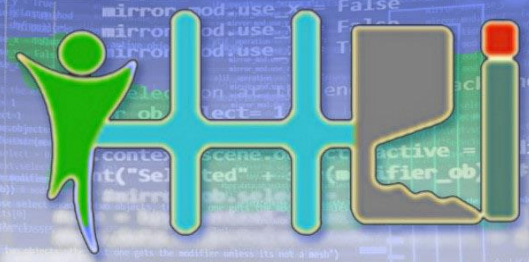
Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

THE 14TH INTERNATIONAL CONFERENCE ON INTELLIGENT HUMAN COMPUTER INTERACTION (IHCI-2022)



Tashkent, Uzbekistan

October 19th-23rd, 2022

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Editors

PREFACE

The IHCI is an annual international conference in the Human-Computer Interaction field, where we explore research challenges emerging in the complex interaction between machine intelligence and human intelligence. This is the thirteenth event which has a theme on “Interactive Technologies for post-Covid Era”, having special tracks related to the main theme of the conference. It is a privilege to present the brochure of the 14th International Conference on Intelligent Human Computer Interaction (IHCI 2022), organized on site and online by the Tashkent University of Information Technology named after Muhammad al-Khwarizmi, Uzbekistan, COIKISM Research Foundation, and Korea Institute of Convergence Signal Processing (KICSP) during October 19-23, 2022 at Tashkent, Uzbekistan. The fourteenth instance of the conference was on the theme of “Interactive Technologies for post-Covid Era”, having 11 special sessions, 5 workshops, and 4 tutorial sessions related to the main theme of the conference. This year out of 147 submitted papers, 67 papers were accepted for oral presentation and publication by the program committee, in each case based on the recommendations of at least 3 expert reviewers. The 14th IHCI conference included keynote and invited talks with powerful expert session chairs who have worked in both industry and academia. It attracted more than 200 participants from more than 25 countries.

IHCI has emerged as the foremost worldwide gathering of the field’s academic researchers, graduate students, top research think tanks, and industry technology developers. Therefore, we believe that the biggest benefit to the participant is the actualization of their goals in the field of HCI. That will ultimately lead to greater success in business, which is ultimately beneficial to society. Moreover, our warm gratitude should be given to all the authors who submitted their work to IHCI 2022. During the submission, review, and editing stages, the EasyChair conference system proved very helpful. We are grateful to the technical program committee (TPC) and local organizing committee for their immeasurable efforts to ensure the success of this conference. Finally, we would like to thank our speakers, authors, and participants for their contribution to making IHCI 2022 a stimulating and productive conference. This IHCI conference series cannot achieve yearly milestones without their continued support in future.

Prof. Hakimjon Zaynidinov
Dr. Madhusudan Singh
Prof. Uma Shanker Tiwary
Prof. Dhananjay Singh

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Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Guwahati, India

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Department of Computer Engineering, University Tun Hussein Onn Malaysia, Malaysia

Dr. Ikechi Ukaegbu
Department of Electrical and Computer Engineering, Nazarbayev University, Nur-Sultan, Kazakhstan

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Department of Artificial Intelligence, TUIT named after Muhammad al Khwarizmi, Tashkent, Uzbekistan

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Department of AI and BigData, Woosong University, Daejeon, South Korea

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Department of Information Technology, Indian Institute of Information Technology, Allahabad, India

Prof. Dhananjay Singh
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School of Computer and Information Sciences, University of Hyderabad, India

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Department of Humanities and Social Sciences, IIT-Kanpur, Kanpur, India

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Dr. Sarvar Makhmudjanov
Department of Artificial Intelligence, TUIT named after Muhammad al Khwarizmi, Tashkent, Uzbekistan

Prof. Dhananjay Singh
ReSENSE Lab, Department of Electronic Engineering, Hankuk University Of Foreign Studies, Seoul, South Korea

Plenary Speakers

Day:1-→ 10:00 AM – 10:30 AM

Shermatov Sherzod Khotamovich
Minister for Development of Information Technologies and Communications of Uzbekistan

Ibrokhim Yulchievich Abdurakhmonov
Minister of innovative Development of the Republic of Uzbekistan

Prof. Bakhtiyor Makhkamov
Rector, TUIT named after Muhammad al-Khwarizmi, Tashkent, Uzbekistan

Welcome Speakers

Day:1-→ 10:30 AM – 11:00 AM

Prof. Hakimjon Zaynidinov
Department of Artificial Intelligence, TUIT named after Muhammad al Khwarizmi, Tashkent, Uzbekistan

Prof. Uma Shanker Tiwary
Department of Information Technology, Indian Institute of Information Technology, Allahabad, India

Prof. Dhananjay Singh
ReSENSE Lab, Department of Electronic Engineering, Hankuk University Of Foreign Studies, Seoul, South Korea

Keynote Speakers

Day:1→11:00 AM – 1:00 PM

Prof. Musaev Mukhamadjan Makhmudovich
Department of Artificial Intelligence, TUIT named after Muhammad al Khwarizmi, Tashkent, Uzbekistan

Title: *Bayesian Brain and Schizophrenia*
Prof. Venkatasubramanian Ganesan
Department of Psychiatry, National Institute of Mental Health & Neurosciences [NIMHANS], Bangalore, India

Keynote Speakers

Day:2→10:00 AM – 12:30 PM

Title: *Smart HCI for HPC in Big Data Proteogenomics: Challenges and Opportunities*
Prof. Ajay Gupta
Department of Computer Science, Western Michigan University, Kalamazoo, USA

Title: *From Multimodal Interaction to Multimodal Synchrony to Behavioural Adaptivity and Back: a Multi-Adaptive Agent Modelling Approach*
Prof. Jan Treur
Full Professor of Artificial Intelligence, Vrije Universiteit Amsterdam, Netherlands

Sophie C. F. Hendrikse
Researcher, Faculty of Behavioural and Movement Sciences, Clinical Psychology, Vrije Universiteit Amsterdam, Netherlands

Title: *Technological Revolution and the future of ownership in the Digital Era*
Prof. Shiho Kim
School of Integrated Technology, Yonsei University, Seoul, Korea.

Keynote Speakers **Day:3-→ 10:00 AM – 10:45 AM**

Title: *Societal Computing: Using Data to Study and Improve Society*
Prof. Ingmar Weber
Research director of the Social Computing Group, Qatar Computing Research Institute, Doha, Qatar

Special Session-1 **Day:1-→ 2:00 PM- 4:00 PM**

Invited Speaker: *Online Mashup Methods for Interesting and Informative Presentation*
Dr. Mukesh Saini
Department of Computer Science and Engineering, IIT Ropar, India

Session Chair: *Brain Computer Interface through AI*
Dr. Nagamani Molakatala
University of Hyderabad, India

Special Session-2 **Day:1-→ 2:00 PM- 4:00 PM**

Invited Speaker: *Taking turns in conversation with a Voice User Interface: Learnings for HCI.*
Dr. Abhishek Shrivastava
Indian Institute of Technology Guwahati & Chair, HCI Professional Association of India (HCIPAI) Steering Committee, Indian

Session Chair: *Adaptive Security in HCI*
Dr. Pritee Parwekar
SRM-IST, Ghaziabad, India

Dr. Irish Singh
Knowledge Intensive Software Engineering (NiSE Lab) Ajou University, Suwon, South Korea

Special Session-3 **Day:1-→ 4:10 PM- 6:10 PM**

Invited Speaker: *Prospects and challenges of HCI in Quantum Computing*
Dr. Nagarajan Prabakar
School of Computing and Information Sciences Florida International University Miami, Florida, USA

Session Chair: *HCI in E-Health Monitoring and Management*
Dr. Mark D. Whitaker
the State University of New York-Korea (SUNY Korea), South Korea

Special Session-4 **Day:1-→ 4:10 PM- 6:10 PM**

Invited Speaker*: No bell will ring if the human may fail*
Dr. Jan-Willem van 't Klooster,
The University of Twente, Netherlands

Session Chair: *Beyond AI: Human-In-The-Loop Intelligence*
Dr. Madhusudan Singh
ReBlockchain Group ,Woosong University, Daejeon, South Korea

Prof. Uma Shanker Tiwary
Department of Information Technology, Indian Institute of Information Technology, Allahabad, India

Special Session-5

Day:2-→ 2:00 PM- 4:00 PM

Invited Speaker: *Role of Self-Adaptive Security for HCI applications.*
Dr. Irish Singh
Knowledge Intensive Software Engineering (NiSE Lab) Ajou University, Suwon, South Korea

Session Title: *Theory & Application of Intelligent Systems in Modelling, Simulation and Automation"*
Dr. Mohd Helmy Abd Wahab (Chair)
Universiti Tun Hussein Onn Malaysia

Special Session-6

Day:2-→ 2:00 PM- 4:00 PM

Invited Speaker: *Democratizing Smart Cities to replicate success stories*
Dr. Antonio J. Jara
GM Smart Cities at Libelium, Spain

Session Chair: *The principle and practice of human-centered AI*
Dr. Jee Hang Lee (Chair)
Department of Human-Centered Artificial Intelligence, Samgmyung University, Seoul, Republic of Korea

Dr. Eui-Chul Lee (Co-Chair)
Department of Human-Centered Artificial Intelligence, Samgmyung University, Seoul, Republic of Korea

