hanmail.net
Dept. of Game, College of Media Contents, Professor, Dongseo University, Korea, mjkim@dongseo.ac.kr

Abstract

Digital game view captures the characteristics of the game and connects characters and players. When an appropriate mechanism according to each view is applied, the immersion of the player may be induced. In racing games, a number of first-person and third-person views appear. In this study, we developed a multi-view racing game in which various views appear. This expands the player experience in racing games. It can also be used as an example of game development that leads to immersion in the manipulation itself, not speed or competition.

Keywords

Multi-view, Game Mechanics, Racing Games

ICCT2022- Oral-2B.3

Help Well: A platform for Disaster Assistance Management

Butsayamat Suanset, Tanapat Chanavestpong, Intiraporn Mulasastra

Department of Computer Engineering, Kasetsart University, Bangkok 10900, Thailand, int@ku.ac.th

Abstract

Disaster caused by human or nature increasingly occurs. However, many countries have yet to experience the full developmental benefits of digital technologies to prepare, respond, and recover from disasters. For instance, during the epidemic of COVID-19 in Thailand, there are many organizations in both private and public sectors that voluntarily provide helps to infected people. However, there is no integrated platform for cooperation among many organizations and those who need help, so the assistance is not efficient. A large number of infected people who need help but could not reach for it due to lacking information of the existing distributed assistance. Our web based application is developed for demonstrating how to integrate assistance form many organizations including individuals who want to providing helps. Therefore, victims can request for help in a centralized assistance system and choose the type of assistance they need, such as patient transfer, food and medicine. The system can display the location of helpers and requesters on a Google map. Hence, the project can match the supply and demand of assistance from many sources during a critical period efficiently.

Keywords

COVID-19, Epidemic, Volunteering, Disaster, Crowd Sourcing, Assistance

ICCT2022- Oral-2B.4

Smart Analysis of Twitter Data to Advance Future Tourism

Muhammad Shaheryar, Jae Cheon Jeon, Soon Ki Jung

School of Computer Science and Engineering, Kyunpook National University, Korea, shaheryar@knu.ac.kr
School of Computer Science and Engineering, Kyunpook National University, Korea, oldgraden21@knu.ac.kr
School of Computer Science and Engineering, Kyunpook National University, Korea, skjung@knu.ac.kr

Abstract

One of the most crucial essential sectors for a country is tourism. The internet is an excellent source of tourism-related information, including opinions and feelings regarding popular tourist destinations. The tourism sector has increasingly adopted emerging technology. Social media is crucial in the digital world for determining the tourism destinations that receive the most visitors. Twitter is a social networking platform that more than 80% of people use. Tweet reviews allow travelers from worldwide to learn about the sentiments, recommendations, and viewpoints of the most popular tourist destinations in the chosen area. The primary goal of this paper is to propose a method for analyzing the tourism-related content shared on Twitter, combining information extraction, cleaning, data processing, and analysis. Our approach is based on a recently compiled collection of tweets about tourism. In addition, this study looks at tourist data for South Korea and uses sentiment analysis and topic modeling to identify the attitudes and destinations that are most popular there.

Keywords

Tourism, Twitter, Tweet Analysis, Tourism Technology, Sentiment Analysis, Topic Modeling

ICCT2022- Online-3A.1

The Integrated Operation Called "Structure +" in Landscape Structure Design

Wang Yu, Chen Zhen

Arts College, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu 211106, China
School of Design, Jiangsu Open University, Nanjing, Jiangsu 210036, China

Abstract

If it happens that difference between the architectural form and the structural technology infinitely reduces to zero, the situation is known as integration between structure and landscape structure. That is, the integration of architecture and structure comes out, based on the landscape structure. The idea of integration is the cornerstone of the integration between architecture and structure. The integrated operation called "Structure +" which is one of the integration methods, is the addition operation for structure. It will add some other properties to the structure on the basis of maintaining its own. And the structural perception is mostly explicit. In the research, it shows that the integrated action of "Structure+" mainly includes two aspects: Structure+ Functional Property of Architecture System and Structure+ Visual Property of Architecture System. The first aspect focuses on the integration of structure and architectural interface, thus leading to the structural interface. The second aspect which refers to the integration of structure and architectural form includes three types: simulation of internal force, static diagram and geometric abstraction. The integrated operation of "Structure+" can not only enrich the expression of structure, but also optimize the efficiency of structure, then realize the ideal mode of integration "structure = architecture" which is a win-win for the integration of architecture and structure.

