EEECS 2022

Program and Abstracts

The 11th International Conference on Electronics,

Electrical Engineering, Computer Science 2022

December 19-22, 2022

Kantary Hills Chiang Mai, Chiang Mai, Thailand

Sponsored by

Korea Culture & Contents Technology Association (KOCTA), Immersive Content Display Center (ICDC),

Computer and Communication Engineering for Capacity Building (CCC), DX Virtual Convergence Technology Center

Contents

1. Messages

1.1 Message from General Chair

It is a great pleasure for me to welcome you to the 11th International Conference on Electronics, Electrical Engineering, Computer Science (11th EEECS 2022) from December 19 to December 22, 2022. This year's conference marks the eleventh EEECS starting from 2016. The EEECS is a conference of the Korea Culture & Contents Technology Association (KOCTA) and represents large number of gatherings of researchers and industry professionals in the corresponding fields.

This year's conference brings together more than 70 delegates from around the Asian countries to discuss the latest advances in this vibrant and constantly evolving field. The topics covered in the program include overall areas in Electronics, Electrical Engineering, and Computer Science. In line with recent research trends, many artificial intelligence-related papers have been accepted with the diligent work of the technical program committee.

2022 has been a very challenging year due to ongoing COVID-19 Pandemic, the world environment has become complicated again. Due to the COVID-19 spread out, it has been converted to a hybrid conference. Nonetheless this difficulty situation, the committee would thank all participants and paper authors contributing this conference more active. Through this hybrid conference platform, EEECS 2022 continues to share an insight into the recent research and cutting-edge technologies in those fields of ICT.

This event has been made up by many volunteers who contributed to the various processes, and it would not be possible for me to name all of them in this short message. In particular, the Technical Program Committee, led by our indefatigable TPC Chairs and supported by the TPC members, completed a thorough peer-review process of technical and special session papers to select a comprehensive and high-quality technical program for the conference. This program is augmented and complemented by two Keynote Speeches, four special sessions and several regular sessions. In addition, all Organizing Committees worked tirelessly to ensure the best quality experience for the delegates during the technical sessions and the social programs.

Also, I would like to thank the groups of KOCTA and CT Research Center of Gachon University, ICDC of Kwangwoon University, DX Virtual Convergence Technology Center of Namseoul University, in Korea, and CCC of Mae Fah Luang University in Thailand. And I would like to thank all participants and supporters for their contribution to the conference. It is a fantastic experience for me to serve as the General Chair of EEECS2022 and it is my hope that you find the conference stimulating, fulfilling and enjoyable. Please enjoy the conference and Chiang Mai!

11th EEECS 2022 General Chair

Prof. Teeravisit Laohapensaeng Mae Fah Luang University, Thailand

Prof. Taek Keun Hwangbo Gachon University, Korea

2 Committee

2.1 Organizing Committee

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Wanus Srimaharaj, Payap University, Thailand

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Kang Yoon Lee, Gachon University, Korea

Information System Chairs

Sang Woon Lee, Namseoul University, Korea

Ui Jin Jang, Soongsil University, Korea

General Secretaries

Dae Seung Park, Namseoul University, Korea

2.1 Technical Program Committee

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Teeravisit Laohapensaeng, Mae Fah Luang University, Thailand

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Pradorn Sureephong, Chiang Mai University, Thailand
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Young Choong Park, KETI, Korea
Young Ho Seo, Mokwon University, Korea
Jeong-Geun Kim, Yonsei University, Korea
Jeong-Dong Kim, Sun Moon University, Korea

2. Keynote Speeches

Tuesday, 20th December 2022, 16:10 – 17:00

AI Based Wireless Communication Standard Classification

Prof. Hiroshi Ochi
Kyushu Institute of Technology, Japan

Abstract

The proliferation of wireless devices and the increasing demand for high-speed internet have led to the development of 5G New Radio (NR) technology, which promises to deliver faster and more reliable wireless communication. 5G NR works in different spectrums, sub-1 GHz, sub-6 GHz and millimeter wave (mmWave) in the 26-28 GHz range. On the other hand, Wi-Fi 6 operates on the unlicensed band and is currently on 2.4 GHz, 5 GHz, and 6 GHz when Wi-Fi 6E is available. However, the coexistence of 5G NR sub-6 GHz and Wi-Fi 6 networks can lead to interference and reduced performance for both technologies. In this paper, we propose a multi-task learning with convolutional neural networks (MTL-CNN) approach to enhance the coexistence of 5G and Wi-Fi networks by identifying and classifying packets transmitted over the networks based on communication standards. The MTL-CNN model is trained to classify packets based on their type (e.g. 5G or Wi-Fi) and identify the specific protocol being used within each packet. WiFi and 5G signals generated by the Matlab waveform-simulator are used to verify the accuracy of the proposed method, which is then implemented on a real-time SDR-based hardware testbed. Our experimental results show that the proposed approach significantly improves the accuracy of packet identification and classification, leading to improved coexistence between 5G and Wi-Fi networks. This approach has the potential to enable more efficient utilization of wireless spectrum and improve the overall performance of wireless communication systems.

Biography

Hiroshi Ochi received his B.E. and M.E. degrees in electronics engineering from Nagaoka Institute of Technology, Japan, in 1981 and 1984, respectively. He also received Ph.D. degree in electrical engineering from Tokyo Metropolitan University in 1991. He was with University of the Ryukyus from 1986 till 1999 as an assistant and an associate professor. He also received MBA degree from Kyushu University in 2007. He is currently with Kyushu Institute of Technology as a professor in computer and communication engineering department from 1999. His current research interests include signal processing for wireless communication system, VLSI chip design and MOT education. He also organizes a venture company Radrix Co. Ltd. as a CEO.

Tuesday, 20th December 2022, 17:10 – 18:00

CREATING A VIRTUAL HUMAN FOR HOLOGRAPHIC STEREOGRAM RECORDING

Prof. Seung Hyun Lee
Ingenium College, Kwangwoon University, Korea

Abstract

Human holograms can vividly express the human characteristics recorded by the artist in 3D, and through this, interaction with the audience can be achieved. In this paper, a method of producing a virtual human for recording a human hologram using a holographic stereogram method is presented. The virtual human model was produced through real object-based 3D modeling. It took 6 months to produce the basic model and 2 to 3 days to produce one still cut image. In order to record a digital hologram with the manufactured virtual human, a multi-view image must be extracted. Camera locations are set within the Maya program, and multi-view images are extracted from virtual human 3D data. The acquired multi-view images are converted into hogel images using data rearrangement S/W, and holographic stereograms can be produced from these hogels.

Biography

- Ph.D. Department of Electronic Engineering, Kwangwoon University
- M.S. Department of Electronic Engineering, Kwangwoon University
- B.S. Department of Electronic Engineering, Kwangwoon University
- IHMA (International Hologram Manufacturers Association) Board Member (2015~present)
- ISDH (International Symposium on Display Holography) 2021 Chairman (present)
- ISU (International Stereoscopic Union) Chairman (2014~2015)
- ISO TC 172/SC 9/WG 7 Board Member (2012~present)-
- SPIE Conference Chair (Practical Holography) (2018~present)
- Development of holographic stereogram printing technology based on multi-view imaging / GM
- Research and development of realistic content device technology (ITRC) / GM
- The development of a full parallax hologram contents printing pipeline / GM
- Development of R&D Human Resources in the Digital Human Holoportation / GM
- Full color 360degree 3D holographic video making technology / GM
- Development of hologram authoring tool technology for creating hologram printing content based on 3D information / GM
- Active sensor-based HD 3D Depth camera development / GM
- Development of a hogel printer for complete 3D hologram production / GM
- Content production for digital holography / GM

4. Program at a Glance

Monday, 19th December 2022

15:00 – 16:00	Registration
16:00 – 16:50	EEECS 2022 Executive Committee Meeting Room: Doi Nua Kyoungro Yoon (TPC Chair, Konkuk Univ.) Worasak Rueangsirarak (Local Arrangement Chair, Mae Fah Luang Univ.) Wanus Srimahara (Local Arrangement Chair, Payap Univ.)
16:50 – 17:00	Break
17:00 – 17:50	Welcome Meeting & Reception Kantary Hill Chiang Mai

Tuesday, 20th December 2022

9:00 – 10:00	Registration
09:20 – 11:00	**Special Session (SS2): AI Convergence and Applications 1** Room: Doi Suthep 1 Organizer & Chair: Prof. Worasak Rueangsirarak (Mae Fah Luang Univ.) Papers: SS2-1, SS2-2, SS2-3, SS2-4 **Special Session (SS3): AI Convergence and Applications 2** Room: Doi Nua Organizer & Chair: Prof. Wanus Srimaharaj (Payap Univ.) Papers: SS3-1, SS3-2, SS3-3, SS3-4, SS3-5
11:00 – 11:10	Break
11:10 – 12:50	**Regular Session (RS1): Intelligent Signal and Image Processing** Room: Doi Suthep 1 Chair: Prof. Hae Chul Choi (Hanbat National Univ.) Papers: RS1-1, RS1-2, RS1-3, RS1-4, RS1-5 **Regular Session (RS2): Smart Communication and Systems** Room: Doi Nua Chair: Prof. Sang Kyun Kim (Myungji Univ.)

	Papers: RS2-1, RS2-2, RS2-3, RS2-4, RS2-5, RS2-6, RS2-7, RS2-8, RS2-9
12:50 – 14:30	Lunch
14:30 – 15:50	**Special Session (SS1): AI & Metaverse** Room: Doi Suthep 1 Organizer & Chair: Prof. Youngmo Kim (Soongsil Univ.) Papers: SS1-1, SS1-2, SS1-3, SS1-4, SS1-5 **Regular Session (RS3): Intelligent Signal and Image Processing** Room: Doi Nua Chair: Prof. Kyoungro Yoon (Konkuk Univ.) Papers: RS3-1, RS3-2, RS3-3, RS3-4, RS3-5, RS3-6, RS3-7, RS3-8, RS3-9
15:50 – 16:10	Break
16:10 – 17:30	**Plenary Session** - Room**:** Doi Suthep 1 - Session Chair: Prof. Kyoungro Yoon (Konkuk Univ.) Prof. Chayapol Kamyod (Mae Fah Luang Univ.) **Welcome Message** - Prof. Taek Keun Hwangbo (Gachon Univ.) - Prof. Teeravisit Laohapensaeng (Mae Fah Luang Univ.) **Keynote Speech (KEY-1): AI Based Wireless Communication Standard Classification** - Invited Speaker: Prof. Hiroshi Ochi **(**Kyushu Institute of Technology) **Keynote Speech (KEY-2)**: **CREATING A VIRTUAL HUMAN FOR HOLOGRAPHIC STEREOGRAM RECORDING** - Invited Speaker: Prof. Seung Hyun Lee (Kwangwoon Univ.)
16:10 – 17:50	**Regular Session (RS8): Intelligent Signal and Image Processing** Room: Doi Nua Chair: Prof. Yongseop Kim (Dankook Univ.) Papers: RS8-1, RS8-2, RS8-3, RS8-4, RS8-5

Wednesday, 21st December 2022

09:00 – 10:00	Registration
10:00 – 11:00	**Regular Session (RS7): Intelligent Signal and Image Processing** Room: Doi Suthep 1 Chair: Prof. Cheong Ghil Kim (Namseoul Univ.) Papers: RS7-1, RS7-2, RS7-3, RS7-4