Special Session-7

Day:2-→4:15 PM- 6:15 PM

Invited Speaker: *Digital Desis: Interfacing Street Maths on Computer Tracks*
Dr. Koumudi Patil
Department of Humanities and Social Sciences, IIT-Kanpur, Kanpur, India

Session Chair: *HCI for Design*
Dr. Abhishek Shrivastava (Chair)
IIT-Guwahati

Special Session-8

Day:2-→4:15 PM- 6:15 PM

Invited Speaker: *On Defining and Deploying Health Services in Fog-Cloud Architecture*
Dr. Rodrigo da Rosa Righi
Dept. of Applied Computing, University of Rio dos Sinos Valley - Universidade do Vale do Rio dos Sinos (UNISINOS), Brazil

Session Chair: *Cyber-Physical Systems for HCI*
Dr. Mukesh Saini (Chair)
Department of Computer Science and Engineering, IIT Ropar, India

Dr. Ajit Kumar (Co-Chair)
School of Computer Science and Engineering, Soongsil University, Seoul, South Korea

Special Session-9

Day:3-→ 10:45 AM- 1:00 PM

Invited Speaker: *Breaking the Unbreakable Human-Machine Interaction in 5G Networks.*
Dr. Muhammad Taqi Raza
Management Information Systems, University of Arizona, USA

Session Chair: *5G Internet for HCI*
Dr. Ikechi Ukaegbu (Chair)
Nazarbayev University, Kazakhstan

Special Session-10 **Day:3-→ 10:45 AM- 1:00 PM**

Invited Speaker*: Novel Data Analytic Methods to Improve Burden Estimates for Wasting*
Dr. Chintan Amrit (Chair)
University of Amsterdam, Netherlands

Session Chair*: Educational Applications of Interactive Computer Systems*
Dr. Nagarajan Prabakar (Co-Chair)
School of Computing and Information Sciences, Florida International University Miami, Florida, USA

Dr. Jong-Hoon Kim (Co-Chair)
Computer Science
Kent State University, Kent, Ohio, USA

Special Session-11 **Day:3-→ 10:45 AM- 1:00 PM**

Invited Speaker*: Human Robot Interaction in the Context of Surgical Robotics*
Dr. Jitendra P. Khatait
IIT-Delhi, India

Session Chair*: AI-Inspired Solutions for Mental Health Ailments*
Dr. David (Bong Jun) Choi (Chair)
School of Computer Science and Engineering & School of Electronic Engineering Soongsil University, Seoul, Korea

Dr. Hanumant Singh (Co-Chair)
Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Guwahati, India

Tutorial-1 **Day:0-→ 10:15 AM- 1:00 PM**

Title: *Fundamentals of Tensors with applications*
Dr. Hanumant Singh (Chair)
Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Guwahati, India

Dr. Shodhan Rao (Co- Chair)
Ghent University Global Campus, South Korea

Mr. Sandeep Pandey (Co-Chair)
Samsung Research and Development Institute, Bangalore, India.

Tutorial-2 **Day:0-→ 10:15 AM- 1:00 PM**

Title: *Introducing deep learning models for human emotion recognition and Analysis*
Dr. Naagmani Molakatala (Chair)
School of Computer and Information Sciences,
University of Hyderabad, India

Mr. Shankhanil Ghosh (Co-Chair)
School of Computer and Information Sciences,
University of Hyderabad, India

Tutorial-3 **Day:0-→ 2:00 PM- 5:00 PM**

Title: *Recent Advancement in Deep Learning: Federated Learning and Self-Supervised Learning*
Dr. David (Bong Jun) Choi (Chair)
School of Computer Science and Engineering & School of Electronic Engineering Soongsil University, Seoul, Korea

Dr. Ajit Kumar (Co-Chair)
School of Computer Science and Engineering, Soongsil University, Seoul, South Korea

Mr. Ankit Kumar (Co-Chair)
Soongsil University, South Korea

Tutorial-4 **Day:0-→ 2:00 PM- 5:00 PM**

Title: *Deep Learning Based Object Detection on Aerial Images*
Dr. Gaurav Tripathi, Ph.D. (Chair)
Senior Scientist, Central Research Lab,
Bharat Electronics Limited, India

Workshop-1 **Day:1-→2:00 PM – 4:00 PM**

Title: *Modelling Process Maps in Process Mining Using Fluxicon Disco*
Dr. Husna Sarirah Husin (Chair)
Universiti Kuala Lumpur, Malaysia

Dr. Mohd Helmy Bin Abd Wahab (Co-Chair)
University Tun Hussein Onn Malaysia

Workshop-2 **Day:1-→ 4:10 PM – 6:10 PM**

Title: *Ux Design Workshop for Establishing a Relationship between Intelligent Objects and Humans using T+E=B*
Prof. Eui-Chul Jung (Chair)
Seoul National University, Seoul,
South Korea

Ms. Hyewon Kim (Co-Chair)
Seoul National University, Seoul,
South Korea

Ms. Younhee Cho (Co-Chair)
Seoul National University, Seoul,
South Korea

Workshop-3 **Day:2-→ 2:00 PM – 4:00 PM**

Title: *User Interface for Metaverse in Personalized Autonomous Vehicles*
Prof. Shiho Kim (Chair)
School of Integrated Technology, Yonsei University, South Korea

Mr. Pamul Yadav (Co-Chair)
School of Integrated Technology, Yonsei University, South Korea

Workshop-4 **Day:2-→ 4:15 PM – 6:15 PM**

Title: *Introduction to DevOps Lifecycle and sample applications*
Ms. Garima Bajpai (Chair)
Canada DevOps Community of Practice, Canada

Mr. Mitesh Soni (Co-Chair)
Canada DevOps Community of Practice, Canada

Topical Speakers

Dr. Ikechi Ukaegbu
Nazarbayev University, Kazakhstan

Dr. Mukesh Saini
Department of Computer Science and Engineering, IIT Ropar, India

Dr. Hanumant Singh
Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Guwahati, India

Dr. Jitendra P. Khatait
IIT-Delhi, India

Prof. Uma Shanker Tiwary
Department of Information Technology, Indian Institute of Information Technology, Allahabad, India

Dr. Rayan Nouh
Department of Computing and Information Technology, Jeddah University, Saudi Arabia

Prof. Dae-Ki Kang
Department of Computer Science, Dongseo University, Busan, South Korea

Prof. Dhananjay Singh
ReSENSE Lab, Department of Electronic Engineering, Hankuk University Of Foreign Studies, Seoul, South Korea

Keynote Speakers

Prof. Jan Treur
Full Professor of Artificial Intelligence,
Vrije Universiteit Amsterdam, Netherlands

Title: *From Multimodal Interaction to Multimodal Synchrony to Behavioural Adaptivity and Back: a Multi-Adaptive Agent Modelling Approach*

Jan Treur has been a full professor of AI since 1990 and is a well-recognized expert in the area of multidisciplinary human-like AI modelling. He has published over 700 well-cited papers about cognitive, affective, and social modelling and AI systems making use of such models. He has also supervised more than 40 Ph.D. students in these areas and from 2016 on written and edited three books on (adaptive) network-oriented AI modelling and its application in various other disciplines. Current research addresses the modelling of higher-order adaptive processes by self-modeling network models with a specific focus on mental processes based on internal mental models and their use by internal simulation, their learning or formation (including organizational learning), and the control over them. An application focus is on the development and use of shared mental models supporting the road toward a just safety culture in organizations such as hospitals. A joint Springer Nature book about computational modelling of multilevel organizational learning is in preparation and will come out by the end of 2022 or the beginning of 2023.

Prof. Venkatasubramanian Ganesan
Department of Psychiatry, National Institute of Mental Health & Neurosciences [NIMHANS], Bangalore, India

Title: *Bayesian Brain and Schizophrenia*

Dr. G Venkatasubramanian is currently working as a Professor of Psychiatry, at the National Institute of Mental Health and Neurosciences (NIMHANS), India. He received his MBBS degree from Stanley Medical College, Chennai, India in 1998. He obtained his MD and Ph.D. in Psychiatry from the National Institute of Mental Health and Neurosciences, Bengaluru, India in 2001 and 2013 respectively. He received the prestigious Shanti Swarup Bhatnagar Prize in the field of Medical Sciences in 2018. His overarching research interest is to learn the science that will facilitate a personalized approach to understanding and treating severe mental illnesses like Schizophrenia, bipolar disorder, depression, and several others. In pursuit of this, he has been involved in translationally relevant research studies to understand the clinical neurobiology of these disorders.

Prof. Musaev Mukhamadjan Makhmudovich
Department of Artificial Intelligence,
TUIT named after Muhammad al Khwarizmi, Tashkent, Uzbekistan

Musaev Mukhamadjan Makhmudovich was born in Uzbekistan. After graduating from the Tashkent State Technical University, he worked at the Academy of Sciences of the Republic of Uzbekistan. He has the degree of Doctor of Science (Doctor of Science), works as a professor at the Tashkent University of Information Technologies. He conducts courses in signal and image processing, is the author of several books and textbooks. The area of scientific interests of Professor Musaev M.M is the processing of speech and medical signals, the development of parallel algorithms for spectral analysis, recognition algorithms and intelligent analysis of speech signals using multi-core and graphics processors.