Keywords

Landscape Structure, Structure, Architecture, Integration, Interface, Architectural Form, Natural Environment

ICCT2022- Online-3A.2

Research on the Computational Structure and Content System of Metaverse Design

Cheng Qiaoming

School of Arts, Nanjing University of Aeronautics and Astronautics, Nanjing, 210096, China

Abstract

Metaverse design contains two core contents: first, it is the design force or design activities for creating the metaverse; Second, it is the design activity of creating new digital images, digital things and digital scenes by artificial intelligence and computational intelligence. The technical foundation of the metaverse design is the application of the computational power structure, and the advanced form of the metaverse design is the construction of the content system. The computing structure creates an open, shared and non-delayed digital platform in the metaverse, and the design of the content system creates a diversified comprehensive form of human physical and mental and mimicry in the metaverse. The structure of computing power is the productive force of the metaverse, and the content system is the centralized embodiment of the production relations and social operation mechanism of the metaverse.

Keywords

Metaverse design, Internet, Computational force structure, Content system

ICCT2022- Online-3A.3

Rural area cultural landscape measurement method based on square grid-cube model

Zhongjian Zhao, Cailing Shang

School of Arts, Nanjing University of Aeronautics and Astronautics, China, zzj111365@nuaa.edu.cn

Abstract

The rural cultural landscape is a product of the accumulation of rural culture, a collection of cultural information and symbols. Among the constituent elements of rural cultural landscape resources, the iconic and representative elements constitute a kind of "particle" landscape unit, and these landscape units constitute a loose "cloud" form in a larger scale space. The estimation and judgement of the amount of rural cultural landscape resources can be reduced to the counting and estimation of landscape particles. The basic method is to set up a grid-cube from a 4D space composed of spatial 3D scale and temporal scale, and then count the number and weight of landscape particles in the cells, and then use the data analysis results to judge and estimate the value of landscape resources.

Keywords

Rural Cultural Landscape, Grid-Cube, Landscape Resources, Landscape Particles

ICCT2022- Online-3A.4

Impact from prefabricated building to modern architecture design

Yueqian Li, Wei Li

Architecture, University of Melbourne, Melbourne, Victoria, Australia
School of Art, Nanjing University of Aeronautics and Astronautics, Nanjing, China, Dracaena27@gmail.com

Abstract

Modern industrial prefabricated buildings are the new architectural products appeared from last century. The advantage and disadvantages are influencing the modern design from many aspects. It is significant for the new generation designers to understand the benefit and limitation of this technology and how it exists in present time.

Keywords

Historical Appearance, Architectural Variation, Efficiency VS Uniqueness, Material Science

ICCT2022- Online-3A.5

Analysis on the Characteristics of Exhibition Design in the Information Age -- Taking Milan EXPO as an Example

Wei Li, Ding Kexin

School of Art, Nanjing University of Aeronautics and Astronautics, Nanjing, China, 376668932@qq.com
School of Art, Nanjing University of Aeronautics and Astronautics, Nanjing, China, 842646834@qq.com

Abstract

As a purposeful creative activity of human beings, design has a close interactive relationship with the development of human society, and has a distinct brand of the times. Based on the perspective of the information age, taking Milan Expo as the research object. This paper analyzes some new design phenomena in Milan Expo and the reasons behind these design phenomena. By summarizing their common characteristics, which is helpful to understand the development status of contemporary exhibition design, grasp the development trend of contemporary exhibition design, and provide some constructive ideas and directions for the research of exhibition design theory. In order to help in promoting the development and improvement of contemporary exhibition design theory research.

This paper is one of the phased achievements of the 2018 Humanities and Social Sciences Research Program Fund of the Ministry of Education (No. 18YJA760033) hosted by the author.