11:00 – 11:20	Break
11:20 – 12:40	**Regular Session (RS4): Intelligent Signal and Image Processing** Room: Doi Suthep 1 Chair: Prof. Cheong Ghil Kim (Namseoul Univ.) Papers: RS4-1, RS4-2, RS4-3, RS4-4 **Regular Session (RS5): Intelligent Speech Processing** Room: Doi Nua Chair: Prof. Youngseop Kim (Dankook Univ.) Papers: RS5-1, RS5-2, RS5-3, RS5-4, RS5-5, RS5-6
12:40 – 14:40	Lunch
14:40 – 15:50	**Regular Session (RS6): Intelligent Speech Processing** Room: Doi Suthep 1 Chair: Prof. Chayapol Kamyod (Mae Fah Luang Univ.) Papers: RS6-1, RS6-2, RS6-3, RS6-4, RS6-5
15:50 – 16:10	Break
16:10 – 17:00	InCIT 2023 Chiang Lai, Pre-constituting Committee Meeting Conference attendee and TPC Members Exchange Program

Thursday, 22nd December 2022

09:00 – 09:10	Pre-meeting
09:10 – 10:20	**EEECS 2023 TPC & Board Meeting** 12th EEECS 2023: Jeju, Korea (June 2023) 13th EEECS 2023: Chiang Lai, Thailand (December 2023)
10:20 – 10:30	Break
10:30 -17:50	**Closing & Field Trip** Chiang Mai University Payap University Temples: Wat Chedi Luang, Wat Chiang Man, Wat Phra Singh Chiang Mai City Arts & Cultural Centre

5. Program

RS1 Regular Session: Intelligent Signal and Image Processing

Room: Doi Suthep 1

Tuesday, 20th December 2022, 11:10 – 12:50

Chair: Prof. Hae Chul Choi (Hanbat National University, Korea)

RS1-1 **Efficient Net-based Model for Knee Osteoarthritis Detection using Transfer Learning Method** *EEECS692*

M.J. Aashik Rasool, Shabir Ahamed, Taeg Keun Whangbo (Gachon University, Korea)

RS1-2 **Cognitive Health Advisor Design for Federated Learning Platform with Noncontact Health Data** *EEECS697*

KangYoon Lee (Gachon University, Korea)

RS1-3 **A Study on the Functional Substitution Technique of 3D Authoring Tool (Unity) for CFD Visualization Optimizations** *EEECS688*

Inpyo Cho, Youngchan Kim, Jiwon Oh, Jaekyu Lee, Sungmin Lim, SangYub Lee (Korea Electronics Technology Institute, Korea)

RS1-4 **Comparison of Low Attention Area Compression Method for Machine Vision** *EEECS694*

Yegi Lee, Kyoungro Yoon (Konkuk University, Korea)

RS1-5 **CHALLENGES AND FUTURE POTENTIALS IN CYBER-PHYSICAL SYSTEMS: A SYSTEMATIC REVIEW** *EEECS733*

D.M.C. Dissanayake, C. Kamyod (Mae Fah Luang University, Thailand)

RS2 Regular Session: Smart Communication and Systems

Room: Doi Nua

Tuesday, 20th December 2022, 11:10 – 12:50

Chair: Prof. Sang Kyun Kim (Myungji University, Korea)

RS2-1 **A MODEL FOR DOWNLOADING AND UPLOADING OF TECHNICAL MEASURES TO PREVENT COPYRIGHT INFRINGEMENT FOR OSP's** *EEECS726*

Ruziev Ulugbek (Tashkent University of Information Technologies, Republic of Uzbekistan), Mamadaliyeva Nigorakhon (Namangan State University, Republic of Uzbekistan)

RS2-2 **KOBERT MODEL FOR INTENT SENTIMENT CLASSIFICATION USING KOGPT BASED CHATBOT** *EEECS707*

HyoungSun Choi, Taeg Keun Whangbo (Gachon University, Korea)

RS2-3 **Exposure therapy effect using metaverse video contents in PTSD patients**

Gisung Oh, Yiqian Han, Teagkeun Whangbo (Gachon University, Korea)

RS2-4 **Metaverse Video Content UX Design for Seniors: Focusing on Color** *EEECS713*

Yiqian Han, Gisung-Oh, Taegkeun-Whangbo (Gachon University, Korea)

RS2-5 **Comparison of WebAR Latency for Edge Server and Cloud Server**

Sukjun Hong, Seyun Choi, Seunghyun Lee, Soonchul Kwon (Kwangwoon University, Korea)

EEECS703

RS2-6 **A Study on Utilization Status and Recognition of Virtual Experiment Content for Online Metaverse Revitalization of Education** *EEECS704*

Jungho Kim, Yujung Lee, Soonchul Kwon, Seunghyun Lee (Kwangwoon University, Korea)

RS2-7 **CREATING A VIRTUAL HUMAN FOR HOLOGRAPHIC STEREOGRAM RECORDING** *EEECS710*

Jiyoun Lee, Kwangchul Son, Soonchul Kwon, Seunghyun Lee (Kwangwoon University, Korea)

RS2-8 **Implementation of Mixed Reality Muscle Rehabilitation Training System by User's EMG Signal** *EEECS712*

Hoijun Kim, Alaric Hamacher, Seunghyun Lee, Soonchul Kwon (Kwangwoon University, Korea)

RS2-9 **Implementation of filters for digital holographic portraits by neural network** *EEECS722*

Philippe Gentet, Jiyoun lee, Soonchul Kwon, Seunghyun Lee (Kwangwoon University, Korea), Matteo Coffin (CESI, Korea)

RS3 Regular Session: Intelligent Signal and Image Processing

Room: Doi Nua

Tuesday, 20th December 2022, 14:30 – 15:50

Chair: Prof. Kyoungro Yoon (Konkuk University, Korea)

RS3-1 **CİRCULARLYPOLARİZED SQUARE PATCH ANTENNA WİTH ASYMMETRİCAL CROSSED SLOTS FOR CUBESAT COMMUNİCATİON SYSTEM** *EEECS699*

Haechul Choi, Seongmin Pyo (Hanbat National University, Korea)

RS3-2 **Deep Learning for Pediatric Respiratory Distress Syndrome** *EEECS706*

Jiyeong Kim, Jaeha Kang, Haechul Cho (Hanbat National University, Korea)

RS3-3 **CboM: Copyright metadata exchange protocol based on Content Bil of Material** *EEECS727*

YongJoon Joe, Wonbin Kim, Dong-Myung Shin (LSWare Inc., Korea)

RS3-4 **Metaverse media identification method using intelligent object extraction and image area correction** *EEECS724*

Seyoung Jang, Jae-Chung Lee, Seok-Yoon Kim, Youngmo Kim (Soongsil University, Korea), In-Jae Yoo (BeyondTech, Inc., Korea)

RS3-5 **Sequential book recommendation method using BERT model**

Youngsun Kwon, Byeongchan Park, Youngmo Kim, Seok-Yoon Kim (Soongsil University, Korea)

RS3-6 **A STUDY ON DEIDENTIFICATION MEHTOD OF VIEWER RATING INFORMATION IN OTT PLAYER AGENT ENVIRONMNET** *EEECS723*

Byeongchan Park, Seok-Yoon Kim, Youngmo Kim (Soongsil University, Korea)

EEECS725

RS3-7 **Multi-receiver encryption technology for efficient Hogel image distribution in the digital holographic market** *EEECS729*

Won-Bin Kim, Kyung-Yeob Park, YongJoon Joe, Dong-Myung Shin (LSWare Inc., Korea)

RS3-8 **Data encryption and encoding integration technology for large-scale Hogel image data streaming** *EEECS730*

Won-Bin Kim, Kyung-Yeob Park, YongJoon Joe, Dong-Myung Shin (LSWare Inc., Korea)

RS3-9 **Tracking original works from derivative work by copyright metadata inclusion** *EEECS728*

YongJoon Joe, Sung-il Jang, Dong-Myung Shin (LSWare Inc., Korea)

RS4 Regular Session: Intelligent Signal and Image Processing

Room: Doi Suthep 1

Wednesday, 21st December 2022, 11:20 – 12:40

Chair: Cheong Ghil Kim (Namseoul University, Korea)

RS4-1 **CLUSTER BASED DATA PLACEMENT POLICY ON HYBRIND MEMORY SYSTEMS** *EEECS715*

Su-Kyung Yoon (Jeonbuk Natinal University, Korea)

RS4-2 **A Study on the Design of a High Availability Big Data Framework for Efficient Collection of Renewable Energy Data based on Container Platform** *EEECS691*

Jaekyu Lee, Sungmin Lim, InPyo Cho, Sangyub Lee (Korea Electronics Technology Institute, Korea)

RS4-3 **Development of a scenario for chatbot counseling for the elderly living alone with underlying diseases in the community** *EEECS682*

Jaeyoung Lee, Kungsuk Kim, Soyeon Choi, Cheong Ghil Kim (Namseoul University, Korea)

RS4-4 **Introduction to Data Generation Method of Multi Fidelity Meta Modeling for Rapid Processing** *EEECS698*

Sangyub Lee, Youngchan Kim (Korea Electronics Technology Institute, Korea)

RS5 Regular Session: Intelligent Speech Processing

Room: Doi Nua

Wednesday, 21st December 2022, 11:20 – 12:40

Chair: Prof. Youngseop Kim (Dankook University, Korea)

RS5-1 **A Study on DVI (Dialogue Voice Interface) based on AI Chatbot for immersive digital signage content** *EEECS683*

Daeseung Park, Cheong Ghil Kim (Namseoul University, Korea)

RS5-2 **A Study on Web-Database-based Immersive Digital Signage Content Control Algorithm** *EEECS684*

Daeseung Park, Cheong Ghil Kim (Namseoul University, Korea)

RS5-3 **ICT-linked Welfare Service Experience of Social Workers in Social Distancing Situations Due to COVID-19** *EEECS687*

Soyun Choi (Namseoul University, Korea)

RS5-4 **A study on community healthcare service model using AI chatbot** *EEECS681*

Jooyeon Park, Eun-young Choi, Daeseung Park, Jaeyoung Lee, Cheong Ghil Kim (Namseoul University, Korea), Youngseop Kim (Dankook University, Korea)

RS5-5 **A STUDY ON THE PERFORMANCE OF IMAGE COMPRESSION WITH DEEP LEARNING** *EEECS739*

Hamed YahouiKim (Claude Bernard University Lyon 1, France), Chayapol Kamyod (Mae Fah Luang University, Thailand)

RS5-6 **AI Based Wireless Communication Standard Classification** *EEECS738*

Hiroshi Ochi (Kyushu Institute of Technology, Japan)

RS6 Regular Session: Intelligent Speech Processing

Room: Doi Suthep 1

Wednesday, 21st December 2022, 14:40 – 15:50

Chair: Prof. Chayapol Kamyod (Mae Fah Luang University, Thailand)

RS6-1 **A study on the expression of 3D object information using multimodal sensor data** *EEECS740*

Yeon-kug Moon, Ho-ik Jang, Ankhzaya Baatarbileg (Korean Electronics Technology Institute, Korea)

RS6-2 **A STUDY ON NRT(NEAR REAL TIME) TECHNOLOGY APPLICABLE TO A VIRTUAL PRODUCTION** *EEECS741*

Yeon-kug Moon, Ho-ik Jang, Ankhzaya Baatarbileg (Korean Electronics Technology Institute, Korea)

RS6-3 **APPARATUS AND METHOD FOR PROVIDING AGRICULTURAL PRODUCTS** *EEECS705*

HaeKyung Chung (Konkuk University, Korea)

RS6-4 **INVESTIGATION OF ELECTROMAGNETIC WAVE CHARACTERISTIC IN TRANSFORMER** *EEECS737*

Myo Myint Maw (Mandalay Technology University, Myanmar), Sathaporn Promwong (King Mongkut's Institute of Technology Ladkrabang, Thailand), Chayapol Kamyod (Mae Fah Luang University, Thailand)