Prof. Ingmar Weber
Research director of the Social Computing Group
Qatar Computing Research Institute, Doha, Qatar

Title: *Societal Computing: Using Data to Study and Improve Society*

Dr. Ingmar Weber is an incoming Alexander von Humboldt Professor in AI at Saarland University. His interdisciplinary research looks at what online user-generated data can tell us about the offline world and society at large. Working closely with sociologists and demographers he has pioneered the use of online advertising data for complementing official statistics on international migration, digital gender gaps, and poverty. His work is regularly featured in UN reports, and analyses performed by his team have been used to improve operations by UN agencies and NGOs ranging from Colombia to the Philippines. Prior to joining Saarland University, Dr. Weber held positions at the Qatar Computing Research Institute, Yahoo Research Barcelona, and École Polytechnique Fédérale de Lausanne. As an undergraduate, he studied mathematics at the University of Cambridge before pursuing a Ph.D. at the Max-Planck Institute for Computer Science. He is an ACM Distinguished Member, and his work has been cited more than 10k times.

Prof. Shiho Kim
School of Integrated Technology
Yonsei University, Seoul, Korea.

Title: *Technological Revolution and the future of ownership in the Digital Era*.

SHIHO KIM is a professor in the school of integrated technology at Yonsei University, Seoul, Korea. His main research interest includes developing software and hardware technologies for intelligent & autonomous vehicles and reinforcement learning for Cyber-physical systems. He has directed Seamless Trans-X Lab since 2011, and he founded I4FT(Interuniversity alliance for Future vehicular Technology) supported by the KIAT (Korea Institute for Advancement of Technology) grant funded by the Korean Government(MOTIE) in 2022. He is a member of the editorial board and reviewer for various Journals and International conferences. So far, he has organized two International conferences as Technical Chair/General Chair. He is a member of IEIE (Institute of Electronics and Information Engineers of Korea), KSAE (Korean Society of Automotive Engineers), vice president of KINGC (Korean Institute of Next Generation Computing), and a senior member of IEEE. He is the co-author of over 100 papers and more than 50 patents, writing five books in his research area.

Abstract: Revolutionary technological advances in artificial intelligence, ultra-low latency connectivity (beyond 5G & 6G), blockchain, Web 3.0, and decentralized autonomous systems enable a new era of cyber-physical systems and various applications for the Metaverse platform. In the Digital Era of the future, where a real physical object is synchronized with its virtual model in a cyber system, we can anticipate that traditional business practices, social structures, and lifestyles may be changed entirely. The revolutionary advancement in the technologies mentioned above a new definition of ownership of properties; hence, it opens immense possibilities for the direction of research and development in the Digital Era. In this talk, the speaker will discuss how blockchain and NFT can provide a decentralized autonomous exchange of digitalized or virtual digital assets as well as real or physical assets through smart contacts and a new concept of ownership in the Digital Era.

Prof. Ajay Gupta
Department of Computer Science,
Western Michigan University, Kalamazoo, USA

Title: *Smart HCI for HPC in Big Data Proteogenomics: Challenges and Opportunities*

Ajay Gupta is a Professor of Computer Science at Western Michigan University. From 1998 to 2002, he was the Chairman of the Computer Science Department at Western Michigan University. Dr. Gupta received his Ph.D. in Computer Science from Purdue University in 1989, his M.S. in Mathematics and Statistics from the University of Cincinnati in 1984, and his B.E. (Honors) in Electrical and Electronics Engineering from Birla Institute of Technology and Sciences, Pilani, India in 1982. Dr. Gupta's research interests include high performance computing, proteogenomics, data analytics, machine learning, sensor systems, cloud computing, mobile computing, web technologies, computer networks, evolutionary computation, scientific computing, and design and analysis of parallel and distributed algorithms. He has published numerous technical papers and book chapters in refereed conferences and journals in these areas.

Special Session-1: Brain Computer Interface through AI

Scope: The domain Brain-computer interfaces (BCIs) aim to enable people to interact with the external world through an alternative, no muscular communication channel, that uses brain signal responses to complete specific cognitive tasks. BCIs have been growing rapidly during the past few years, with most of the BCI research focusing on system performance, such as improving accuracy or information transfer rate. Despite these advances, BCI research and development is still in its infancy and requires further consideration to significantly affect human experience in most real-world environments. Exploration of this domain through Artificial Intelligence is the scope of this special session.

Session Chair(s):

Dr. Nagamani Molakatala (University of Hyderabad, India)

Faculty in school of CIS teaching AI and Computer science courses, experienced Communications Specialist with a demonstrated history of working in the computer software industry. Skilled in C++, Java, Management, Software Development, and Leadership. Strong information technology professional with a B.Tech (ECE) focused in Signal processing from SMGH School Anantapur, Govt. Polytechnic Anantapur, JNTU Anantapur, and JNTU Hyderabad. PhD from University of Hyderabad.

Invited Speaker:

Dr. Mukesh Saini
Department of Computer Science and Engineering, IIT Ropar, India

Dr. Mukesh Saini has 12 years of experience in video processing and data fusion. He obtained Master of Technology (M. Tech) in Electronics Design and Technology from Indian Institute of Science (IISc), Bangalore, in 2006 and PhD in Computer Science from School of Computing, National University of Singapore, Singapore in 2012. He worked as post-doctoral researcher at National University of Singapore, University of Ottawa, and New York University. In recent years, he has focused more in information systems that exploit multimodal data, particularly video audio and text in application areas of smart classrooms, social network analysis, multimedia surveillance, and automatic video mashups.

Talk Title: *Online Mashup Methods for Interesting and Informative Presentation*

Abstract: Video is one of the key mediums for computer-to-human interaction. Video presentations are used to communicate information to the users. Currently, multiple high-resolution cameras are used to capture the same event. Displaying videos in raw format is boring; it may not effectively meet the objectives of video presentation. I will discuss various methods and challenges of creating a mashup of these videos to meet the desired objective. Specifically, I will discuss online video mashup approaches for surveillance and social network sharing.

Special Session-2: Adaptive Security in HCI

Scope: Human-Computer Interaction (HCI) has demonstrated strong connectivity between humans and computers. HCI devices allow the people to interact with computers and extend computer ability to perform the interaction with humans. One of the most important research fields in building robust HCI systems is surveillance and security. In this special session, we invite authors to submit their original and high-quality research work in the field of adaptive and interactive HCI based surveillance and security solutions and challenges and their possible solutions in HCI such as privacy, authentication, authorization analysis that relates to usability evaluation, system's robustness etc.

Session Chair(s):

Dr. Pritee Parwekar (SRM-IST, Ghaziabad, India)

Dr. Pritee Parwekar is an Associate Professor in Department of Computer Science & Engineering, Faculty of Engineering and Technology. She has been an academician from last 20 years. She has been awarded PhD in the area of Wireless Sensor Networks. She holds a life membership of IEEE, ACM, CSI, and ISTE. She has also contributed as Computer Society of India (CSI) State Student Coordinator for two years. Her research interests include Internet of Things, Cloud Computing, Machine Learning, Wireless Sensor Networks, Software Engineering, Information Retrieval Systems, Social Media, Data Mining. She has published more than 50 research papers in peer-reviewed journals with SCI, SSCI, Scopus Index, and in conference proceeding of Springer and IEEE. She has been a resource person to many Workshops, FDPs and International Conferences. She has been program chair and organizing chair of many international conferences. She has been invited to many workshops and international conferences as organizer, session chair, and member in Advisory/Program committees. She has peer-reviewed IEEE Network Magazine, Springer, IGI Global, Inderscience, Evolutionary Intelligence (EVIN) Journals, Personal and Ubiquitous Computing, Multimedia Tools and Applications, Expert Systems and many more international journals. She has guided many M. Tech Thesis, B. Tech Major and Minor Projects. Presently she is guiding 4 PhD scholars.

Dr. Irish Singh (Knowledge Intensive Software Engineering (NiSE Lab) Ajou University, Suwon, South Korea)

Irish Singh did her Ph.D. in Software Engineering in the Department of Computer Science and Engineering, Graduate School of Computer Engineering, Ajou University, Suwon, South Korea under the supervision of Prof. Seok-Won Lee. Her research topic is Self-Adaptive Security for Blockchain-Based Cloud Platform. She did her Masters (M.Tech.) in Computer Engineering from Birla Institute of Technology, Ranchi, India in June 2015.

Invited Speaker:

Dr. Abhishek Shrivastava
Indian Institute of Technology Guwahati & Chair, HCI Professional Association of India (HCIPAI) Steering Committee, Indian

Abhishek Shrivastava, Ph.D., is a faculty of Human Computer Interaction at the Department of Design, IIT Guwahati. In addition, he is chairing the steering committee of HCI Professional Association of India (HCIPAI) since February 2022. For over a decade now, his research focuses on user interaction issues across diverse technology deployments and end-user applications involving Voice Agents and Voice User Interfaces. During his Ph.D. dissertation, he conducted studies aimed at evaluating the role of spoken language in improving user performance and subjective satisfaction. He has lead research, design and development of (speech-

based) assistive tools for specially-abled children. These tools, in close-to-real-deployment scenarios, have been tested at All India Institute of Speech and Hearing (AIISH Mysuru) by trained Speech Language Pathologists. He is the recipient of prestigious research grants from Ministry of Education, Department of Biotechnology along with other organisations. He has experience working in consortium mode projects in three projects under Imprint India scheme. He has been recognised as the Subject Matter Expert (SME) - Interaction Design by the National Program of Technology Enhanced Learning (NPTEL).