Keywords

Component, Age of Information, Exhibition Design, Characteristics, Milan Expo

ICCT2022- Online-3B.1

Analysis of Reproduction using 3D scanning Technology and Vehicle Relics Data Preservation

Jiawei Yin, Sojin Kim, Yongki Lee

Dept. of Visual Contents, Dongseo University, Korea, cplarfyinjiawei@gmail.com
Dept. of Visual Contents, Dongseo University, Korea, Sojinkim@gdsu.dongseo.ac.kr
Dept. of Design Department, Dongseo University, Korea, ykl77@gdsu.dongseo.ac.kr

Abstract

In recent years, with the development of science and technology, 3D scanning equipment and 3D scanning technology are gradually used in the restoration and protection of cultural relics. It has provided great help for the preservation of 3D data of various valuable cultural relics. This technology has great value in saving the 3D data of physical objects. On the other hand, the model directly obtained by 3D scanning has the problems of the high number of faces, wrong material information, and wrong details of the model, which can't be directly applied to other new media fields other than saving data, such as 3D animation, movies, and games. Manual intervention is required.

As a new technology developed in recent years, the quality of 3D scanning products depends on many factors. If the preparatory work is forced to be degraded due to certain conditions, the final quality of the scanning model will be greatly affected. The feature of unlimited realism of the scanning model also limits its application range. Integrating the scanning model into the existing scene needs to ensure that the two are unified in style. Therefore, how to make good use of the valuable but challenging technology of 3D scanning while preserving and repairing the 3D data of vehicle cultural relics is the topic to be explored in this paper.

This paper will briefly describe the necessity of preserving and restoring the 3D data of vehicle cultural relics, list the digital media technologies that need to be used in the process of preservation and restoration and explain how to use these technical achievements to transform the data into digital media artworks. The demonstration method will cite domestic and foreign examples of making 3D models of vehicles for the comparison. Combined with my research and practice in related fields, the advantages, disadvantages, and feasibility of this method will be proved. Finally, the application of digital media technology in the field of cultural relics protection and reproduction is summarized and prospected.

Keywords

Reproduction, 3D Scan, Vehicle Relics, Data Preservation

ICCT2022- Online-3B.2

Marketing of Medium and Low-budget Films in the New Media Environment

Siwen Shi, Sunghoon Cho, Yong-Ki Lee

Dept. of Visual Contents, Dongseo University, Korea, 11483sikx@gmail.com
Visual Contents, Dongseo University, Korea, mattcho@gdsu.dongseo.ac.kr
Design, Dongseo University, Korea, ykl177@gdsu.dongseo.ac.kr

Abstract

This study analyzes how medium and low-budget films can be more efficiently marketing in the new media environment by comparing traditional media and new media. Through this study, it is expected to provide a better creation and development environment for medium and low-budget films, which is very important for the development of film art and the film industry.

Keywords

Medium and Low-budget Films, The New Media Environment, Film Marketing

ICCT2022- Online-3B.3

Analysis of Development of Virtual Idols Based on Game Characters

Lyu Yin, Sojin Kim, Yong-Ki Lee

Dept. of Visual Contents, Dongseo University, Korea, lyuyin1213@gmail.com
Visual Contents, Dongseo University, Korea, Sojinkim@gdsu.dongseo.ac.kr
Design, Dongseo University, Korea, ykl177@gdsu.dongseo.ac.kr

Abstract

With the development of computer technology, virtual idols are more stable, versatile, and exclusive than real star idols, and are gradually connected with social life. In the process of the field, it has shown significant economic and cultural effects. From the well-known Hatsune Miku to the emergence of virtual idols such as virtual anchor Kizuna Al and virtual model Imma in recent years, virtual idols with different functions are constantly being loved by people. Among them, virtual idols based on game characters are also gradually received by the public. Welcomed and sought after, the design and research on the virtual idolization of game characters have become one of the important forms for the major game industries to study and promote the development of idol IP characteristics. What are the advantages of transforming game characters into virtual idols, what help does the improvement of technology provide for the development of virtual idols, and how to better develop virtual idols in the future, have become the focus of this study.

Keywords

Virtual Idol, Uncanny valley, Game Character, Character Development

ICCT2022- Online-3B.4

Defining types & elements of film space in suspense films

Chuxuan Wang, Sunghoon Cho, Yong-Ki Lee

Dept. of Visual Contents, Dongseo University, Korea, zhishi0210@gmail.com
Dept. of Visual Contents, Dongseo University, Korea, mattcho@gdsu.dongseo.ac.kr
Dept. of Visual Contents, Dongseo University, Korea, ykl177@gdsu.dongseo.ac.kr

Abstract

This paper studies the function of suspense film space construction from the two aspects of suspense film space types and space design elements. It also discusses the types of films with examples, and analyzes the different film spaces in the suspense film and the design elements of the suspense film space.