RS6-5 **A STUDY ON DIGITAL TERRESTRIAL TELEVISION BROADCASTING LOCALIZATION IN THAILAND** *EEECS738*

Phouthong Southisombath (ational University of Laos, Vientiane, Lao PDR), Sathaporn Promwong (King Mongkut's Institute of Technology Ladkrabang, Thailand), Chayapol Kamyod (Mae Fah Luang University, Thailand)

RS7 Regular Session: Intelligent Speech Processing

Room: Doi Suthep 1

Wednesday, 21st December 2022, 10:00 – 11:20

Chair: Prof. Cheong Ghil Kim (Namseoul University, Korea)

RS7-1 **A Study on Reducing Bit-precision for Denoising Neural Networks** *EEECS685*

Ji-Young Kim, Jin-Young Lee, Woo-Chan Park (Sejong University, Korea), Cheong-Ghil Kim (Namseoul University, Korea)

RS7-2 **Development of drug information search service app UX contents** *EEECS678*

Seungmin Lee (Namseoul University, Korea)

RS7-3 **A STUDY ON FAST SOUND PROPOGATION ALGORITHM ON MOBILE DEVICES USING PARALLE THREADS** *EEECS680*

EunJae Kim, Suk Won Choi, Woo-Chan Park (Sejong University, Korea), Cheong Ghil Kim (Namseoul University, Korea)

RS7-4 **A STUDY ON CHATBOT SERVICE ARCHITECTURE OF MULTI-DOMAIL BASED HYBRID CHATBOT** *EEECS679*

Jooyeon Park, Eun-young Choi, Cheong Ghil Kim (Namseoul University, Korea)

RS8 Regular Session: Intelligent Speech Processing

Room: Doi Nua

Tuesday, 20th December 2022, 16:10 – 17:50

Chair: Prof. Youngseop Kim (Dankook University, Korea)

RS8-1 **AI in Medicine to Classify Heart Disease using Machine Learning Approach** *EEECS701*

Akmalbek Abdusalomov, Taeg Keun Whangbo (Gachon University, Korea), Mekhriddin Rakhimov (Tashkent University, Uzbekistan)

RS8-2 **XLNet Classificaiton Model for Standard EEG Reports** EEECS690

Kyoungsu Oh, Min Kang, SeoHyun Oh, Do-hyoung Kim, Youngho Lee (Gachon University, Korea)

RS8-3 **Comparison of Background Color on Machine Attention-based Image Compression for Machine Vision** *EEECS702*

Yegi Lee, Kyoungro Yoon (Konkuk University, Korea)

RS8-4 **Tumor detection in various brain anatomy based on deep convolutional neural network** *EEECS693*

Faisal Mehmood, Taeg Keun Whangbo (Gachon University, Korea)

RS8-5 **AI in Medicine to Classify Heart Disease using Machine Learning Approach** *EEECS700*

Akmalbek Abdusalomov, Mekhriddin Rakhimov, Taeg Keun Whangbo (Gachon University, Korea)

SS1 Special Session: AI & Metaverse

Room: Doi Suthep 1

Tuesday, 20th December 2022, 14:30 – 15:50

Organizer & Chair: Prof. Youngmo Kim (Soongsil University, Korea)

SS1-1 **SMART CONTRACT FOR MUSIC MANAGEMENT** *EEECS689*

Gi Woong Chae, Seon Jae Hyeon, Sang-Kyun Kim (Myongji University, Korea)

SS1-2 **SOC ESTIMATION OF LITHIUM THIONYL CHLORIDE BATTERY USING VOLTAGE RECOVERY TIME IN IOT DEVICES** *EEECS696*

Minji Kang, Seongseop Kim, Youngmin Kwon, Seugnwoo Lee (Korea Electronics Technology Institute, Korea)

SS1-3 **A Study on Implementation of Roadside Disaster Information Display Device Using FM RDS 2** *EEECS686*

SangWoon Lee (Namseoul University, Korea)

SS1-4 **STREAM DATA MANAGEMENT ON COUD COMPUTING** *EEECS716*

Su-Kyung Yoon (Jeonbuk Natinal University, Korea)

SS1-5 **Webtoon image generation from treatment based on AttnGAN** *EEECS695*

Kyung-ho Yu, Hyung-ju Kim, Jeong-in Kim, Junho-Choi, Chan-Jun Chun, Pan-Koo Kim (Chosun University, Korea), Han-il Kim (Jeju National University, Korea), Seong-je Cho (Dankook University, Korea)

SS2 Special Session: AI Convergence and Applications 1

Room: Doi Suthep 1

Tuesday, 20th December 2022, 09:20 – 11:00

Organizer & Chair: Prof. Worasak Rueangsirarak (Mae Fah Luang University, Thailand)

SS2-1 **THE DEPRESSIVE INTERVENTION OF SELFADOPTION WITH THE HEALTH BELIFE MODEL USING VR TECHNOLOGY** *EEECS708*

Natthamol Heebjankri, Adisorn Leelasantitham (Mahidol University, Thailand)

SS2-2 **FACTORS OF CONTEXT OF USE FOR THE ADOPTION OF AI MEDICAL IMAGING TECHNOLOGY** *EEECS719*

Anuchit Nirapai , Adisorn Leelasantitham (Mahidol University, Thailand)

SS2-3 **APPLICATION OF TRACEABILITY SYSTEM FOR TEAK IDENTITY BASED ON BLOCKCHAIN** *EEECS711*

Sai Woon Sheng , Santichai Wich (Mae Fah Luang University, Thailand)

SS2-4 **FACTORS OF ICHANGE MODEL AFFECTING THE TRANSTHEORETICAL MODEL FOR MAJOR DEPRESSIVE DISORDER** *EEECS718*

Piangruthai Nusawat, Adisorn Leelasantitham (Mahidol University, Thailand)

SS3 Special Session: AI Convergence and Applications 2

Room: Doi Nua
Tuesday, 20th December 2022, 09:20 – 11:00
Organizer & Chair: Prof. Wanus Srimaharaj (Payap University, Thailand)

SS3-1	**Holistic Success Factors influencing to ERP Project success, ERP System quality and Organizational performances** Itthiphol Eampoonga, Adisorn Leelasantitham (Mahidol University, Thailand)	*EEECS709*
SS3-2	**EMPLOYEE CLUSTERING MODEL FOR DETERMINING PROMOTION STATUS USING KMEAN AND SMOTE** Theeramet Kaewwiset, Punnarumol Temdee (Mae Fah Luang University, Thailand)	*EEECS720*
SS3-3	**MACHINE LEARNING BASED MODEL FOR CLASSIFICATION OF ADULT PEOPLE WITH DEMENTIA RISK** Yanawut Chaiyo, Punnarumol Temdee (Mae Fah Luang University, Thailand)	*EEECS721*
SS3-4	**EARLY DETECTION OF DEMENTIA USING OPTIMIZED WEIGHTED OBJECTIVE DISTANCE** Veerasak Noonpan, Supansa Chaising, Punnarumol Temdee (Mae Fah Luang University, Thailand)	*EEECS731*
SS3-5	**AUTOMATIC CAT FEEDER AND CAT MONITORING SYSTEM THROUGH Wi-Fi** HASSANSEEROYEE SAEAED, WEISHAANISMAIL NOIPOM, SAFIA YAHLEE, THONGCHAI YOOYATIVONG, CHAYAPOL KAMYOD (Mae Fah Luang University, Thailand)	*EEECS732*

6. Abstracts

RS1 Regular Session: Intelligent Signal and Image Processing 1

Room: Doi Nua

Tuesday, 20th December 2022, 11:10 – 12:50

Chair: Prof. Hae Chul Choi (Hanbat National University, Korea)

RS1-1 Efficient Net-based Model for Knee Osteoarthritis Detection using Transfer Learning Method

EEECS692

M.J. Aashik Rasool Gachon University
Shabir Ahamed Gachon University
Taeg Keun Whangbo Gachon University

Recent studies have proven that knee osteoarthritis is notoriously incurable disease in modern world. As articular cartilage gradually wears out, it worsens the affected area. The major factor in knee osteoarthritis identification is knee x-rays require professional judgment from doctors. However, large numbers of x-rays and some minor differences within them may cause human misjudgment. Recently convolutional neural network-based algorithms are proposed to automate the diagnostic process to some extent; however, the low test and validation accuracy make it impractical. In this paper, we consider a more robust model which uses transfer learning techniques to identify knee osteoarthritis even if there are minor modifications in training data. We carried out experiments on CNN-based state-of-the-art models by utilizing transfer learning as opposed to generic approach. It was found that EfficientNet shows the best results compared to other methods such as Resnet18, AlexNet, SqueezeNet and DenseNet. After comparing state of the art, our proposed model achieves higher training accuracy of 93.8% as well as validation accuracy of 92.3%. The proposed model is trained to identify five classes according to Kallgren Lawrence grading. The obtained results indicate that proposed model not only achieves higher accuracy but also reduces loss compared to existing models.

RS1-2 Cognitive Health Advisor Design for Federated Learning Platform with Non-contact Health Data

EEECS697

KangYoon Lee Gachon University

With the development of technology to acquire and manage vital-signals from non-aware and non-contact sensors, anomaly detection, prediction, and prevention support become possible. It will accelerate the shift from hospital care to home health care. Federated learning technology that supports privacy and personalized models in various health devices is applied. The implementation of digital twin-based AAL (Ambient Assisted

Living) environment platform technology to support bio-abnormality detection, prediction, and digital treatment are required. Ultimately Social welfare and health care services are expanded by providing personalized health care in the living environment

RS1-3 A Study on the Functional Substitution Technique of 3D Authoring Tool (Unity) for CFD Visualization Optimizations *EEECS688*

Inpyo Cho	Korea Electronics Technology Institute
Youngchan Kim	Korea Electronics Technology Institute
Jiwon Oh	Korea Electronics Technology Institute
Jaekyu Lee	Korea Electronics Technology Institute
Sungmin Lim	Korea Electronics Technology Institute
SangYub Lee	Korea Electronics Technology Institute

Visual effects resulting from CFD analysis include strem line plots and contour line plots. Visualization applications can be developed using VTK, a standard output format for visualizing CFD results, as input again. Among 3D authoring tools, Unity, in particular, has a library that officially supports VTK parsing, and you can use it to parse VTK files within Unity. Along with parsing, it includes a function to render visualization effects such as streamlines and contour lines together. However, the functions included in the VTK library are rendered without fully utilizing the functions of Unity, so they lack performance and visual effects. In this thesis, we apply the Unity functions for effectively rendering stream lines and contour lines and propose simple examples. It is expected that the proposed function will optimize the development of 3D visualization applications of CFD results.

EEECS694

RS1-4 Comparison of Low Attention Area Compression Method for Machine Vision

Yegi Lee	Konkuk University
Kyoungro Yoon	Konkuk University

As demands for machine vision in various applications, such as smart cities, autonomous vehicles, and surveillance systems, grow, MPEG has started a new standardization activity called VCM(Video Coding for Machine). The main goal of VCM is to achieve optimal compression performance of video while minimizing the impact of lossy compression method to machine vision tasks. Since conventional video compression technologies have developed by reflecting HVS(Human Vision System) to develop a compression scheme for the machine, it is vital to understand the characteristics of the machine vision. So, in this paper, we design an attention-based compression technology by dividing each frame of a video into the High Attention Region (HAR) that the machine is interested in and the Low Attention Region (LAR) that the machine is relatively less interested in. We also propose two LAR compression techniques and compare their performance.