In recent years, his research group has actively looked at aspects of turn-taking involving temporal behaviours in human-machine conversations. The group is currently studying half-duplex conversations with Voice-agents. Further, in collaboration with industry partners, the group has contributed to the design and development of TaskSpeech studio – a suite of applications aimed at making the learning of Spoken Dialog Systems easier for novice learners. Lately in 2020, he was invited for the prestigious Dagstuhl Seminar in Dagstuhl Germany. In this seminar, invited experts from academia, scientists and industry members discussed different research issues with respect to Spoken Language Interactions with Voice Agents and Robots (SLIVAR).

Abhishek has contributed to a total of 17 different courses besides collaborating with peers across two different Centre(s)- Centre for Linguistics Science and Technology (CLST) and Centre for Intelligently Cyber-physical Systems for Underwater Explorations (CICPS) at IIT Guwahati. In his past life, he has a series of professional experiences including working in industry and as visiting faculty and being a publishing Cartoonist in different Newspapers.

Talk Title: *Taking turns in conversation with a Voice User Interface: Learnings for HCI.*

Abstract: Turn-taking is an intrinsic aspect of sustaining conversations with desired outcomes between the human user and the Voice User Interface (VUI). While it may seem that turn-taking comes naturally to human interlocutors in a conversation, it is perhaps not the case when talking to a VUI. Often such dialogues yield undesirable outcomes where user goals remain unsatisfied. Cascading errors and lesser instances of self-recovery (by the users) in conversation with VUI lead to interactions that experts call the "death of a thousand cuts." Within this context, the talk sheds light on the nature of turn-taking in a half-duplex dialogue with VUI. In addition, it presents a snapshot of the ongoing research and proposes specific strategies to improve turn-taking with VUIs

Special Session-3: A HCI in E-Health Monitoring and Management

Scope: This session explores the innovations and challenges of Human-Computer Interfaces in E-Health Monitoring and Management in either completely virtual spaces or in virtual spaces associated with aiding physical spaces. This should appeal to scholars, practitioners, and entrepreneurs wanting to share their insights on how to adapt HCI for e-health, defined as self-monitoring and digital sharing of data on (1) tracking or diagnosing physical health (sleep/motion analysis, weight, blood sugar, breath/cough audio or chemical analysis, etc.), (2) monitoring, diagnosing, or improving psychological problems (of addiction, depression, anxiety, impulsiveness, hopelessness, etc.), or (3) tracking medical adherence and ongoing evaluation of patients, drugs, or treatments. We accept case studies or comparative analysis of such platforms and projects that involve medical diagnosis or ongoing treatments whether they are websites, cloud drives, and/or mobile apps. The analysis of successes, failures, or ongoing improvements of such platforms are for learning better routes for constructing HCI may involve hospitals, disaster/refugee camps, or self-help app tools and how they are all used commonly for health/behavioural monitoring and for diagnostic aids. Analysis of different kinds of data inputs, data processing, or data outputs of such platforms are welcome. Analysis of benefits or drawbacks of using different tactics for e-health and self-help are of interest that include: chatbots, AI, natural language processing, machine learning, biofeedback from users, wearables, smartphone-peripherals, virtual communities, questionnaires, audio analysis, visual analysis, gait analysis, sleep pattern analysis, eye-tracking, diagnostic algorithms, gamification, concerns of data sharing/privacy, etc.

Session Chair(s):

Dr. Mark D. Whitaker (the State University of New York-Korea (SUNY Korea), South Korea)

He is an Experienced Professor in the higher education industry for over 10 years. Doctorate from University of Wisconsin-Madison, in Sociology & Environmental Sociology, a department ranked as a top global department in Sociology for generations and one of the few departments worldwide for Environmental Sociology. Interests in: Circular Economy; Environment, Technology & Social Relationships; Information Society; Information & Communication Technology for Development (ICT4D); Technology Impact Assessment; 'Mobile Addiction'; Science and Technology Studies; Comparative Historical Methods; Comparative Sustainability Programs; Comparative Development. Comparative Historical Sociology of Degradation & Sustainability; Theories of Environmental Degradation; 2 books so far; US NSF Award Grant (2010); Korean NSF Award Grant (2014); Korean NRF Grant (2020-2023); 2nd Korean NRF Grant (2020-2023) Korea-India Joint Center on Mental Health; UN Secretariat HQ presentations and Asia Development Bank HQ presentations on mobile technologies for sustainable development; disaster risk reduction.

Recently, in April and May of 2019, Dr. Mark Whitaker was invited to speak about his model for sustainability called Commodity Ecology to executive staff at the United Nations Secretariat in NYC and to the staff of the Asia Development Bank in Manila, Philippines. Commodity Ecology is a way to implement democratic debate about 130+ categories of material sustainability, globally yet in 860+ specific ecoregions worldwide at the same time via an online virtual community platform. From 2019, Commodity Ecology is being built at SUNY Korea as social media platform that is mobile-phone accessible—and there are over 5 billion mobile phones by 2019 that will make Commodity Ecology's facilitation of material sustainability worldwide instantly. By 2020, Dr. Mark Whitaker received a 3-year Korean NRF Grant (2020-2023) to support Commodity Ecology, and another 3-yr Korean NRF joint grant between Korea and India.

Invited Speaker:

Dr. Nagarajan Prabakar
School of Computing and Information Sciences Florida International University Miami, Florida, USA

Nagarajan Prabakar is an Associate Professor in the School of Computing and Information Sciences at Florida International University. He received his Ph.D. from the University of Queensland in Database Systems. He developed a scheme to access a vast amount of spatial data from a semantic database and fly over the data in real-time – this emerged as TerraFly software from the High Performance Database Research Center, FIU. He has also designed dynamic mosaicking algorithms for spatial images and integrated vector GIS data with spatial data sets. Currently, he is working on quantum algorithms, security models for cloud storage, and advanced machine learning for cyber physical systems.

Talk Title: *Prospects and challenges of HCI in Quantum Computing*

Abstract: What salient features of quantum computing establish quantum supremacy? How does the wave function of quantum states and the probabilistic measures of results impact the deployment of this emerging technology? We will present a glimpse of scenarios to answer these questions and describe the role of HCI in the design and use of quantum systems.

Special Session-4: Beyond AI: Human-In-The-Loop Intelligence

Scope: The reach of Artificial Intelligence and Machine Learning has increased manifold in every technical domain, especially in the field of Computer Vision, NLP, Biomedical Engineering, and Data Analytics and so on. New capabilities have been on the rise and their implications to the society have also become complex and debatable. Yet a Generic AI remains a myriad. One can debate the very existence and the usability of such a context-free Generic AI. What is required is the human cooperation at multiple stages, from design to the application levels. The combination of Natural (human) Intelligence and Artificial Intelligence where can result in more Creative and Innovative solutions to problems that are presently unsolved or have very low accuracy. This is the crux of emergence of Human-In-The-Loop (HITL) Intelligence, which is a branch of Artificial Intelligence (AI) where Natural (human) and Artificial (machine) intelligence combine to create a new AI paradigm. In any HTIL system humans are deeply involved at each stage of the algorithm. A feedback loop is connected at crucial stages to humans which results in a more accurate representation. Thus, a hybrid solution is created which is a mix of supervised learning and active learning. Machine learning involves huge amount of unlabelled data, like images, speech, text, etc. Specialists are involved for annotations of unlabelled data so that human expertise can be used through AI algorithm for learning and then machines can predict unseen cases. Human in the loop increases the accuracy of AI classifier. HITL proposes to change the way the business analytics works in the system by creating a pipeline that includes data collection, model training, testing, deployment and maintenance. Hybrid processes involving best of humans and machines can create better automated systems or can yield creative solutions like writing a book or creating a digital artwork. Thus the vision of beyond AI can be achieved using Human-In-The-Loop (HITL).

Session Chair(s):

Dr. Madhusudan Singh (ReBlockchain Group, Woosong University, Daejeon, South Korea)

Madhusudan Singh is an Assistant Professor/Director of Department of AI & Big Data, and ReBlockchain Group at ECIS, Woosong University, South Korea. He is actively involved in entrepreneurial endeavours in Blockchain Technologies with Applied Artificial Intelligence, HealthCare Data Analysis, Information Security, and Autonomous vehicles. And in his career, he has worked as a senior engineer in the R&D division at Samsung Display, Korea, and Research Professor in YICT, Yonsei University, Korea. He serves as a series editor of the Blockchain Technologies in Springer Nature, IEEE Computer Society and ACM Distinguished speaker, a senior member of IEEE societies. He serves as an Editor/Reviewer/TPC member of several IEEE/ACM/springer conferences and Journals. He has published 9+ Books as author/editor, 60+ technical research papers, and 10+ patents and delivered 30+ invited talks in Blockchain Technology and applications, Applied Artificial Intelligence, Intelligent Vehicles, Internet of Things, and Industrial Internet (Industry 4.0).

Prof. Uma Shanker Tiwary (Department of Information Technology, Indian Institute of Information Technology, Allahabad, India)

He is a B.Tech (Electronics Engineering) - 1983IIT BHU (Formerly, Institute of Technology, BHU) Varanasi, India. He has done his Ph.D. (Electronics Engineering) – 1991 from IIT BHU (Formerly, Institute of Technology, BHU) Varanasi, India. His areas of interest are image Processing, Computer Vision- Human Computer Interaction, Medical Image Processing, digital Signal Processing, Wavelet Transform etc.