Keywords

Film Space, Suspense Film, Film Narration, Space Construction

ICCT2022- Online-3B.5

Pneumonia Detection from X-Ray Images through Voting Ensemble method

Harsha B M, Sibu Cyriac, Yong Woon Kim

Centre for Digital Innovation CHRIST (Deemed to be University) Bengaluru, India, harshabm96@gmail.com
Centre for Digital Innovation CHRIST (Deemed to be University) Bengaluru, India, sibu.cyriac@christuniversity.in
Centre for Digital Innovation CHRIST (Deemed to be University) Bengaluru, India, jonathan.kim@christuniversity.in

Abstract

Pneumonia is an infectious disease that affects the lungs in humans and is one of the causes of death in people The Chest X-ray images technique is one of the most used for diagnosing pneumonia. There have been several Machine Learning algorithms that have been used in order to provide computer-aided diagnosis by automatic classification of medical images. The Convolutional Neural Networks (models based on Deep Learning) that are widely used in Computer Vision tasks, such as classification of medical images and among other applications. In this paper, we present a Full training based CNN model method that automatically classifies between X-ray images characterized as pneumonia and normal. The proposed method uses Five CNN models and Ensemble method to classify the given image into respective classes. Our model is competitive with respect to other proposals. To make comparisons with other models, we have used four well-known performance measures, obtaining the following results: precision, recall, F1-score. These results allow us to consider our proposal as an alternative that can be useful in situations where there is not enough equipment and specialized radiologists.

Keywords

Deep Learning, CNN models, Ensemble, Hard voting, Soft Voting

ICCT2022- Online-3C.1

A study of university education methods in the metaverse era

Chun Hyunjin, Sun jiaqin, Shi yanan

School of Arts, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China, tough4324@naver.com
School of Arts, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China, SUNJIAQIN@88.com
School of Arts, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China, 514524139@qq.com

Abstract

With the advent of the age of artificial intelligence, universities need to move away from the existing rote style of education and implement creative education. In this context, many universities are striving to develop new approaches to education through the meta-universe space platform. With this in mind, this thesis examines university education methods in the metaverse era. The results of this study can be a theoretical base material for future educational design.

Keywords

Metaverse, Virtual Reality, University, University Education

ICCT2022- Oral-3C.2

Real-time Object Reconstruction for Spatial Augmented Reality Platform

Aye Chan Zay Hta, YunLi Lee, Wai Chong Chia

Department of Computing and Information Systems, School of Engineering and Technology, Sunway University, Bandar Sunway, Malaysia, ayechan.aczh@gmail.com
Department of Computing and Information Systems, Research Centre for Human-Machine Collaboration (HUMAC), School of Engineering and Technology, Sunway University, Bandar Sunway, Malaysia, yunlil@sunway.edu.my
Department of Engineering, Research Centre for Human-Machine Collaboration (HUMAC), School of Engineering and Technology, Sunway University Bandar Sunway, Malaysia, waichongc@sunway.edu.my

Abstract

Spatial Augmented Reality (SAR) falls under Augmented Reality technology. In SAR, the virtual and real-world objects are integrated together by projecting virtual contents onto real-world objects using projection mapping. However, most of the existing SAR platforms used pre-rendered models in a static setting which did not allow for the dynamic modification of physical structure. This can be a limitation between the users and the platforms because users are unable to make changes to the physical structure to reflect their ideas. Especially, in applications where rapid real-time prototyping is required to better visualize the impact of changes made to a physical structure. In this paper, a Real-time Interactive Spatial Augmented Reality (RISAR) platform was designed and developed. The RISAR platform supported real-time object reconstruction, marker detection, tracking & assignment, and dynamic projection mapping. A system test and end-user usability test were also conducted to evaluate the platform. The results showed that the RISAR platform was able to successfully detect the user constructed Lego object in real-time, and dynamically project out the virtual content onto the tangible Lego blocks in real-time.