RS1-5 **CHALLENGES AND FUTURE POTENTIALS IN CYBER-PHYSICAL SYSTEMS: A SYSTEMATIC REVIEW** *EEECS733*

D.M.C. Dissanayake Mae Fah Luang University

C. Kamyod[2] Mae Fah Luang University

Cyber-Physical Systems (CPSs) are integrated components that have both computational and processing capabilities. They include various real-world physical elements and other software systems. These real-world objects utilize communication technologies through which they are controlled to deliver various tasks around the world. Therefore, CPSs interact with the physical world continuously in different areas such as manufacturing, transportation, healthcare, etc. The integration of cyber and physical components generates various challenges. On the other hand, CPSs are engineered using several layers of complex hardware and software that are interconnected. Researchers introduce solutions for the limitations and new trends for the CPS. This study conducted a literature survey and identified current challenges and future trends for CPSs.

RS2 Regular Session: Intelligent Signal and Image Processing

Room: Doi Suthep 1

Tuesday, 20th December 2022, 11:10 – 12:50

Chair: Prof. Sang Kyun Kim (Myungji University, Korea)

RS2-1 **A MODEL FOR DOWNLOADING AND UPLOADING OF TECHNICAL MEASURES TO PREVENT COPYRIGHT INFRINGEMENT FOR OSP's** *EEECS726*

Ruziev Ulugbek Tashkent Universit
Mamadaliyeva Nigorakhon Namangan State University

Filtering technology is used to prevent the circulation of unlawful digital material in accordance with copyright rules. This kind of filtering contains a preventive algorithm as well as diversion restrictions to protect against the intentional counterfeiting of internet service providers. Measures of a technical nature ensure that the technology being evaluated functions regularly, without experiencing any degradation in performance or being hindered by technological restrictions. The process of uploading and downloading material is broken down into its component parts for the purpose of this research. in addition to flowcharts for the process of uploading and downloading material.

RS2-2 **KOBERT MODEL FOR INTENT SENTIMENT CLASSIFICATION USING KOGPT BASED CHATBOT** *EEECS707*

HyoungSun Choi Gachon University
Taeg Keun Whangbo Gachon University

Chatbots are computer programs designed to perform specific tasks through conversations with humans using voice or text. With the development of hardware and huge datasets, deep learning has developed dramatically. Recently, various kinds of research have been done by applying digital to healthcare. One example is the depression chatbot. Depression has become one of the major diseases in modern society, and in recent research, chatbots were effective in relieving the degree of depression. In this experiment, we suggest a chatbot system that classifies the intent and sentiment of the user and outputs a response through the chatbot. The proposed model is trained by the Wellness dataset and Cloud Sourcing data from GRRC. For the result, intent classification had 0.77 f1-score, and sentiment classification had 0.73 f1-score.

RS2-3 **Exposure therapy effect using metaverse video contents in PTSD patients** *EEECS713*

Gisung Oh Gachon University
Yiqian Han Gachon University
Teagkeun Whangbo Gachon University

With the recent emergence of realistic content media such as Metaverse, people are more interested in immersive treatment with increased realism and realism, such as virtual space or 360° VR video. Exposure therapy for PTSD patients using metaverse content is known to be more effective because it can show more vivid exposure to patients than conventional psychological counseling therapy. In this study, we recruited experience groups and conducted clinical trials to verify the clinical intervention effect of metaverse contents produced for the purpose of exposure treatment of PTSD patients. We measured the data through PCL tests in the patient group and the normal group and conducted repeated measurement ANOVA, and confirmed that it had a significant effect on the patient group. This study is meaningful as an empirical case of content production for PTSD rehabilitation.

RS2-4 Metaverse Video Content UX Design for Seniors : Focusing on Color *EEECS714*

Gisung Oh Gachon University
Yiqian Han Gachon University
Teagkeun Whangbo Gachon University

The Metaverse experience is now a new way of socializing; people can experience more video content through Metaverse. Although the Metaverse video platform must be better adapted to older users, the currently available Metaverse user experience (UX) needs to be optimized for this purpose. We aim to optimize the VR device experience for older adults by examining the relevant literature. By collecting characteristics of eye diseases and cognitive impairment of the elderly, color matching, page layout, information delivery, and behavioral guidance are found to be the core factors of elderly user (UX) experience in the design process of an interactive interface. Moreover, we designed a questionnaire to verify our conjecture. The findings of this study help to understand the barriers to older users' Metaverse and VR content experiences and provide developers in related fields with usability UX design references related to improving the user interface (UI) to help older users have a better Metaverse video experience.

EEECS703

RS2-5 Comparison of WebAR Latency for Edge Server and Cloud Server

Sukjun Hong Kwangwoon University
Seyun Choi Kwangwoon University

Seunghyun Lee Kwangwoon University
Soonchul Kwon Kwangwoon University

Recently, various services using AR(Augmented Reality) technology are provided. WebAR service can provide AR service through Web. WebAR makes it easy for users to use AR services with convenient accessibility. Users can enjoy AR services through the web without installing applications. When accessing the WebAR service, the AR content is downloaded by connecting to the cloud server. There is a problem that an initial latency for downloading AR content [1]. This study perposed to reduce AR content latency by building and using by edge server. In recent years, the paradigm of computing has shifted from centralized cloud servers to edge servers [2]. Edge servers is servers that run the processing at an edge location. Latency is relatively reduced, when a user accesses WebAR and downloads AR content from edge server [3]. For the experiment, a WebAR environment was created for each edge server and cloud server. We measured the latency of downloading the AR content to the user's device. The measurement results in the edge server improved about 21.38% compared to the cloud server. Edge server have a lower standard deviation than cloud servers. Therefore, it is possible to provide a more stable service to the user. The results of this study, users can reduce latency when using WebAR service on edge server. It is expected that edge server technologies will contribute to AR technology.

RS2-6 A Study on Utilization Status and Recognition of Virtual Experiment Content for Online Metaverse Revitalization of Education *EEECS704*

Jungho Kim Kwangwoon University
Yujung Lee Kwangwoon University
Soonchul Kwon Kwangwoon University
Seunghyun Lee Kwangwoon University

The recent method of displaying content has the form of a metaverse, which is classified into virtual reality, augmented reality, lifelogging, and mirror world. As the metaverse is attracting attention as a means to replace the Internet, high market growth is predicted in the future. As immersive content technology develops, the metaverse, a digital reality space, is expected to expand physical reality. In the field of education, with the development of such content technology, attempts are being made to class methods that utilize the digital environment, breaking away from the existing class methods. This study conducted experiments with 85 elementary, middle, and high school teachers using 5 types of experimental math and science virtual experiment contents. After the experiment was completed, the content satisfaction level, virtual experiment utilization status, and virtual experiment recognition were analyzed using each frequency analysis, independent sample t-test, multiple response analysis, and cross-analysis. The most common responses were lack of information and data for the reasons for not using virtual experimental content and motivation and attention for the reasons for use. Visualization learning methods were provided for effective reasons for virtual experiment content, and

distractions were the most common responses for ineffective reasons. There were no statistical differences according to teacher background variables (gender, age, affiliation, teaching experience, field, etc.). Through this study, a plan to effectively operate online virtual experiment classes at elementary, middle, and high school sites was suggested. In addition, it is judged that this study can be used as basic evidence to bridge the gap in underprivileged areas' education and expand student participation-type classes.

EEECS710

RS2-7 CREATING A VIRTUAL HUMAN FOR HOLOGRAPHIC STEREOGRAM RECORDING

Jiyoun Lee	Kwangwoon University
Kwangchul Son,	Kwangwoon University
Soonchul Kwon	Kwangwoon University
Seunghyun Lee	Kwangwoon University

Human holograms can vividly express the human characteristics recorded by the artist in 3D, and through this, interaction with the audience can be achieved [1]. In this paper, a method of producing a virtual human for recording a human hologram using a holographic stereogram method is presented. The virtual human model was produced through real object-based 3D modeling [2]. It took 6 months to produce the basic model and 2 to 3 days to produce one still cut image. In order to record a digital hologram with the manufactured virtual human, a multi-view image must be extracted. Camera locations are set within the Maya program, and multi-view images are extracted from virtual human 3D data. The acquired multi-view images are converted into hogel images using data rearrangement S/W, and holographic stereograms can be produced from these hogels.

RS2-8 Implementation of Mixed Reality Muscle Rehabilitation Training System by User's EMG Signal *EEECS712*

Hoijun Kim	Kwangwoon University
Alaric Hamacher	Kwangwoon University
Seunghyun Lee	Kwangwoon University
Soonchul Kwon	Kwangwoon University

Recently, a rehabilitation system using mixed reality technology has been proposed [1, 2]. The clinical effectiveness of the rehabilitation system has been demonstrated in various medical fields. Mixed reality technology provides not only realistic experiences but also game-based fun factors. The purpose of this study is to implement the lower extremity muscle rehabilitation system in mixed reality by analyzing the user's motion intention [3]. We proposed a bidirectional LSTM-based artificial intelligence network model to understand the user's motion intention. The EMG signal is acquired from the sEMG sensor attached to the user's thigh, and noise is filtered by the average filter. The proposed bidirectional LSTM classifies three motion intentions (up,

down, rest state) of the ankle. We advanced time series data analysis using nested prediction method. The accuracy of the proposed model showed 91% performance. In addition, virtual lower extremity data that can be simulated according to the user's intention is implemented. The proposed rehabilitation system is serviced in mixed reality using Microsoft's HoloLens 2. The user moves the virtual lower extremity data through muscle movement according to the provided guide video. The results of this study are expected to be applicable to patients who need muscle rehabilitation immediately after surgery and patients with lower extremity amputation.

RS2-9 Implementation of filters for digital holographic portraits by neural network *EEECS722*

Philippe Gentet	Kwangwoon University
Matteo Coffin	Kwangwoon University
Jiyoun lee	Kwangwoon University
Soonchul Kwon	Kwangwoon University
Seunghyun Lee	Kwangwoon University

The most precise way of representing a person is the pulsed holographic portraiture [1]. In the 21st century, this technique has almost disappeared because of the final monochromatic green or red color of the holograms that makes the holographic portraits cadaverous and ghostly for the general public. Moreover these portraits were not editable. Beyond the rendering of colors, people have become accustomed today, thanks to the tools present in their smart phones and cameras, to apply filters to modify and enhance their portrait. With the emergence in 1995 of holographic stereograms divided into a matrix of small elements or hogels, it is now possible to record holograms from a series of photographs. In 2019, the third generation of holoprinter called CHIMERA [2] prints full-color digital holograms with a hogel resolution of 250 μm and a 120◦ full-parallax. The 768 images needed to create an holographic portrait can be edited before the hologram is recorded. Because of the large number of images to be modified, it is impossible to do it by hand one by one with graphic editors. This research proposes to solve the problem by implementing neural network filters.

RS3 Regular Session: Intelligent Signal and Image Processing

Room: Doi Suthep 1

Tuesday, 20th December 2022, 14:30 – 15:50

Chair: Prof. Kyoungro Yoon (Konkuk University, Korea)

RS3-1 CİRCULARLY-POLARİZED SQUARE PATCH ANTENNA WİTH ASYMMETRİCAL CROSSED SLOTS FOR CUBESAT COMMUNİCATİON SYSTEM *EEECS699*

Haechul Choi Hanbat National University
Seongmin Pyo Hanbat National University

In this paper, we proposed a new right-handed circularly polarized square patch antenna based on asymmetrical crossed slots for S-band communication system of the CubeSat. The proposed antenna consists of the square microstrip radiator, the quarter-wavelength impedance matching circuit on the top side and the asymmetrical crossed slot perturbation on the ground side. The proposed antenna shows the right-handed circularly-polarized radiation at the resonant frequency of 2.23 GHz with the minimum axial ratio of 0.91.