Invited Speaker:

Dr. Jan-Willem van't Klooster
Director of the BMS Lab, the innovation lab of the faculty of Behavioural,
Management and Social Sciences at the University of Twente, The Netherlands

Dr. Jan-Willem van 't Klooster is director of the BMS Lab, the innovation lab of the faculty of Behavioural, Management and Social Sciences at the University of Twente, The Netherlands. This lab consists of over a dozen of experts, 16 lab rooms, a mobile lab, various large scale research software products and > 15

assistants. He has coordinated multiple national and European projects and work packages, including EFRO, ZonMw and EIP AHA research projects. Grants won as (co)applicant include EFRO, euregional, and work for the Dutch Ministry of Health. Jan-Willem obtained his PhD in health informatics from the University of Twente, The Netherlands, in 2013. After that he worked as a product owner at Nedap, a large electronic healthcare corporation, and as project manager for developing health-related self-management services at Roessingh Research and Development, the largest telemedicine and rehabilitation institute in The Netherlands. He has taught computer science topics and was section chair computer science at the Bonhoeffer College for 11 years, was involved in nationwide ICT curriculum design for SLO, and peer reviews for various ehealth related journals and conferences, including JMIR and Plos One. Since 2019, he is director of the faculty innovation lab BMS Lab.

Talk Title: *No bell will ring if the human may fail.*

Abstract: How well do humans function in interaction with high tech systems? A car is full of sensors that measure how well the car operates. If the tire pressure is too low a warning light goes on; if the catalyser defects this happens as well. And so there are many systems that warn in case of potential issues. In complex systems, even more sensors check the condition of the system and optimise it. However, this does not guarantee optimal functioning. Because the human in the equation is oftentimes a critical component. They take (good or bad) decisions, and communicate or miscommunicate. How about the functioning of the human component in these kinds of systems? Is she/he still alert, tired or overburdened?

In our BCI testbed, we test these kinds of questions using brain measurements, in different (ambulant) conditions. We do this together with companies in the region and large enterprises. In this tutorial, we will cover different aspects of measuring human functioning, including the possibilities and challenges of BCIs (brain computer interfaces). And give appealing examples and research opportunities to measure, to know and to improve!

Special Session-5: Theory & Application of Intelligent Systems in Modelling, Simulation and Automation

Scope: This special session of the IHCI2021: International Conference on Intelligent Human-Computer Interaction is devoted to “Theory & Application of Intelligent Systems in Modelling, Simulation, and Automation”. Papers are being solicited for this session. Topics of this special session include, but are not limited to, the following area: Intelligent Business Systems, Intelligent Control. Intelligent Systems in Automation, Adaptation and learning for agents, Human and computer interaction, Virtual agent-based marketplaces, Intelligent systems for personalization and privacy issues, Automated shopping and trading agents, Intelligent systems for modelling and Simulations, Intelligent systems in software engineering, Intelligent systems in social media Intelligent Systems & E-commerce applications, Intelligent systems in logistics issues

Session Chair(s):

Dr. Mohd Helmy Abd Wahab (Universiti Tun Hussein Onn Malaysia)

Mohd Helmy Abd Wahab is a senior lecturer and former Head of Intelligent System Lab at the Department of Computer Engineering, Faculty of Electrical and Electronic Engineering, Universiti Tun Hussein Onn Malaysia (UTHM). He has actively involved in many academic activities such as being invited speaker at ICRITO 2015 (India), IPIARTI 2015 (UTP), IPIARTI2014 (UNIMAP) and IPIARTI 2012 (UiTM). He hold several research grants, won several medals in research and innovation showcases and awarded several publication award and teaching awards. He has authored and co-authored 2 books in database system (2013) and this book received consolation prize by Society of Science and Mathematics Malaysia (PESAMA) in 2014 and WAP application (2009), published several both local and international book chapters (11), technical papers in conferences and peer-reviewed journals (>100) papers. He also involve in publishing articles in periodicals such as newspaper (Utusan Malaysia) and national magazine (Dewan Kosmik). He also served as guest editor for Special Issue in Wireless and Mobile Networks in International Journal of Advanced Computer Science and Applications (2011) and as Deputy Editor in Chief for Int. Journal of Software Engineering and Computing since 2009 and scholarly contributed as committee for conferences, editorial team and manuscript reviewers and also invited to be session chair in conferences.

Dr. Masoud Mohammadian (University of Canberra, Australia)

Masoud Mohammadian graduated with a PhD degree from the University of Central Queensland and an Master of Science (Computing) degree from the University of Central Queensland, Australia and his undergraduate degree at the Flinders University, Australia. He taught various undergraduate and postgraduate courses in the areas of computer science and information systems at Edith Cowan University, Monash University and University of Canberra for almost 5 years before joining the University of Canberra in late 1998. Besides teaching, he has been actively pursuing research related to neural networks, fuzzy logic, evolutionary computing, optimization, data analytics, modelling of complex adaptive systems, decision support systems and data security and privacy and their applications in industrial, financial and business problems which involve real time data processing, planning and decision making. His current research also concentrates on the application of computational intelligence techniques for learning and adaptation of intelligent agents and web-based information filtering and data mining. To date, he has edited over 25 books and conference proceedings in Computational Intelligence and Intelligent Agents. He was chair and co-chaired of over 19 international conferences in Computational Intelligence, Intelligent Agents and has written more than 175 refereed publications in the form of books, book chapters, journal articles and conference papers. He has been a keynote speaker at a large number of international conferences in Computational Intelligence, Intelligent Agents, Control, Modelling and optimization. He has received many national and international awards from Australia, Austria and United Sate of America. He has received an honorary professorship from Amity University in Indian in 2018.

Invited Speaker:

Dr. Irish Singh
Knowledge Intensive Software Engineering (NiSE Lab) Ajou University, Suwon, South Korea

Irish Singh is a researcher at Knowledge Intensive Software Engineering (NiSE) Lab and before that she did her Ph.D. in the Department of Computer Engineering, from Ajou University, South Korea. Before that, she did a Master's degree in Computer Engineering, from the Birla Institute of Technology, India, and a Bachelor's degree in Computer Science and Engineering from Uttar Pradesh State Technical University, India. Her research interests are Connected Minds, Adaptive Security, Cloud Networks, Blockchain Technology, Software Engineering, Requirement Engineering, and Human-Computer Interaction.

Talk Title: Role of Self-Adaptive Security for HCI applications.

Abstract: Human Computer Interaction (HCI) Systems is the two-way communication and information exchange between the application stakeholders and the HCI applications. Self-adaptive security requirements engineering helps to elicit the security needs and requirements for individual application stakeholders as well as the needs and requirements for the HCI system. In recent time several security vulnerabilities have been reported in the HCI applications. Secondly, the HCI applications are not developed for secure and successful interaction with the application stakeholders. Secure HCI is the study of how stakeholders securely interact with the HCI system and to what extent self-adaptive security requirements engineering process can be used by HCI application informatics to understand major elements of security and usability. The process also helps to maintain the HCI informaticists' design applications secure, effective, efficient & user friendly to ensure customers satisfaction.

Special Session-6: The principle and practice of human-centered AI

Scope: Recent decades have witnessed the drastic advances in artificial intelligence (AI). These results in growing demand for means to which AI technologies are able to more deeply understand human beings so that they can enhance the quality of living through deeper interactions based upon the understanding. To this end, several human-centered approaches have been investigated in the field of AI, from the perception level by utilizing many sensors, the reasoning level to infer the internal states of the human mind on the basis of the perception, to the action level to interact with human beings in order to maintain the best states of human conditions. This special session, the principle and practice of human-centered AI, is designed to provide a venue to be able to exhibit state-of-the-art in the field of human-centered AI. We would like to invite all areas including the perception of human beings using all sorts of sensors, algorithms and applications to understand/infer human's internal/external states, understanding of external context/situations affecting human beings, and all kinds of interaction design and technologies, but not limited to those areas. We welcome all levels of research from the innovative ideas, new and exciting work in progress and the fully matured research of course. We also welcome interdisciplinary and multidisciplinary research from all domains such as computer science, neuroscience, psychology, electric and electronic engineering, architecture, art and so on.

Session Chair(s):

Dr. Jee Hang Lee (Department of Human-Centered Artificial Intelligence, Samgmyung University, Seoul, Republic of Korea)

Jee Hang Lee is an assistant professor (2020-) in the Department of Human-Centered Artificial Intelligence, Samgmyung University, Seoul, KR. Before joining, he was a research assistant professor in the Department of Bio and Brain Engineering at KAIST, KR (2017-2020), where he was a winner of KI HST postdoc fellowship (2017-2018). Prior to joining KAIST, he was a Research Associate at University of Bath, UK (2015-2016). He received his Ph.D. in AI from University of Bath, UK, in 2015. Before coming back to academia, he was a Senior Engineer at Samsung Electronics (2005- 2010), and Researcher at Hangul & Computer Inc (2000-2005). His research interests include reasoning and decision making based upon brain-inspired artificial intelligence.