Keywords

Spatial Augmented Reality (SAR), Tracker-based SAR, Lego blocks, Real-time marker assignment, Dynamic Object Reconstruction, SAR Tabletop

ICCT2022-Online-3C.3

AI-Based Online Proctoring: A Review of the State-of-the-Art Techniques and Open Challenges

Sagaya Aurelia. P, Yong-Woon Kim, Felcy Judith

Department of Computer Science, CHRIST Deemed University, Bangalore, India, sagaya.aurelia@christuniversity.in
Centre for Digital Innovation, CHRIST Deemed to be University, Bangalore, India, jonathan.kim@christuniversity.in
Department of Computer Applications, T John College, Bangalore, India, felcyjudith@tjohngroup.com

Abstract

Today, the education sector has been severely impacted by this pandemic situation. While new technologies are dramatically transforming education, the acquisition of digital knowledge is not yet widely accepted. Using a combination of manual and primary based technologies, remote monitoring has many advantages. This allows students to take tests in any area with specific technical requirements and eliminates the physical examination center requirement. Costeffective and easy to schedule but difficult to manage, especially for aggressive trials. This paper describes the functional characteristics of various web supervisory system and their boundaries and problems.

Keywords

Artificial Intelligence, Machine Learning, Online Proctoring, Pandemic, Proctors

ICCT2022-Online-3C.4

Analysis of the causes of cyber violence harm and solution

Kaicheng Zhang, Sunghoon Cho, Yong-Ki Lee

Dept. of Visual Contents, Dongseo University, Korea, 823709333qq@gmail.com
Visual Contents, Dongseo University, Korea, mattcho@gdsu.dongseo.ac.kr
Design, Dongseo University, Korea, ykl177@gdsu.dongseo.ac.kr

Abstract

Cyber violence can broken the moral bottom line, often accompanied by infringement and criminal acts. If netizens want to gain the right of free expression, they should also take on the mission of maintaining network civilization and morality. At least, they should keep the necessary rationality and objectivity.

Keywords

Cyberbullying, Network behavior, Issue

ICCT2022-Poster-1A.1

A Study on Object Detection Methods Using Image Binarization

Young-Jin Kang, Ji Yeon Kim, Eun Sung Choi, Hyun Park, Seok Chan Jeong

AI Grand ICT Research Center, Dong-Eui University, Korea, 15073@deu.ac.kr
Department of Artificial Intelligence, Dong-Eui University, Korea, jnsp0907@naver.com
Convergence of IT Devices Institute, Dong-Eui University, Korea, desty@deu.ac.kr
AI Grand ICT Research Center, Dong-Eui University, Korea, hpark@deu.ac.kr
Dept. of e-Business, AI Grand ICT Research Center, Dong-Eui University, Korea, scjeong@deu.ac.kr

Abstract

Smart manufacturing is a technology that combines ICT with traditional manufacturing to actively respond to changing the market environment by improving the competitiveness of the existing manufacturing industry. Through this, it is possible to build a next-generation of factories that can actively respond to the new environments for improving productivity, energy saving, and the realization of human-centered tasks, personalized manufacturing, etc. In this paper, domain data and Artificial Intelligence technology is used to improve the accuracy of decision-making to detect the defects of the dyeing processes and the result shows that the utilized AI model overcomes the traditional method. In the research, 1700 data was used, and also it was analyzed whether normal or abnormal cases can be detected with high accuracy through the trained model.

Keywords

Object Detection, Deep-Learning, Yolo, Artificial Intelligence

ICCT2022-Poster-1A.2

An Improved YOLOv5 Model Based on the Scene-Specific Head Models

Jin Ho Lee, In Su Kim, Hyeong Bok Kim, Seung Won Lee, Soon Ki Jung

School of Computer Science and Engineering, Kyungpook National University, Korea, ghfkdrjal777@knu.ac.kr
School of Computer Science and Engineering, Kyungpook National University, Korea, sky5166@knu.ac.kr
Testworks, Korea, kimyeongbok@testworks.co.kr
Testworks, Korea, swlee@testworks.co.kr
School of Computer Science and Engineering, Kyunpook National University, Korea, skjung@knu.ac.kr

Abstract

Analyzing traffic flow and congestion of vehicles and pedestrians through cameras is essential for urban planning and management. Processing speed as fast as accurately detecting objects is necessary for real-time applications. This paper proposes a YOLOv5-based scene-specific head system to increase inference speed but minimize accuracy loss. We modify the basic model of YOLOv5, which has three heads to detect different-sized objects. The scene-specific characteristics of the non-moving camera specify the object's size and class for each image grid and determine the best detecting head for objects of measure within a range. The scene-specific head models disable the head node and its corresponding neck modules from detecting specific-sized objects. Avoiding the computation of unnecessary head nodes in YOLOv5 increases our models' inference speed but minimizes the loss of accuracy, as shown in the experiments.