RS3-2 Deep Learning for Pediatric Respiratory Distress Syndrome *EEECS706*

Jiyeong Kim Hanbat National University
Jaeha Kang, Hanbat National University
Haechul Choi Hanbat National University

Respiratory Distress Syndrome (RDS) [1] Respiratory Distress Syndrome (Rpediatric death and requires rapid diagnosis and treatment. Pediatric RDS diagnosis is typically made by visually analyzing X-ray images, but since it relies on the subjective judgment of experts, considerable time, cost, and labor are consumed. Accordingly, this paper proposes a pediatric RDS/nonRDS discrimination method using a deep neural network to assist the pediatric RDS diagnosis. The proposed method builds a data set with 1772 X-ray images using an augmentation method through random geometric transformation, and segments lung region by using Multi-Scale Residual Fusion Network [2] so that the neural network focuses on RDS features. Using the augmented and segmented data set, Densely Connected Convolutional Networks [3] discriminant model pretrained with ImageNet is further fine-tunes to enhance discrimination accuarcy. Experimental results show an average accuracy of 78.5%, which is 3.9% better than the case without lung region segmentation.

RS3-3 CboM: Copyright metadata exchange protocol based on Content Bil of Material *EEECS727*

YongJoon Joe LSWare Inc.
Wonbin Kim LSWare Inc.
Dong-Myung Shin LSWare Inc.

Infringement and unpaid fees for using copyright work could happen without the intention. We know that not fully providing information about the creator, copyrighter, and license for the work leads the cases.
In this paper, we introduce a new protocol for exchange between distribution platforms and its users that utilize copyright works.

RS3-4 Metaverse media identification method using intelligent object extraction and image area correction *EEECS724*

Seyoung jang Soongsil University
In-Jae Yoo BeyondTech, Inc
Jae-Chung Lee Soongsil University
Seok-Yoon Kim Soongsil University
Youngmo Kim Soongsil University

As the craze for metabus has recently expanded to various fields, events that require a sense of realism are being held using metaverse media. Although metaverse media that crosses the virtual world and the real world is a virtual space, digital works used in it are subject to personal property rights, and it may cause copyright issues if the copyrighted works in the real world are used on metaverse media without permission. In order to prevent copyright infringement in these metaverse media, this paper proposes a metaverse media identification method using object extraction and image area correctiqon.

RS3-5 Sequential book recommendation method using BERT model *EEECS725*

Youngsun Kwon Soongsil University
Byeongchan Park Soongsil University
Youngmo Kim, Soongsil University
Seok-Yoon Kim Soongsil University

Recently, with the advance of mobile devices and mobile communication environments, it is possible to consume a variety of products and contents on online platforms. As a result, technology that recommends products or contents that may be of interest based on user preferences and past behavior is becoming important. It is also applied and serviced in the book product field, but there is a problem in that it does not reflect the user's recent interest because it does not consider the change in preference over time. In this paper, we propose

a sequential book recommendation method that predicts the next choosable book through the BERT model that learns the user's sequential past book usage patterns. Through this, it is possible to recommend books that reflect the user's recent interests.

RS3-6 A STUDY ON DEIDENTIFICATION MEHTOD OF VIEWER RATING INFORMATION IN OTT PLAYER AGENT ENVIRONMNET *EEECS723*

Byeongchan Park	Soongsil University
Seok-Yoon Kim	Soongsil University
Youngmo Kim	Soongsil University

Due to the recent appearance of Corona 19, the OTT platform, a non-face-to-face service, has achieved a lot of growth in a short time. However, the OTT platform does not accurately provide the viewing time of content, making it difficult for right holders to manage their rights. An objective and reliable viewer rating survey method is needed to make the settlement with the rightholder transparent. Efforts to protect personal information are required in the viewer rating survey process, and the rating survey requires the information only on which and how much content was reproduced. In this paper, we propose a method to de-identify personal information from viewer rating information in the OTT player agent environment

RS3-7 Multi-receiver encryption technology for efficient Hogel image distribution in the digital holographic market *EEECS729*

Won-Bin Kim	LSWare Inc.
Kyung-Yeob Park	LSWare Inc.
YongJoon Joe	LSWare Inc.
Dong-Myung Shin	LSWare Inc.

Hogel image is an abbreviation for Hologram element and means original data of a digital holographic image. Such a Hogel image is being studied to be used for hologram printing. In order to activate the hologram market using the Hogel image, the use of the Hogel image must be made in various ways. To this end, we are conducting research on platforms that can trade, distribute, and manage usage records of Hogel images. Therefore, in this work, we conduct research on multi-receiver encryption techniques to securely distribute the same Hogel image to multiple recipients.

RS3-8 Data encryption and encoding integration technology for large-scale Hogel image data streaming *EEECS730*

Won-Bin Kim	LSWare Inc.
Kyung-Yeob Park	LSWare Inc.
YongJoon Joe	LSWare Inc.
Dong-Myung Shin	LSWare Inc.

Digital holographic technology uses an image file called a Hogel(Hologram element) image. Hogel image differs from conventional 2D images because it contains information about color, depth, and viewpoint to show three-dimensional images on a plane. Depending on the size and resolution of the digital holographic output, these Hogel images are printed superimposed on hundreds to hundreds of thousands of images, and all image data must be stored and transmitted without loss because each image interferes with the output of other images. In this study, we studied how to encode the Hogel image into a form suitable for data streaming and perform encryption at the same time so that a portion of the transmitted data can be used for output before all data is completed in the process of transmitting a large amount of Hogel image.

RS3-9 Tracking original works from derivative work by copyright metadata inclusion *EEECS728*

YongJoon Joe LSWare Inc.
Sung-il Jang LSWare Inc.
Dong-Myung Shin LSWare Inc.

Because of contemporary artworks becoming bigger, many of works re-use other works as a material. Re-use of other work is not bad, but the creators of the works should be honored. In this paper, we introduce a new copyright metadata format for including in the works and provide how to track metarial works.

RS4 Regular Session: Intelligent Signal and Image Processing

Room: Doi Suthep 1

Wednesday, 21st December, 11:20 – 12:40

Chair: Cheong Ghil Kim (Namseoul University, Korea)

RS4-1 **CLUSTER BASED DATA PLACEMENT POLICY ON HYBRIND MEMORY SYSTEMS** *EEECS715*

Su-Kyung Yoon Jeonbuk Natinal University

In this paper, a DRAM buffer for non volatile memories and a cluster-based data placement policy are used to improve the performance of hybrid memory using next-generation non-volatile memory devices. The DRAM buffer stores prefetched data by predicting the availability of data, and analyzes previously requested data using the K-mean algorithm to predict data that is likely to be used in the future, and clusters them. The proposed cluster-based data placement policy can create clusters that continuously reflect data access patterns over time. We performed performance evaluation on a trace-driven simulator. The input file of the simulator was extracted using the pintool by driving SpecCPU2006. As a result, the hit rate of the proposed system is 87.1%, the hit rate of the DRAM buffer with simple prefetch algorithm is 86.2%, and the hit rate of the DRAM buffer with only simple fetch is 85.9%.

RS4-2 **A Study on the Design of a High Availability Big Data Framework for Efficient Collection of Renewable Energy Data based on Container Platform** *EEECS691*

Jaekyu Lee Korea Electronics Technology Institute
Sungmin Lim Korea Electronics Technology Institute
InPyo Cho Korea Electronics Technology Institute
Sangyub Lee Korea Electronics Technology Institute

In this paper, we conducted a study on the design of a high-availability big data framework to efficiently collect renewable energy data such as solar and wind power. We have designed the database server based on the Docker container and developed to increase the server's availability by duplicating the containers that make up the database server. In order to build an efficient big data system, it is very important to collect data without missing data. In addition, it is absolutely necessary to build a high-availability big data platform in order to seamlessly collect continuous data without missing data.

RS4-3 Development of a scenario for chatbot counseling for the elderly living alone with underlying diseases in the community *EEECS682*

Jaeyoung Lee Namseoul University
Kyungsuk Kim Namseoul University
Soyeon Choi Namseoul University
Cheong Ghil Kim Namseoul University

Recently, along with the development of technologies of big data, machine learning, and artificial intelligence, the introduction of intelligent services is actively taking place in the IT service field. Chatbot may be one of the most actively introduced technologies from this point of view. This paper aims to develop a conversation scenario that is the basis for implementing a counseling chatbot. Through this, it will be the basis for a hybrid structured empathic counseling chatbot model through the combination of scenario-based dialogue module and artificial intelligence dialogue module. It will be possible to overcome the limitations of existing chatbots that give mechanical answers based only on pre-entered content and rules. The counseling scenario configuration is divided into the user's position and the service-providing chatbot's position, and it is created based on the decision tree and models the results that can come out in a situation where a decision needs to be made in a tree structure. The users can be middle-aged and elderly people living alone, and this paper aims to construct a conversation system that can search for empathic conversation related to depression and manage underlying diseases at the same time.

RS4-4 Introduction to Data Generation Method of Multi Fidelity Meta Modeling for Rapid Processing *EEECS698*

Sangyub Lee Korea Electronics Technology Institute
Youngchan Kim Korea Electronics Technology Institute

Data generation of multi fidelity meta modeling (MFMM) is a crucial problem to enhance modeling data quality. This problem is also challenging due to the processing speed in cloud computing based systems. This paper introduces a method for generating a multi-fidelity meta model using a small amount of high-fidelity data by extracting the streamline of low-fidelity data using the convolutional long short term memory(ConvLSTM) technique using time series data proposed in this paper.

RS5 Regular Session: Intelligent Speech Processing

Room: Doi Nua

Wednesday, 21st December 2022, 11:20 – 12:40

Chair: Prof. Youngseop Kim (Dankook University, Korea)

RS5-1 A Study on DVI (Dialogue Voice Interface) based on AI Chatbot for immersive digital signage content *EEECS683*

Daeseung Park Namseoul University
Cheong Ghil Kim Namseoul University

Existing general digital signage contents have been interacted with users based on traditional input devices such as touch screens or keyboards. However, in immersive digital signage content, this traditional interaction method can result in lower immersion and limit the usability of the content. In order to overcome these limitations, we study the structure of an AI chatbot for immersive digital signage contents that can interact based on voice conversation. Existing text-based chatbots are being studied in various ways, and open-source projects such as Google Dialog flow and Open-source Chatbot RASA and freeware are actively being developed. Therefore, there are advantages to utilizing and applying immediately. However, since text-based chatbots are the main ones, a conversion process by interlocking voice communication modules is necessary to enable voice conversations. In this paper, we propose a structural design for this.

RS5-2 A Study on Web-Database-based Immersive Digital Signage Content Control Algorithm *EEECS684*

Daeseung Park Namseoul University
Cheong Ghil Kim Namseoul University

General digital signage is collectively controlled and managed by a centralized server. And it distributes content and delivers commands through direct communication. However, the disadvantage of this method is that communication is not smooth in a restricted network with a firewall. In addition, limited networks have limitations in communication bandwidth. Due to these circumstances, direct communication may have problems distributing and controlling content relatively normally. However, even in a generally restricted network environment, outbound traffic is relatively free of restrictions. In this paper, to solve the communication problem, outbound communication is used to facilitate content control. Design and propose indirect communication structure through Web-Database based server.