Dr. Eui-Chul Lee (Department of Human-Centered Artificial Intelligence, Samgmyung University, Seoul, Republic of Korea)

Since March 2012, he has been Associate Professor in the Department of Human-Centered AI at Samgmyung University, Seoul, Korea. His research interests include computer vision, image processing, pattern recognition, and human computer interface (HCI).

Invited Speaker:

Dr. Antonio J. Jara
GM Smart Cities at Libelium, Spain

Antonio J. Jara is (General Manager Smart Cities at Libelium), chair of Data Quality and IoT in IEEE. He did his PhD (Cum Laude) at the University of Murcia (UMU), Spain. These PhD results present a novel way to connect objects to Internet-enabled platforms in an easy, secure and scalable way. He also carried out a MBA and entrepreneurship formation in the ENAE business school and UCAM (2012). He received entrepreneurship awards from ENAE (sponsored by SabadellCAM financial services), emprendeGo (sponsored by Spanish government), IPSO Alliance Award (Sponsored by Google) for its disruptive innovation in the IoT, selected and mentored by the acceleration program FIWARE. Antonio Jara as part of HOPU is focused on the Smart Cities market with solutions for citizens engagements and environmental

monitoring (air quality sensors). Antonio Jara has also participated in over 100 international events about Internet of Things as Speaker, over 100 international publications / papers (~5000 citations and impact factor h=37), he holds several patents in the IoT domain and finally he has advised in the IoT domain to companies such as Microsoft and Fujitsu.

Talk Title: *Democratizing Smart Cities to replicate success stories.*

Abstract: Technologies and standards are leading a common integration ecosystem, starting with APIs and common information systems such as FIWARE (ETSI NGSI-LD) and with the creation of data models (smart data models) that unify and define a vendor-independent approach to the description of the information, have made it possible to achieve the ambition of local testing and global exploits, promoting high replicability, at a low cost; culminating in the ability to transfer experiences and successful solutions between cities. The next step will be to also be able to transfer knowledge, a reality that before common challenges such as Low Emission Zones we will be able to see as being able to learn collaboratively, reaching tactical urbanism of cooperation and cross-city impact.

Special Session-7: HCI for Design

Session Chair(s):

Dr. Abhishek Shrivastava (Indian Institute of Technology Guwahati & Chair, HCI Professional Association of India (HCIPAI) Steering Committee, Indian)

Abhishek Shrivastava, Ph.D., is a faculty of Human Computer Interaction at the Department of Design, IIT Guwahati. In addition, he is chairing the steering committee of HCI Professional Association of India (HCIPAI) since February 2022. For over a decade now, his research focuses on user interaction issues across diverse technology deployments and end-user applications involving Voice Agents and Voice User Interfaces. During his Ph.D. dissertation, he conducted studies aimed at evaluating the role of spoken language in improving user performance and subjective satisfaction. He has lead research, design and development of (speech-based) assistive tools for specially-abled children. These tools, in close-to-real-deployment scenarios, have been tested at All India Institute of Speech and Hearing (AIISH Mysuru) by trained Speech Language Pathologists. He is the recipient of prestigious research grants from Ministry of Education, Department of Biotechnology along with other organisations. He has experience working in consortium mode projects in three projects under Imprint India scheme. He has been recognised as the Subject Matter Expert (SME) - Interaction Design by the National Program of Technology Enhanced Learning (NPTEL).

Invited Speaker:

Dr. Koumudi Patil
Department of Humanities and Social Sciences, IIT-Kanpur, Kanpur, India

Dr. Koumudi Patil is an Associate Professor in the Department of Design, Indian Institute of Technology Kanpur, India. She works in the area of interactive and inclusive design of pedagogies for school curriculum and the creative industry in the Indian developmental context.

Talk Title: Digital Desis: Interfacing Street Maths on Computer Tracks

Abstract: The author has coined the term 'Digital Desis' to include early adopters within the category of Digital Immigrants who fundamentally think and process information differently than digital natives. In formal educational institutions, Desis are submitted to pedagogical regimes based on decontextualized knowledge and skill sets seeped in unplugged technologies. Often, their performance is less than average in the classrooms. However, outside school, the same individual seamlessly navigates complex and multimodal context-specific environments. Several acclaimed projects, targeting the informal learning environment, such as One Laptop per Child and the Hole-in-the-Wall initiative, aim to increase the access of computers and other plugged activities to Digital Desis. Even though the context in which these projects operate is informal, their approach is often overly techno-centric, ignoring the significant role that local contexts play in shaping ICTs.

Despite the significance of ICTs, schools in developing countries continue to focus on imparting abstract procedural knowledge through unplugged tools and less on application of this knowledge in the real world. Children are not explicitly taught how to link abstract or symbolic content with the real world, or vice versa.

Therefore, this paper attempts to unfold the barriers and enablers of e-tools to integrate the informal learning pedagogy of Digital Desis through the case study of an online educational game. The digital game was designed and developed by the author to integrate informal learning contexts on a digital platform deployed in formal educational institutions. A Pair T-test was employed on the pre and post test data of 30 students who used the game for one month. The subjects had little or no knowledge and access of computers before they participated in this study. 450 hours of video footage was analysed to understand the process of knowledge acquisition on computers by young Digital Desis, and its impact on their learning trajectory. The post-test scores were significantly higher than the pre-test scores, and informal knowledge acquired out-of-school was applied fluently by students in the educational game.

Special Session-8: Cyber-Physical Systems for HCI

Session Chair(s):

Dr. Mukesh Saini (Department of Computer Science and Engineering, IIT Ropar, India)

Dr. Mukesh Saini has 12 years of experience in video processing and data fusion. He obtained Master of Technology (M. Tech) in Electronics Design and Technology from Indian Institute of Science (IISc), Bangalore, in 2006 and PhD in Computer Science from School of Computing, National University of Singapore, Singapore in 2012. He worked as post-doctoral researcher at National University of Singapore, University of Ottawa, and New York University. In recent years, he has focused more in information systems that exploit multimodal data, particularly video audio and text in application areas of smart classrooms, social network analysis, multimedia surveillance, and automatic video mashups.

Dr. Ajit Kumar (School of Computer Science and Engineering, Soongsil University, Seoul, South Korea)

Dr. Ajit Kumar is a Post-Doctoral researcher at Soongsil University, Seoul, South Korea. He has completed his Ph.D. in Computer Science and Engineering from the Department of Computer Science, Pondicherry University in May 2018. His Ph.D. thesis titled "A Framework for Malware Detection with Static Features using Machine Learning Algorithms" focused on Malware detection using machine learning. He has received his Bachelor of Computer Application (BCA) from IGNOU in the year 2009 and Master of Computer Science in the year 2011, from Pondicherry University. He has also received Post Graduate Diploma in Statistical and Research Methods from Pondicherry University in 2015 and Post Graduate Diploma in Information Security from IGNOU in 2016. His area of interest includes Information Security, Malware detection, Machine learning, IoT, Edge, Smart grid security. He qualified UGC-NET for Lecturer exam in 2014, besides UGC-NET he has also qualified three states (Rajasthan, Andhra Pradesh, and Tamilnadu) SET (State Eligibility Test) lectureship exam. He is the first rank holder in the national Ph.D. entrance exam of Pondicherry University in the year 2012. He has published 6 research articles in peer-reviewed International Journal and has also presented and published his research in International IEEE and Elsevier conferences. He is fond of Python programming and love to train others in Python Programming.

Invited Speaker:

Dr. Rodrigo da Rosa Righi
Dept. of Applied Computing, University of Rio dos Sinos Valley - Universidade do Vale do Rio dos Sinos (UNISINOS), Brazil

Rodrigo da Rosa Righi is a Senior Member at IEEE and a Senior member at ACM, being also a professor and researcher at the University of Vale do Rio dos Sinos (Unisinos), Brazil. Today, he is the coordinator of the Applied Computing Graduate Program, Master and Ph.D., at this university. Rodrigo concluded his post-doctoral studies at KAIST - Korean Advanced Institute of Science and Technology, South Korea, under the following topics: IoT and cloud computing. He obtained his MS and Ph.D. degrees in Computer Science from the Federal University of Rio Grande do Sul, Brazil, in 2005 and 2009, respectively. He is the coordinator of national and international projection in the topics of: resource management in distributed systems, fog and cloud computing, Industry 4,,.0 and Artificial Intelligence. His research interests include performance analysis, predictive maintenance, event prediction and correlation, cloud and fog resource elasticity, and micro services to enable the next generation of mobile communication (5G).

Talk Title: *On Defining and Deploying Health Services in Fog-Cloud Architecture*

Abstract: Fog computing architectures are gaining popularity as an alternative to provide low latency communication on executing distributed services. With cloud resources, it is possible to assemble architecture with resources that reside close to data providers and those with more processing capacity, which are achieved through Internet links. In this context, this talk aims to present first insights regarding a fog-cloud architecture for the healthcare area. In particular, we address vital sign monitoring in sensor devices and provide intelligent health services that reside both in the fog and in the cloud to offer benefits for the end-users and public government. The preliminary results show the advantages of combining fog and cloud and critical applications and highlight some points of attention to address system scalability and quality of service.