Keywords

Scene-specific Head, You Only Look Once Version 5(YOLOv5), CCTV, Embedded System

ICCT2022-Poster-1A.3

Dueling Double Deep Q Networks for Agricultural Crop Price Prediction

Ohnmar Khin, Sung Keun Lee, Jin Gwang Koh

Department of Artificial Intelligence Engineering, Sunchon National University, Korea
Department of Artificial Intelligence Engineering, Sunchon National University, Korea, sklee@scnu.ac.kr
Department of Computer Science and Engineering, Sunchon National University, Korea.

Abstract

Agricultural crop price prediction is an imaginable analysis issue. Deep learning (DL) algorithms are extensively utilized to acquire influential crop attributes for forecasting. These algorithms are unable to construct a linear map among the input datasets and crop prediction results outputs. Furthermore, implementation of these algorithms positively depends on the rate of acquired attributes. The power of deep reinforcement learning (DRL) stands for the principle and explanation of the aforementioned imperfections supplyments. DRL constructs the crop yield prediction network totally to execute the input dataset for crop prediction values. The proposed methodology creates the Dueling Double DQN to improve upon the DQN algorithms. The DQN algorithm retains the overestimation problem. Whereas, Dueling Double DQN declines the overestimations and leads to getting better results. The proposed model achieves this by reducing the falsehood and increasing the prediction exactness.

Keywords

Agriculture, DQN, Double DQN, Dueling DQN Algorithms

ICCT2022-Poster-1A.4

BetterCog : Computerized Cognitive Training System for Mild Cognitive Impairment

Tae-Young Byun, Joo-Hwan Seo, Sun-Woo Lee

School of Computer Software, Daegu Catholic University, Gyeongsan, Korea, tybyun@cu.ac.kr
Development Department, M3Solutions Ltd., Daegu, Korea, joohwan.seo@m3solutions.co.kr
Business Department, M3 Solutions Ltd., Daegu, Korea, swlee@m3solutions.co.kr

Abstract

This study shows details of design and implementation of BetterCog, computerized cognitive training system for mild cognitive impairment for older adults. It is possible to provide professional health management services by early detection of dementia cognitive function status management for each user and new dementia patients by using BetterCog.

Keywords

Computerized Cognitive Training System, CCTS, Mild Cognitive Impairment, BetterCog

ICCT2022-Poster-1A.5

Implementation of Mobile Boat for Measuring Water Quality over LTE Networks

Tae-Young Byun, Chang-Hak Cho, Jin-Hyun Seol, Bonghwan Kim

School of Coumputer Software, Daegu Catholic University, Korea, tybyun@cu.ac.kr
Institute of Technology, Water Korea Ltd., Daegu, Rep. of Korea, sambo0@sejoongis.co.kr
Institute of Technology, Water Korea Ltd., Daegu, Rep. of Korea, sjh@sejoongis.co.kr
School of Electronic and Electrical Engineering, Daegu Catholic University, Korea, bhkim@cu.ac.kr

Abstract

This paper shows details of design and implementation of mobile boat with multi sensor meter for measuring water quality in real-time over LTE (Long-Term Evolution) networks. We also describe the major functionalities of parts that consist of mobile boat with multi sensor meter in brief. Our proposed architecture will facilitate the rapid development and maintenance of concrete system architectures of sensor based environmental information systems.

Keywords

Water Quality Measurement System, Environmental Information System,

ICCT2022-Poster-1A.6

Audio Quality Restoration Method using Convolutional Neural Network

Hong-Jin Kim, Sehyun Park, Kyuman Jeong

School of AI, Daegu University, Daegu, Korea
School of AI, Daegu University, Daegu, Korea, sehyun@daegu.ac.kr
School of AI, Daegu University, Daegu, Korea, kyuman.jeong@gmail.com

Abstract

Artificial intelligence technology, in which computers perform human-like actions or behaviors, is becoming popular. Particularly, efforts are being made to implement technologies that classify objects or respond to user behavior. It is also attracting attention in fields that require much time and effort, such as restoring paintings drawn in the past. It is expected that it can be used in various fields as well as an image restoration technique using three-dimensional data. In particular, audio data has changed from the way of using physical storage devices in the past to the way of being provided on a network basis. In this paper, we propose an algorithm to recover high - quality audio data from the internal storage device that can be self - produced by receiving compressed audio data. We propose a method of restoring audio data that is arranged and reproduced by changing time-dependent one-dimensional data using lossless audio data and lost audio data after compression through a deep learning technology, CNN (Convolutional Neural Network).