RS5-3 ICT-linked Welfare Service Experience of Social Workers in Social Distancing Situations Due to COVID-19 *EEECS687*

Soyun Choi Namseoul University

As social distancing due to COVID-19 is more fatal to the vulnerable, social welfare services should be provided without gaps as much as possible. Therefore, this study analyzed the experiences of ICT-linked non-face-to-face services conducted by social workers in the situations of social distancing. Data were collected using an open-ended questionnaire for fourteen social workers at community social welfare centers in Korea. As a result of the study, first, social workers suddenly experienced a lack of technology utilization skills in the process of implementing non-face-to-face services using ICT. Second, it was confirmed that ICT-linked telecommuting was not effective due to the nature of social welfare works. Third, various non-face-to-face methods such as web conference, YouTube, and SNS were used in the service process, but were evaluated to have little effect compared to face-to-face services. Fourth, it was confirmed that it is practically difficult to provide ICT-linked non-face-to-face services to the digital underprivileged. Fifth, various service provision methods using ICT were presented as a new alternative to the accessibility of services for the digital generation or young people. Based on these research results, this study made suggestions to improve the effective role of social workers in a situation where face-to-face services are limited

RS5-4 A study on community healthcare service model using AI chatbot *EEECS681*

Jooyeon Park Namseoul University
Eun-young Choi Namseoul University
Daeseung Park Namseoul University
Jaeyoung Lee Namseoul University
Cheong Ghil Kim Namseoul University
Youngseop Kim Dankook University

Conversational artificial intelligence (AI) services that can replace human roles are considered a key technology to lead the post-COVID-19 era, and in the future, the technology that implements more natural conversational AI than the present is expected to be applied to many fields. In particular, it is considered to be an important technology to be used as a way to solve this problem in Korea, where the number of middle-aged and elderly people living alone increases and their deaths in loneliness increase accordingly. In this paper, we develop a chatbot that seeks natural language conversation by its users for caring of diabetic patients with cummunity care service program. Diabetes is considered one of the most difficult diseases to treat and manage, and the most important thing in treating diabetic patients is to continuously improve their lifestyle based on sufficient information about the patient. Therefore, this part becomes a proposal of a community healthcare service model parallel to chatbot. The uniqueness of this chatbot lies in the fact that its architecture

provides it flexibility to evolve to encompass more domains and services without having any impact on existing services. Specifically, this bot uses a hierarchical and hybrid approach.

RS5-5 A STUDY ON THE PERFORMANCE OF IMAGE COMPRESSION WITH DEEP LEARNING *EEECS739*

Hamed YahouiKim Claude Bernard University Lyon 1
Chayapol Kamyod Mae Fah Luang University

Image compression plays an important role in encoding and improving various forms of images in the digital era. Recent researches have focused on the principle of deep learning as one of the most exciting machine learning methods to show that it is good scheme to analyze, classify and compress images. Various neural networks are able to adapt for image compressions, such as deep neural networks, artificial neural networks, recurrent neural networks and convolution neural networks. In this review paper, we discussed how to apply the rule of deep learning to obtain better image compression with high accuracy, low lossness and high visibility of the image. For those results in performance, deep learning methods are required on justified manner with distinct analysis.

RS5-6 AI Based Wireless Communication Standard Classification *EEECS738*

Hiroshi Ochi Kyushu Institute of Technology

The proliferation of wireless devices and the increasing demand for high-speed internet have led to the development of 5G New Radio (NR) technology, which promises to deliver faster and more reliable wireless communication. 5G NR works in different spectrums, sub-1 GHz, sub-6 GHz and millimeter wave (mmWave) in the 26-28 GHz range. On the other hand, Wi-Fi 6 operates on the unlicensed band and is currently on 2.4 GHz, 5 GHz, and 6 GHz when Wi-Fi 6E is available. However, the coexistence of 5G NR sub-6 GHz and Wi-Fi 6 networks can lead to interference and reduced performance for both technologies. In this paper, we propose a multi-task learning with convolutional neural networks (MTL-CNN) approach to enhance the coexistence of 5G and Wi-Fi networks by identifying and classifying packets transmitted over the networks based on communication standards. The MTL-CNN model is trained to classify packets based on their type (e.g. 5G or Wi-Fi) and identify the specific protocol being used within each packet. WiFi and 5G signals generated by the Matlab waveform-simulator are used to verify the accuracy of the proposed method, which is then implemented on a real-time SDR-based hardware testbed. Our experimental results show that the proposed approach significantly improves the accuracy of packet identification and classification, leading to improved coexistence between 5G and Wi-Fi networks. This approach has the potential to enable more efficient utilization of wireless spectrum and improve the overall performance of wireless communication systems.

RS6 Regular Session: Intelligent Speech Processing

Room: Doi Suthep 1

Wednesday, 21st December 2022, 14:40 – 15:50

Chair: Prof. Chayapol Kamyod (Mae Fah Luang University, Thailand)

RS6-1 **A study on the expression of 3D object information using multimodal sensor data** *EEECS740*

Yeon-kug Moon	Korean Electronics Technology Institute
Ankhzaya Baatarbileg	Korean Electronics Technology Institute
Ho-ik Jang	Korean Electronics Technology Institute

The study of restoring the motion of a performer in the form of a 3D volumetric has been one of the most complex and difficult subjects in the field of computer vision for the past several decades. Because human cognitive ability has a high degree of learning about humans, it is more sensitive and stricter than other 3D object restorations for inaccurate restoration quality. This paper investigates restoring detailed human movements are largely divided into 5 stages. These are research on system technology that can acquire human movements using various viewpoints and multimodal sensor data, the calibration of multimodal sensors, applying for AI-based efficient 3D dynamic characteristics, synthesizing of 3D volume area, and matching of the acquired 3D motion information in a 3D space as an application technology that can actually be used as content. In the case of ToFU, the overall process was applied very efficiently. There are still many limitations for commercial level purposes. In the case of NeRF, a methodology that can approximate elements that are difficult to model optically and provide them from a new point of view. The results show that to increase the resolution, design the 3D voxel grid of the image below with some degree of complexity. If various multi-viewpoint information is additionally secured, more reliable results can be obtained by converging the flow of light in various directions.

RS6-2 **A STUDY ON NRT(NEAR REAL TIME) TECHNOLOGY APPLICABLE TO A VIRTUAL PRODUCTION** *EEECS741*

Yeon-kug Moon	Korean Electronics Technology Institute
Ankhzaya Baatarbileg	Korean Electronics Technology Institute
Ho-ik Jang	Korean Electronics Technology Institute

Due to the most fatal issue between work processes, various content production processes are currently being suspended as one trend of virtual production. It causes a problem of production cost, and the additional budget of large-scale and high-end LED video wall can be very large. The recorded videos always need to be reprocessed separately from the re-filmed source for studio field or post-production. When the background and object are unified, it is inconvenient to re-key in VFX. In addition, virtual production corresponds to pre-

production in terms of the entire work process, it is the beginning of the process and not the master stage. The results show that when NRT(Near Real Time) technology is applied, it is a way to solve various problems for virtual productions. All processes of NRT use a node-based synthesis method and are performed through a simple process. The innovative point of the workflow is that it can be easily linked to the Unreal game engine or AI(Artificial Intelligence). Using AI-based NRT, the background and object can be separated easily. Applying NRT technology in Virtual Production, the background of the virtual studio is based on monitoring, there is no need for a high-resolution and high-definition video wall. And, the object and the background are separated, they are synthesized with high-definition video files built into Unreal Engine. The study confirmed the application of the NRT for Virtual Production demonstrations.

RS6-3 APPARATUS AND METHOD FOR PROVIDING AGRICULTURAL PRODUCTS *EEECS705*

HaeKyung Chung Konkuk University

Recently, direct trade of agricultural products online has been attracting attention as an alternative to increase the efficiency of the distribution of agricultural products with existing complex distribution channels. The direct marketing method is a method in which producers directly sell agricultural products to consumers without an intermediate distribution stage. As such, the direct transaction method is the most suitable method for the purpose of the direct transaction method in that producers directly sell agricultural products to consumers without intermediate distribution stages. There was a limit to the use of individual consumers. Users can easily grasp product information through product information provided by category, list up in order of rating, best product list, etc., and help in product selection through product ratings, reviews, reviews, and the number of likes. Its purpose is to provide a device and method for providing agricultural special product transactions that can provide fair and reliable transactions to both sellers and consumers by reducing the distribution process by dividing into, In addition, food ingredients suitable for each user can be provided by recommending products (agricultural and special products) necessary for the user in consideration of the user's life pattern, consumption pattern, and eating habits analysis.

RS6-4 INVESTIGATION OF ELECTROMAGNETIC WAVE CHARACTERISTIC IN TRANSFORMER *EEECS737*

Myo Myint Maw Mandalay Technology University

Sathaporn Promwong King Mongkut’s Institute of Technology Ladkrabang

Chayapol Kamyod Mae Fah Luang University

Transformer condision diagnosis is important to consider as a failure of the transformer can cause serious problem in wide area. Partial discheage is usually accounted as the key parameter in the condision diagnosis. Various methos are introduce to used, e.g., electrical method, gas analysis, themperature, acoustic method, and electromagnetic method. In this paper, a model and actual measurement of electromagnetic waves transmission in transformers is present. The experiment was done in an actual transformer with VNA and microstrip patch

antenna. The results were evaluated by path loss with different position of antennas. The result of this paper is useful for a study on the identification of the partial discharge in transformer.

RS6-5 A STUDY ON DIGITAL TERRESTRIAL TELEVISION BROADCASTING LOCALIZATION IN THAILAND *EEECS738*

Phouthong Southisombath National University

Sathaporn Promwong King Mongkut's Institute of Technology Ladkrabang

Chayapol Kamyod Mae Fah Luang University

Wireless localization uses radio waves such as AM, FM, telephone, and wireless signals have been studied by many research, consider finding locations using signals. The digital terrestrial television broadcasting signal was used for localization. The distance from the transmit antenna to the receiving antenna is about 26 kilometers, using spectrum analyzers to measure and collect the results for analysis and compare the distance errors by using a fingerprinting scanning technique and the CLEAN algorithm to get the most suitable signal. It can be seen that the distance error is reduced. Hence, it can locate more accurately using digital terrestrial television signals, The DVB-T2 standard digital terrestrial television broadcasting signal fingerprinting scanning technique, and the CLEAN algorithm. This technique is helpful for position analysis in digital terrestrial television technology.

RS7 Regular Session: Intelligent Speech Processing

Room: Doi Suthep 1

Wednesday, 21st December 2022, 10:00 – 11:20

Chair: Prof. Cheong Ghil Kim (Namseoul University, Korea)

RS7-1 **A Study on Reducing Bit-precision for Denoising Neural Networks** *EEECS685*

Ji-Young Kim	Sejong University
Jin-Young Lee	Sejong University
Cheong-Ghil Kim	Namseoul University
Woo-Chan Park	Sejong University

Due to the most fatal issue between work processes, various content production processes are currently being suspended as one trend of virtual production. It causes a problem of production cost, and the additional budget of large-scale and high-end LED video wall can be very large. The recorded videos always need to be reprocessed separately from the re-filmed source for studio field or post-production. When the background and object are unified, it is inconvenient to re-key in VFX. In addition, virtual production corresponds to pre-production in terms of the entire work process, it is the beginning of the process and not the master stage. The results show that when NRT(Near Real Time) technology is applied, it is a way to solve various problems for virtual productions. All processes of NRT use a node-based synthesis method and are performed through a simple process. The innovative point of the workflow is that it can be easily linked to the Unreal game engine or AI(Artificial Intelligence). Using AI-based NRT, the background and object can be separated easily. Applying NRT technology in Virtual Production, the background of the virtual studio is based on monitoring, there is no need for a high-resolution and high-definition video wall. And, the object and the background are separated, they are synthesized with high-definition video files built into Unreal Engine. The study confirmed the application of the NRT for Virtual Production demonstrations.