Special Session-9: 5G Internet for HCI

Session Chair(s):

Dr. Ikechi Ukaegbu (Nazarbayev University, Kazakhstan)

Ikechi Augustine Ukaegbu received his B.Sc. in Electrical Engineering, Electro mechanics and Electro-technology at Moscow Power Engineering Institute (Technical University), Moscow, Russia in 2004 and M.Sc. in Electronics and Microelectronics at the same university in 2006. He obtained his Ph.D. at Korea Advanced Institute of Science and Technology (KAIST) in 2012. He has worked as a Post-Doctoral researcher in Electrical Engineering Department at KAIST from 2012 to 2013. He held R&D positions at Electronics and Telecommunications Research Institute (ETRI), Korea, from 2008 to 2009 and at Lightron Fiber-Optics Inc., Korea in 2013. He also worked as a senior engineer with the design technology team at Samsung Electronics Co. Ltd, Korea from 2013 to 2016. He co-founded a start-up company where he served as the CTO from 2016 to 2017. He has been with Nazarbayev University School of Engineering since 2018 as an assistant professor with the Electrical and Computer Engineering Department. He is the director of Integrated Device Solutions and Nano photonics Laboratory at Nazarbayev University and his research interests include 5G Technologies, Electronics & Nano photonics, Signal & Power Integrity, Channel Modelling, and Terahertz Chip-to-chip links.

Invited Speaker:

Dr. Muhammad Taqi Raza
Management Information Systems, University of Arizona, USA

Muhammad Taqi Raza joined the University of Arizona's information systems department in 2019, soon after earning his PhD in computer science from UCLA. His research interests broadly lie in the area of networked systems and security. His research contributes to better understanding of the state-of-the-art networked systems by challenging their operational efficacy and identifying unexplored aspects at their heterogeneity—providing simple and innovative solutions from system designs to their operations through verification.

Talk Title: *Breaking the Unbreakable Human-Machine Interaction in 5G Networks.*

Abstract: Today 5G mobile networked enable human and machine interaction at massive scale. To enable secure human-machine interaction 5G systems have built-in security mechanisms that protect against disclosure of information exchanged between users, machines, and the network. Despite these existing security mechanisms, I will show that an attacker is still capable of eavesdropping on users' interaction with machines, impersonating a user by forging packets, and causing service outage. My key finding is that the attacker breaks 4G/5G encryption and integrity protection without relying on the knowledge of security key. Motivated by these attacks, I advocate for an efficient and exhaustive vulnerability analysis on 4G/5G systems to discover security loopholes previously unknown. In this talk, I will demonstrate how we can build systems and design algorithms that can extract new vulnerabilities and enable exhaustive security analysis in a polynomial time. Further, I will discuss how this approach provides a new dimension for jointly solving security and availability problems in various related fields including Machine-to-Machine communication, multimedia subsystems, and network analytics.

Special Session-10: Educational Applications of Interactive Computer Systems

Scope: The field of human-computer interaction (HCI) has always been of interest to learning scientists. It brings together expertise from computer science, cognitive psychology and design to create innovative technologies that enhance learning and advance our understanding of how students interact with technology. Recent advances in newer technologies such as mixed reality, tangible interfaces, robot-assisted and AI-based systems have dramatically increased educators' and researchers' interest in educational applications of these technologies. The exploration of various applications of HCI for teaching and learning is the scope of this special session. Topics of interest include but are not limited to Cyber-Physical tools for Learning,

Visual and Tangible Coding, HCI for Project-Based Learning, Robot-Assisted Education, and Computational Thinking Education in HCI.

Session Chair(s):

Dr. Nagarajan Prabakar (School of Computing and Information Sciences, Florida International University Miami, Florida, USA)

Nagarajan Prabakar is an Associate Professor in the School of Computing and Information Sciences at Florida International University. He received his Ph.D. from the University of Queensland in Database Systems. He developed a scheme to access a vast amount of spatial data from a semantic database and fly over the data in real-time – this emerged as TerraFly software from the High Performance Database Research Center, FIU. He has also designed dynamic mosaicking algorithms for spatial images and integrated vector GIS data with spatial data sets. Currently, he is working on quantum algorithms, security models for cloud storage, and advanced machine learning for cyber physical systems.

Dr. Elena Novak (Kent State University, USA)

Elena Novak is an Associate Professor of Educational Technology at Kent State University. She earned her Ph.D. in Instructional Systems and Learning Technologies from Florida State University in 2012. Her research examines the intersections of design, technology, and learning. Elena's current projects focus on learning technologies such as 3D printing, social robotics, video games, and game-like learning environments as well as computer science education, design thinking and creativity. Her research aims to provide educators with research-informed guidelines on how to integrate technology in various educational settings. She designs curricula, assessments, and tools to support and evaluate students' learning and creativity. Elena's recent collaboration with the Department of Computer Science has led to the development of the Computer Science endorsement at Kent State University and $2,000,000 grant from the Ohio Department of Higher Education to support computer science education at Kent State University. Her research has been recognized with several international awards sponsored by the American Educational Research Association as well as Association for Educational Communications and Technology.

Dr. Jong-Hoon Kim (Kent State University, USA)

Jong-Hoon Kim is an assistant professor of Computer Science and a director of the Advanced Telerobotics Research Laboratory at Kent State University. He received his Ph.D. in Computer Science from Louisiana State University on December 2011. He has over 54 peer-reviewed publications and one US Patent. Throughout his years as a researcher, he has been awarded over $12M grants as a PI, Co-PI, or SI. Dr. Kim has over 8 years academic experience and 6 years industry experience for companies such as IBM. Over 400 worldwide media coverage on TeleBot Research. His research interests are immersive telepresence through hybrid reality (VR, AR, and MR), Intuitive & ergonomic interface design, Efficient co-design of hardware/software in embedded systems for a low-cost robot, Analysis of emotional and affective behavioural 53 aspects of robot-human interactions, Incorporation of artificial intelligence for assisting smart teleoperations, Management system framework for secure and accountable teleoperations and virtual experiences, Human-Robot Interaction through decentralized & distributed platforms such as smart contracts in Blockchain technology, and Tangible coding education for children

Invited Speaker:

Dr. Chintan Amrit
University of Amsterdam, Netherlands

Chintan Amrit is an Associate Professor at the Department of Operations Management, at the University of Amsterdam. He has completed his Ph.D. from the University of Twente in the area of Coordination in Software Development, having started it at RSM Erasmus University. He holds a master's degree in Computer Science from the Indian Institute of Science, Bangalore. In the past, he has worked for three years as a software engineer. His research interests are in the area of business intelligence (using machine learning), open-source development, and mining software repositories. His work has been accepted in venues such as Journal of Information Technology, Decision Support Systems, Information, and Software Technology, International Journal of Production Research, Social Science Computer Review, Information Systems Management, Journal of Systems and Software, IT Professional, Journal of Software Evolution and Process, Environmental Modelling & Software among others. He serves as a coordinating editor of Information Systems Frontiers journal, an associate editor of PeerJ CS journal, and is a regular track chair at ECIS.

Talk Title: *Novel Data Analytic Methods to Improve Burden Estimates for Wasting*

Abstract: Estimates of caseloads of wasting are essential for prioritizing the most vulnerable areas and populations at risk of malnutrition. In this talk, I present the work we undertook in collaboration with the UN World Food Programme's (WFP) Regional Bureau of Dakar (RBD) to estimate the burden of wasting in the Sahel region of Africa. I describe the steps we undertook to analyze the current Hotspot analysis used to estimate the burden, the data gathering and processing steps we took, as well as the three machine learning models we built to estimate the burden using both new features and those that are previously considered. I then compare the efficacy of the models to predict the severity of acute malnutrition and assess the model performance in comparison to the current Hotspot approach used by WFP. I will also describe the analysis performed to identify the most important features that influence the predictions for each model and their commonalities across models.

Special Session-11: AI-Inspired Solutions for Mental Health Ailments: Prevention, Detection, and Treatment

Scope: Mental health ailments consist of a wide range of conditions that affect mood, thinking and behaviour. Depression is one of the most common observation in human minds. Depression in the modern century has become the most common symptom that is being observed in humans. People living in developed as well as poor countries are facing the heat of depression for various reasons. With the global community reeling under Covid19 pandemic and its variants, people have lost lives, have become jobless and a gloom has descended upon their future projections. The result is depression which has seen a phenomenal growth in all age groups. Therefore, we believe that AI inspired Solutions is the simulation of human intelligence processes by machines, especially computer systems. AI constitutes of machine learning, NLP and Deep learning domains. These domains can help to fight mental stress and depression in the current scenario. Similarly, Deep learning combined with Computer Vision can have a far insight on human emotions, human poses, and human postures so as to ascertain their emotional stress. Their behavior history can help to prepare the next day schedule using machine learning solutions. Finally, we believe that, AI can fill this gap so as to present a viable anti depression solution so that humans can cope with their reality and still be happy

Session Chair(s):

Dr. David (Bong Jun) Choi (School of Computer Science and Engineering & School of Electronic Engineering Soongsil University, Seoul, Korea)

Bong Jun Choi is an associate professor at the School of Computer Science & Engineering and jointly at the School of Electronic Engineering, Soongsil University, Seoul, Korea. Previously, he was an assistant professor at the Department of Computer Science, State University of New York Korea, Korea, and concurrently a research assistant professor at the Department of Computer Science, Stony Brook University, USA. He received his B.Sc. and M.Sc. degrees from Yonsei University, Korea, both in Electrical and Electronics Engineering, and the Ph.D. degree from the University of Waterloo, Canada, in Electrical and Computer Engineering. His current research focuses on distributed artificial intelligence, distributed intelligent energy networks, and security. He is a senior member of the IEEE and a member of the ACM.