Keywords

Component, Formatting, Style, Styling, Insert

ICCT2022-Poster-1A.7

Cow Delivery Detection System using Deep Learning-based Object Recognition Algorithm

Sung-Wook Chae, Donghwa Lee

School of AI, Daegu University, Korea
School of AI, Daegu University, Korea, leedonghwa@daegu.ac.kr

Abstract

In this paper, we propose a cow calving detection system using deep learning-based object recognition algorithm. Cattle raising behavior can have a variety of causes, among which continuous lifting behavior can be associated with signs of labor. Using the vision system, a system that can predict these signs and give notifications was configured.

Keywords

Deep Learning-based Object Recognition, Cow Delivery, Tail Detection

ICCT2022-Poster-1A.8

Development of Handwriting Generation and Classification Model based on Deep Learning Algorithm

Jae-Jung Kim, Ji-Yun Seo, Sang-Joong Jung, Do-Un Jeong

Dept. Computer Engineering Graduate School, Dongseo University, Korea, qkqhd74@gmail.com
Industry-Academic Cooperation Foundation, Dongseo University, Korea, seoji42@gduso.dongseo.ac.kr
Dept. Applied Artificial Intelligence, Dongseo University, Korea, sjjung@gdsu.dongseo.ac.kr
Dept. Applied Artificial Intelligence, Dongseo University, Korea, dujeong@gdsu.dongseo.ac.kr

Abstract

In this paper, a deep learning algorithm based on handwriting generation and classification model was implemented to solve the problem of data shortage for Korean handwriting and to improve the performance of handwriting recognition and classification model. The implemented model consists of a GAN-based handwriting generation model and a CNN model that classifies the generated handwriting. The GAN model was trained by collecting actual handwriting, and it was confirmed that high-quality handwriting was generated according to the number of times the model was trained. In addition, a CNN model was implemented to classify Korean handwriting, and a dataset was constructed by integrating the handwriting generated through the GAN model with open data, and performance evaluation was conducted upon training the model. As a result, it was confirmed that the performance of the model trained by adding the Korean handwriting generated through the GAN model resulted in better classification performance.

Keywords

Korean Handwriting, GAN, CNN, Recognition

ICCT2022-Poster-1A.9

Development of Advanced Visual Function Training System using VR Content

Yong-Ju Kim, Sang-Joong Jung

Dept. Computer Engineering, Graduate School, Dongseo University, Korea, joulipong@naver.com
Dept. Applied Artificial Intelligence, Dongseo University, Korea, sjjung@dongseo.ac.kr

Abstract

This paper presents an advanced visual function training solution that includes scenario-based VR contents to enforce the eye condition of users with a highly effective, comprehensive, and convenient head-mounted display (HMD) device. The proposed solution is composed of virtual reality (VR) contents that consist of scenarios for amblyopia and presbyopia, and devices that can demonstrate and test the teaching aids used in the recent offline optic nerve center. For enhancing the visual function using VR contents, six training methods were applied to train the amblyopia and presbyopia by breaking free from the constraints of space. A novel HMD device tracks the user's pupils in the demonstration of the proposed content so that the focus, movement, and reaction for visual function training can be checked to provide feedback to the user. Our approach for an advanced visual function training solution is to provide services that can be used in daily life with the optimal environment and contents by solving the current problems.

Keywords

Visual Function Training, VR Content, Pupil Tracking, HMD, Reference Point for Focus

ABSTRACT BOOK

International Joint Conference 2022

The 17th International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2022)

The 3rd International Conference on Artificial Intelligence and Internet of Things (AIoT 2022) The 5th International Conference on Culture Technology (ICCT 2022)

A joint conference organized by Artificial Intelligence Association of Thailand (AIAT) and Rajamangala University of Technology Lanna (RMUTL)