RS7-2 **Development of drug information search service app UX contents** *EEECS678*

Seungmin Lee	Namseoul University

It is said that most of the users who experienced drug delivery through an app operated with temporary nonfacetoface treatment permission experienced poor and unsatisfactory medication guidance. Therefore, there is a need for an alternative to strengthen medical access for the medically vulnerable target. This study develops and proposes a UX for nonfacetoface treatment and medicine prescription applications so that anyone can easily receive treatment, It aims to contribute to national health care by providing information on drugs and making

them searchable. The UX of the app was conducted based on Alan Coopers goaloriented design process, and a userfriendly and intuitive design was derived. Through the results of this study, we intend to improve the information service on medicine and improve the user experience of the medically underprivileged.

RS7-3 A STUDY ON FAST SOUND PROPOGATION ALGORITHM ON MOBILE DEVICES USING PARALLE THREADS *EEECS680*

EunJae Kim	Sejong University
SukWon Choi	Sejong University
Cheong Ghil Kim	Namseoul University
Woo-Chan Park	Sejong University

In this paper, we propose a multithreaded algorithm that can improve the performance of GA-based sound propagation algorithms in mobile devices. In general, sound propagation algorithms require high computational cost because they are performed based on ray tracing algorithms. For this reason, it is difficult to operate the sound propagation algorithm at real-time rates in mobile environments. To solve this problem, in this study, the early reflection and late rever-beration steps, which are performed sequentially in the existing sound propagation algorithm, were processed in parallel. We verify the performance in 4 scenes based on 8 sound sources. Experi-mental results show that the proposed method has an average 1.77 times better performance than the existing single-threaded method.

RS7-4 A STUDY ON CHATBOT SERVICE ARCHITECTURE OF MULTI-DOMAIL BASED HYBRID CHATBOT *EEECS*679

Jooyeon Park	Namseoul University
Eun-young Choi	Namseoul University
Cheong Ghil Kim	Namseoul University

Over the past few years, through the COVID-19 pandemic, AI chatbots have made great strides by overcoming the limitations of traditional chatbot technology. Nonetheless, AI chatbots still lack some less complex features compared to rule-based chatbots. In this paper, we propose a hybrid chatbot architecture that combines AI and rule-based chatbots to form one chatbot that complements the weaknesses by combining the strengths of each. AI chatbots generally have the disadvantage of not being able to advance their current knowledge unless the model is retrained. Rule-based chatbots, on the other hand, do not have this drawback, but unlike AI chatbots, they cannot respond appropriately to messages without appropriate rules. Therefore, hybrid chatbots that combine these two models can update their learnings even after training and can respond appropriately to messages even in situations where the rules are not clear. In addition, by using the fact that learning results can be changed while a conversation is in progress, data received from external APIs can be used to influence hybrid chatbots and provide the latest customized services to users. The proposed structure consists of Chat API, Chat Manager, GPT-based conversation creation module, domain specific Chatbot,

knowledge base, and external API. The performance of the proposed structure was verified through prototype implementation.

RS8 Regular Session: Intelligent Speech Processing

Room: Doi Nua

Wednesday, 20th December 2022, 16:10 – 17:50

Chair: Prof. Youngseop Kim (Dankook University, Korea)

RS8-1 AI in Medicine to Classify Heart Disease using Machine Learning Approach *EEECS701*

Akmalbek Abdusalomov	Gachon University
Mekhriddin Rakhimov	Tashkent University
Taeg Keun Whangbo	Gachon University

Heart disease is the leading cause of death worldwide: no other cause causes as many deaths each year as heart disease. People with heart disease or those who are at high risk of developing it (due to one or more risk factors including high blood pressure, diabetes, hyperlipidemia, or an underlying illness) require early detection, support through counseling, and, if necessary, taking medications. An individual's exposure to behavioral risk factors can manifest as high blood pressure, high white blood cell counts, high blood cholesterol levels, and overweight and obesity. These "intermediate risk factors" can be assessed in primary care settings and may indicate an increased risk of myocardial infarction, stroke, heart failure, and other complications. Recently, algorithms based on k nearest neighbors have been proposed to automate the diagnostic process to some extent; however, the large number of attributes makes this difficult. In this article, we consider a more robust model that uses a machine learning algorithm to diagnose heart disease even if there are fewer dataset attributes in the training data. We have carried out experiments based on SVM. It was found that SVM shows the best results compared to other machine learning algorithms such as KNN, Naïve Bayes, Random Forest and Logistic Regression. After comparing state of the art, our proposed model achieves higher training accuracy of 92.5% as well as validation accuracy of 91.1%. The proposed model is trained to identify two classes. The obtained results indicate that proposed model not only achieves higher accuracy but also reduces loss compared to existing models.

RS8-2 XLNet Classificaiton Model for Standard EEG Reports *EEECS690*

Kyoungsu Oh	Gachon University
Min Kang	Gachon University
SeoHyun Oh	Gachon University
Do-hyoung Kim	Gachon University

Youngho Lee Gachon University

BCI is being actively researched in various research fields such as informatics, computer science, and rehabilitation. In particular, EEG is generally used in BCI applications because of its low cost and high time resolution compared to other methods. Although SCORE standard has been proposed for EEG report format, it is necessary to standardize EEG report in areas where SCORE is not applied or before SCORE standard is presented. In this study, as a basic study for converting non-standard EEG reports into standardized reports, a model for classifying EEG reports into ICU, Outpatient, Inpatient, and EMU according to medical record types is presented. At this time, in order to alleviate the data imbalance problem, EEG report corresponding to the minority class was augmented using a BERT-based augmentation model. An XLNet-based classification model was trained with augmented data, and the model was evaluated with data not used for training. As a result, it showed high performance with Accuracy 77%, F1-score 67%, Precision 66%, and Recall 71%. The model proposed in this study can be used as a basic process for converting non-standard EEG report data into standard reports.

RS8-3 Comparison of Background Color on Machine Attention-based Image Compression for Machine Vision *EEECS702*

Yegi Lee Konkuk University

Kyoungro Yoon Konkuk University

With the development of deep learning technology, research on computer vision, such as object detection, object segmentation, and object tracking, has remarkably improved. Due to these developments, deep learning technology is being applied in various industrial fields, such as the Internet of Things, surveillance, and autonomous vehicles. Therefore, in the near future, video consumption for machines is expected to surpass that of humans. Following these changes, MPEG has started a new standard activity called VCM(Video Coding for Machine). As the main target of VCM is focused on machine vision tasks, it may be reasonable to assume that the background or texture with no interest from the viewpoint of machine vision. The main target of VCM is focused on machine vision tasks. In general, in object detection and object segmentation tasks, the machine may not be interested in the background or texture since it is interested in the surroundings of the object. In this paper, we try to compare how the compression efficiency changes according to the background color in the machine attention-based compression method.

RS8-4 Tumor detection in various brain anatomy based on deep convolutional neural network *EEECS693*

Faisal Mehmood Gachon University

Taeg Keun Whangbo Gachon University

Deep learning is the sub-branch of artificial intelligence. It acquires knowledge by training a neural network. Deep learning has many applications in the field of banking, automobile industry, agriculture, and healthcare industry. It aims to solve many complex problems related to computer vision e.g., natural language processing, image classification, object detection, and facial recognition. Training a neural network is a tedious task and is challenging. In healthcare industry, researchers have developed state-of-the-art architectures that are capable to diagnose disease at an early stage. Deep learning models are used to diagnose various diseases in human body parts such as liver, kidney, stomach, and brain. In this study, we train a neural network to predict the brain tumor. Data preprocessing is the first step for training a neural network. We categorize the dataset into coronal, sagittal, and axial planes. We have used YOLOv5s architecture to train our model and predict brain tumor. During experiment, we found that YOLOv5s is efficient in terms of accuracy when detecting brain tumor in axial plane as compared to coronal and sagittal planes. In future, we aim to use dataset that can classify various types of tumors in different parts of brain. We also intend to use YOLOv7 and compare the results with the current model.

RS8-5 AI in Medicine to Classify Heart Disease using Machine Learning Approach *EEECS700*

Akmalbek Abdusalomov Gachon University

Mekhriddin Rakhimov Tashkent University

Taeg Keun Whangbo Gachon University

Heart disease is the leading cause of death worldwide: no other cause causes as many deaths each year as heart disease. People with heart disease or those who are at high risk of developing it (due to one or more risk factors including high blood pressure, diabetes, hyperlipidemia, or an underlying illness) require early detection, support through counseling, and, if necessary, taking medications. An individual's exposure to behavioral risk factors can manifest as high blood pressure, high white blood cell counts, high blood cholesterol levels, and overweight and obesity. These "intermediate risk factors" can be assessed in primary care settings and may indicate an increased risk of myocardial infarction, stroke, heart failure, and other complications. Recently, algorithms based on k nearest neighbors have been proposed to automate the diagnostic process to some extent; however, the large number of attributes makes this difficult. In this article, we consider a more robust model that uses a machine learning algorithm to diagnose heart disease even if there are fewer dataset attributes in the training data. We have carried out experiments based on SVM. It was found that SVM shows the best results compared to other machine learning algorithms such as KNN, Naïve Bayes, Random Forest and Logistic Regression. After comparing state of the art, our proposed model achieves higher training accuracy of 92.5% as well as validation accuracy of 91.1%. The proposed model is trained to identify two classes. The obtained results indicate that proposed model not only achieves higher accuracy but also reduces loss compared to existing models.

SS1 Special Session: Intelligent Media Service

Room: Doi Suthep 1

Tuesday, 20th December 2022, 14:30 – 15:50

Organizer & Chair: Prof. Youngmo Kim (Soongsil University, Korea)

EEECS689

SS1-1 SMART CONTRACT FOR MUSIC MANAGEMENT

Gi Woong Chae	Myongji University
Seon Jae Hyeon	Myongji University
Sang-Kyun Kim	Myongji University

With the popularization of the Internet, physical distribution became meaningless. New and disruptive business models, such as NAPSTER's peer-to-peer music-sharing network, have dramatically increased music piracy. As sales in the music industry declined exponentially, the need for restructuring the existing business model became apparent. One of the significant turning points in the industry was the launch of the iTunes Store, an online platform created by Apple, which has radically changed how we consume music. Songs were no longer a physical commodity, and consumers could purchase music through any Apple device without restrictions. However, record labels have not been satisfied with Apple's pricing for songs, and musicians have not received sufficient royalties from Apple [1]. On-demand streaming platforms such as YouTube, Spotify, and Apple Music are the most used tools for accessing music today. Consumers have faster, simpler, and unlimited access to media. On the other hand, musicians still have little influence over their creations and continue to receive low rewards amid these turning points. Blockchain enables the establishment of a transparent and economic system through the recording of music ownership, transparent and rapid distribution of profits, and music management without intermediaries [2-4]. Music creators are guaranteed quick and transparent revenue by automating music registration and revenue distribution using smart contracts [5]. This paper proposes a method to solve the problems of the existing music service system by introducing a smart contract for efficient music management.

SS1-2 SOC ESTIMATION OF LITHIUM THIONYL CHLORIDE BATTERY USING VOLTAGE RECOVERY TIME IN IOT DEVICES

EEECS696

Minji Kang	Korea Electronics Technology Institute
Youngmin Kwon	Korea Electronics Technology Institute
Seugnwoo Lee	Korea Electronics Technology Institute
Seongseop Kim	Korea Electronics Technology Institute

In this study, we proposed state-of-charge (SoC) estimation of lithium thionyl chloride battery using voltage recovery time ratio which can be applied to IoT devices. The proposed estimation method is analyzed

by experimental battery data, generated with communication current pattern using electronic load. By analyzing experimental battery data, recovery ratio is increased as capacity used and lifetime of primary battery can be estimated using voltage recovery ratio. As a result, the proposed method can be used in IoT devices for estimating SoC of primary battery.

SS1-3 A Study on Implementation of Roadside Disaster Information Display Device Using FM RDS 2 *EEECS686*

SangWoon Lee Namseoul University

FM RDS 2 is a service technology that can transmit digital information using FM broadcasting, and was established as an IEC international standard in 2021 by improving the existing RDS. Since RDS 2 uses FM radio broadcasting using the VHF frequency band with excellent radio wave characteristics, it is possible to provide robust service for a wide area even if mobile communication is disrupted in disasters such as earthquakes and typhoons. In addition, unlike the existing RDS, it supports global characters such as Korean, Chinese characters and Arabic in addition to English characters, so it can provide disaster information in various languages in an emergency. In this study, we propose a disaster alert transmission system using RDS 2.

SS1-4 Webtoon image generation from treatment based on AttnGAN *EEECS695*

Kyung-ho Y Chosun university
Hyung-ju Kim Chosun university
Jeong-in Kim Chosun university
Han-il Kim Jeju national university
Seong-je Cho Dankook university
Junho-Choi Chosun university
Chan-Jun Chun Chosun university
Pan-Koo Kim Chosun university

Recently, text-to-image research has been actively conducted to enable computers to perform the process of observing and recognizing objects. Text-to-image uses a method of extracting characteristics of text and images, and creating a new image by feeding the extracted characteristics into the generative advertising network. In this research, data pairs consisting of webtoon images and treatments, which are descriptions of webtoons, are learned in AttnGAN and images are generated. As a result of the experiment, an image that reflects the contextual meaning of the entered treatment was generated.

SS1-5 STREAM DATA MANAGEMENT ON COUD COMPUTING *EEECS716*

Su-Kyung Yoon Jeonbuk Natinal University

This study designs a clustering-based data processing technique for real-time stream data processing. Social media-based multimedia services are emphasizing real-time processing as a very important key factor, but as the scale of data to be processed increases, processing speed is limited. In addition, stream data input in real time is not only the size of the input data set is not fixed, but also the reusability of the data used in the main memory is very low due to the constant inflow of data. Therefore, in this study, we propose a technique to increase the reusability of data by using a clustering technique to accelerate realtime stream data processing. To evaluate the performance of the clustering-based data processing technique, a trace-driven simulator was implemented. According to the experimental results, the proposed system shortened the running time by 14% on average.

SS2 Special Session: Smart Media Protection

Room: Doi Suthep 1

Wednesday, 20th December 2022, 09:20 – 11:00

Organizer & Chair: Prof. Worasak Rueangsirarak (Mae Fah Luang University, Thailand)

SS2-1 **THE DEPRESSIVE INTERVENTION OF SELF-ADOPTION WITH THE HEALTH BELIFE MODEL USING VR TECHNOLOGY** *EEECS708*

Natthamol Heebjankri Mahidol University
Adisorn Leelasantitham Mahidol University

Depression is common in people of all genders and ages and can be found all over the world. Currently, there are more than 264 million people with depression. Self-help behavioral therapy based on behavioral therapy principles is widely used in the health care of people with depression to bridge the depression treatment gap. spread out widely This paper describes the relationship between depression intervention and related factors using VR technology as an inducer of the Health Belief Model depression intervention activity. The results showed that VR technology plays a role in depression intervention leading to the development of technology for self-care.

SS2-2 **Holistic Success Factors influencing to ERP Project success, ERP System quality and Organizational performances** *EEECS709*

Itthiphol Eampoonga Mahidol University
Adisorn Leelasantitham Mahidol University

Postmodern ERP are widely implementation and a powerful weapon or strategic tool that helps organizations increase their competitiveness. However, the failure rate of ERP Project remains high because of they are complicate, risk, high resource and budget. It is largely recognized as a very complicated task for both academics and practitioners. This paper proposes conceptual model of holistic success factor for ERP Implementation. This model was analyzed using structural equation modeling(SEM) based on data collection from 455 System ERP User from SMEs Company in Thailand. The PLS-SEM results supported fourteen (15) out of the seventeen (18) hypotheses. This research's results confirmed that holistic factors in terms of people, process, technology, organization and environment are significant relate to ERP project success, ERP System Quality and Organization Performances.

SS2-3 APPLICATION OF TRACEABILITY SYSTEM FOR TEAK IDENTITY BASED ON BLOCKCHAIN *EEECS711*

Sai Woon Sheng Mae Fah Luang University

Santichai Wicha Mae Fah Luang University

The Southern regions of India, Myanmar, Thailand, Laos (the area next to Thailand's North Region), and Indonesia are where teak originated. Teak is a high-value wood that used to be an export good for Thailand, bringing in a lot of money. Later, teak wood from Thailand's natural forests was less plentiful and more expensive. Teak logs were recently priced between 25,000 and 50,000 baht per m3 , and prices have been rising yearly. Due to its high value, there is also a chance that smuggled wood from within the country or wood that has been illegally obtained abroad will enter the supply chain. Encroachment and illegal logging are still major problems in Thailand. A significant issue is the smuggling of illegally harvested wood, especially expensive wood like teak. Blockchain technology has become extremely popular due to its distinctive immutability and traceability properties, which have the opportunity to overcome a variety of issues. In order to get rid of illegal teak timber and achieve traceable, transparent, and reliable teak data that is moved through the teak supply chain, we present a decentralized application (Dapp) based on the Ethereum blockchain that implements a traceability system for teak identity. According to the findings of the experiment, our Dapp successfully balances the gas costs associated with storing data on the Ethereum blockchain with ensuring traceability, reducing unauthorized logging, and boosting user confidence.

EEECS718

SS2-4 FACTORS OF I-CHANGE MODEL AFFECTING THE TRANSTHEORETICAL MODEL FOR MAJOR DEPRESSIVE DISORDER

Piangruthai Nusawat Mahidol University

Adisorn Leelasantitham Mahidol University

According to the World Health Organization, more than 264 million people worldwide suffer from depression, and the side effects can cause impairment to live. The treatment method or therapy used in conjunction with medication is to modify the patient's behavior. This research aims to study the factors affecting the behavioral change process in depressive patients by using the theory of the I-change model and the Transtheoretical model as a framework of study and test the relationship of factors using a structural equation model. Equation Modeling: SEM). The results showed that the factors of the I-change model were related and affected the behavioral change process of patients with depressive disorder. Besides, the results can serve as a framework for behavior modification to design interventions for patient care to affect in positive ways on the patients for allowing them to adapt themselves and live with others.

SS3 Special Session: Smart Media Protection

Room: Doi Nua

Wednesday, 20th December 2022, 14:40 – 15:50

Organizer & Chair: Prof. Wanus Srimaharaj (Payap University, Thailand)

SS3-1 FACTORS OF CONTEXT OF USE FOR THE ADOPTION OF AI MEDICAL IMAGING TECHNOLOGY

EEECS719

Anuchit Nirapai Mahidol University

Adisorn Leelasantitham Mahidol University

Over the last few years, the field of AI medical imaging useful for diagnosis and classification has been rapidly expanding for radiologists, The usability of a Computer User Interface (CUI) in radiography is assessed by three indicators. There is effectiveness, efficiency, and satisfaction. This research uses the quality of experience (QoE) is focused on the user, expressed in technical QoS measurements, and based on subjective and objective psychological measurements. Factors that influence user experience include people factors, content factors, contextual factors, and quality factors. The results showed that factors of the context of use affect the technology adoption of AI medical imaging.

SS3-2 EMPLOYEE CLUSTERING MODEL FOR DETERMINING PROMOTION STATUS USING K-MEAN AND SMOTE

EEECS720

Theeramet Kaewwiset Mae Fah Luang University

Punnarumol Temdee Mae Fah Luang University

In Human Resource Management(HRM), Training and Development(T&D) is an important part because this process improves employee performance to satisfy job criterion and promote in the next level. The problem of T&D process is finding the right employee to the right training program for promotion preparation. This paper aims to determine the clustering method to determine group of employees for the right promotion program. Promotion status data is usually an indicator specifying who will be promoted in the next level position because it includes data that can describe employees' performances and reflect their potential. The accuracy comparison of the different clustering methods, including K-Mean, Fuzzy, Agglomerative, and Balanced Iterative Reducing and Clustering using Hierarchies (BIRCH), for two different human resource datasets from Kaggle are conducted. In additions, the synthetic minority over-sampling technique (SMOTE) is used for dealing with imbalance data. The results shows that K-Mean clustering with SMOTE feature outperforms the other clustering methods for both dataset 1 and dataset 2 (accuracy), with 98.63% and 98.94%, respectively.

*EEECS*721

SS3-3 MACHINE LEARNING BASED MODEL FOR CLASSIFICATION OF ADULT PEOPLE WITH DEMENTIA RISK

Yanawut Chaiyo Mae Fah Luang University

Punnarumol Temdee Mae Fah Luang University

Dementia is one of the major diseases today because of the rapid expansion of the aging society. Screening people with dementia is necessary because it can help reducing severe of the disease and the treatment cost in long term. This paper proposes the machine learning based model for the classification of adult people with dementia risk. The personal and health data of 1,800 records from Chiangrai Phachanukroh Hospital, Chiang Rai, Thailand is used in this study. Five different classifiers, including Support Vector Machine (SVM), Decision Tree (DCT), Random Forest (RF), k-nearest neighbors (KNN), and Neural networks (NN), are studied. For feature extraction methods, principal component analysis (PCA) and t-distributed stochastic neighbor embedding (T-SNE) are used. From the comparison results, it was found that the neural network classification method with PCA and Random Forest (RF) with t-SNE achieved the maximum accuracy which is 98.60%

SS3-4 EARLY DETECTION OF DEMENTIA USING OPTIMIZED WEIGHTED OBJECTIVE DISTANCE *EEECS*731

Veerasak Noonpan Mae Fah Luang University

Supansa Chaising Mae Fah Luang University

Punnarumol Temdee Mae Fah Luang University

Worldwide, around 55 million people have dementia. Most of which, about 60%, is the population of low and middle-income countries. Caused by an aging population has increased in every country, this number will increase to approximately 78 million by 2030. There is no practical cure for dementia. The best way to help and improve the quality of life for people with dementia, their caregivers, and their families is early diagnosis, in order to find an optimal management. There are many studies related to dementia diagnosis from pre-clinical study such as physical assessment, risks factor, to clinical study such as PET/MRI scan (positron emission tomography / magnetic resonance imaging). Our study is based on an annual check-up information and blood biomarkers, because brain imaging markers are more costly. This paper proposes a method to classify dementia people with optimized weighted objective distance (OWOD), the modification of WOD using weighting factors. In the study, we have studied annual check-up information and blood biomarkers with over 20 factors comprising 12,000 samples. The OWOD method provided classification results with 94.83% accuracy, which is higher than the WOD method, which provided 77.89% accuracy. To validate the OWOD method in terms of classification accuracy, we compare to other classification provided by neural network and decision tree classifiers. The results also show that the OWOD method is outperformed other methods.

SS3-5 **AUTOMATIC CAT FEEDER AND CAT MONITORING SYSTEM THROUGH Wi-Fi** *EEECS732*

HASSANSEEROYEE SAEAED	Mae Fah Luang University
WEISHAANISMAIL NOIPOM	Mae Fah Luang University
SAFIA YAHLEE	Mae Fah Luang University
THONGCHAI YOOYATIVONG	Mae Fah Luang University
CHAYAPOL KAMYOD	Mae Fah Luang University

This project proposes a development of an automatic cat feeder and cat monitoring system through Wi-Fi communication. Cat feeder device is based on several IoT technologies which are ultrasonic sensor, weight sensor, servo motor, water pump, and ESP32.

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