Dr. Hanumant Singh Shekhawat (IIT Guwahati, India)
Dr. Hanumant Singh Shekhawat is working at Indian Institute of Technology Guwahati as an Assistant Professor in the Department of Electronics and Electrical Engineering. He did his postdoc from the Department of Electrical Engineering, Eindhoven University of Technology, and The Netherlands. His research was on multi-linear data (tensor) reduction techniques, which has applications in video/speech processing, MRI and (higher dimensional) data analysis. He completed his PhD in Nov 2012, from the Department of Applied Mathematics, University of Twente, The Netherlands. His research was related to optimization problems in sampling and interpolation. He has completed his masters (in 2004) from the Department of Electrical engineering and his bachelor in Electronics and communication engineering (in 2002) from Indian Institute of Technology Bombay and Rajasthan University in India, respectively. After the master degree, he worked in the Texas Instruments India and Sasken Communications India for around four years in the area of electronics, software and algorithm development. He had visiting faculty position in University of Pardubice, Czech Republic during May-June 2019. Currently, his work is related to problems in radar, tensor, speech, signals and systems.

Dr. Dhananjay Singh (Hankuk University of Foreign Studies, South Korea)
Dhananjay Singh is a Full Professor/Director of ReSENSE Labs in the Department of Electronics Engineering at Hankuk University of Foreign Studies (HUFS), Seoul, South Korea. He is cofounder/CTO of VESTELLA and COIKOSITY to provide innovative solutions based on AI, Blockchain, BigData Analysis and IoT for Smart City Technologies and services. He is the recipient of U.P. NRI award (Apravasi Bharatiya Ratna Puraskar) for the outstanding work in the field of Technology in the year 2019, Varanasi, India. He is a Senior Member of IEEE and ACM societies. He is a series Editor of Springer Blockchain Technologies and Associate Editor of PlosOne Journal.

Invited Speaker:

Dr. Jitendra P. Khatait
Professor at the Department of Mechanical Engineering, Indian Institute of Technology Delhi

Jitendra P. Khatait is currently working as an Associate Professor at the Department of Mechanical Engineering, Indian Institute of Technology Delhi. He works in the area of surgical robotics, using compliant mechanisms to design flexible instruments for safer surgical interventions. He obtained his Ph.D. degree from University of Twente, Netherlands in 2013 and worked in the area of tele-manipulation of surgical robots with flexible instruments. He received his B.E. from Indian Institute of Technology Roorkee in 2000 and M.Tech. from Indian Institute of Technology Delhi in 2002. He later received M.T.D. (Mechatronics) jointly from National University of Singapore and Eindhoven University of Technology, Netherlands in 2005. He worked as a Design Engineer at ASML, Netherlands (2013-2014) and as a Research Engineer in Singapore Institute of Manufacturing Technology, Singapore (2005-2008). His research interests are in precision machine design, medical devices, flexible surgical instrument, and medical robotics. He has published several journal articles and filed patents in the relevant area.

Talk Title: *Human Robot Interaction in the Context of Surgical Robotics*

Abstract: Minimally invasive surgery (MIS) or a keyhole surgery obviates the need for open surgery in most of the surgical interventions. MIS has benefited the patients immensely by reducing the damage and trauma to healthy tissues, post-operative complications, and greatly reduced the hospital stay. However, the surgeon suffered with reduced dexterity due to constrained manipulation and loss of haptic feedback and natural hand-eye coordination. Surgical robotics has addressed most of the limitations of MIS and improved dexterity, restored hand-eye coordination, and enhanced quality of surgery. Surgeon's and instrument's workspace are separated. The surgeon operates through his master console, manipulating the surgical instruments dexterously and remotely via a computer. On the other hand, the instruments with increased degrees of freedom greatly improve the surgeon's ability to manipulate instruments and tissues. Human robot interaction especially in medical robotics is very invasive and intrusive in nature. The robot design needs to meet conflicting requirements - stiffness v/s compliance, degrees of freedom v/s constraints, hard v/s soft, etc. These design traits must comply with the anatomy to provide safer and reliable interventions. Flexible instruments are now increasingly used for surgical interventions.

Poster and Presentation Session: Digital signal and image processing methods

Scope: Digital signal processing, finding effective ways to solve digital data and image processing problems, also it is important to apply in obtaining practical results. Digital signal processing has been applied in various fields to increase their efficiency. Currently, there are many types of methods for data processing. Based on digital signal processing, so many new algorithms and methods can be developed by applying and optimizing various mathematical methods for digital signal or image processing. In addition, we can use digital processing for the determination of the number of leukocytes in the blood and the prediction of mineral resources because of obtained data from the medical and geophysical research. It is widely used for classification, feature extraction, multiscale signal analysis. We welcome to discuss topics on digital signals processing, methods, and their application in HCI in this session

Session Chair(s):

Dr. Khakimjon Zaynidinov (Tashkent University of information technologies, Uzbekistan)

Khakimjon Zaynidinov was born in 1963. He graduated from Furkat secondary school No.20 in Izbaskan district of Andijan region in 1979. In 1984, he graduated from the Tashkent Polytechnic Institute. Diploma in computer science, specialty - systems engineer. On October 19, 1993 at the Specialized Council of the St.

Petersburg State University of Electrical Engineering named after VILenin (Ulyanov) for the degree of Candidate of Technical Sciences for the degree of Candidate of Technical Sciences - Defended his dissertation on "Computers, systems, complexes and networks." On November 28, 1996, Khakimjon Zaynidinov was awarded the title of "Associate Professor" at the department of "Computer Technology and Networks". Kh. Zaynidinov received the degree of Doctor of Technical Sciences on October 8, 2005 at the Academic Council for the award of the degree of Doctor of Science at the Tashkent University of Information Technology. He is the author of more than 150 scientific and methodological works, including: 10 textbook, more than 100 scientific articles (22 on the basis of SCOPUS) and more than 120 theses, 40 software certificates. Since 2016, he has been working as the head of the "Artificial Intelligence" department at Tashkent University of Information Technologies.

Dr. Elmira Nazirova (Tashkent University of information technologies, Uzbekistan)

In 2012 she defended her dissertation on "Mathematical and software for automated systems for determining the performance of oil and gas fields." In 2017, she was awarded the title of Associate Professor in 05.01.04 - "Mathematical and software of computers, complexes and computer networks." In 2019, she defended his doctoral dissertation (DSc) entitled "Mathematical models, a set of numerical methods and programs for the study of the filtration process of liquids and gases". She has 107 scientific articles, a certificate of official registration of the program for more than 20 computers, 2 textbooks, 5 manuals and about 25 guidelines. Currently, E. Nazirova is leading 5 independent researchers. Within the framework of her scientific activity Nazirova is the leader of 1 practical project (№A5-019, 2015-2017), as well as 1 fundamental (№F4-FA-F005, 2012-2016) and 1 practical (BV-Atex-2018). - (399-487), 2018-2020). Science 2015, She has been working as a head of Multimedia technologies department at TUIT.

Dr. Ibrohimbek Yusupov (Tashkent University of information technologies, Uzbekistan)

He was born on July 9, 1991 in Marhamat district of Andijan region. In 2017, he graduated from Tashkent University of Information Technology. He began his career as a methodologist at the Academy of Public Administration under the President of the Republic of Uzbekistan, Department of Information and Communication Technologies in Management. From 2017 to 2020 he worked as an assistant professor at the Department of "Information Technology" of Tashkent University of Information Technology, from 2021 to the present as an associate professor at the department of "Artificial Intelligence". I.Yusupov successfully defended his dissertation for the degree of Doctor of 57 Philosophy (PhD) in technical sciences on July 15, 2021. Yusupov studied at Soongsil University in South Korea in 2013-2014. In 2020, he completed a 2-month research internship in the Broadband technologies and future trends course under the Indian technical and economic program organized by the Government of India. He is the author of more than 27 scientific and methodological works, including: 1 textbook and more than 8 scientific articles (3 on the basis of SCOPUS) and more than 14 theses, 5 software certificates.

Dr. Sarvarbek Makhmudjanov (Tashkent University of information technologies, Uzbekistan)

He was born on December 22, 1991 in Beruniy district of Karakalpagistan region. In 2017, he graduated from Tashkent University of Information Technology. He began his career as a software programmer at the Academy of Public Administration under the President of the Republic of Uzbekistan, Department of Information and Communication Technologies in Management. From 2017 to 2020 he worked as an assistant professor at the Department of "Information Technology" of Tashkent University of Information Technology, from 2021 to the present as an associate professor at the department of "Artificial Intelligence" in TUIT. Sarvar Makhmudjanov successfully defended his dissertation for the degree of Doctor of Philosophy (PhD) in technical sciences on July 15, 2021. He studied at Soongsil University in South Korea in 2013-2014. He has 25 scientific and methodological works, including: 1 textbook based on IoT and more than 8 scientific articles (2 on the basis of SCOPUS) and more than 14 theses, 4 software certificates.

Technical Tutorial-1

Title: *Fundamentals of Tensors with applications*

Summary: Multidimensional data can be represented as a tensor, multi-array, or multi-linear functionals without losing any information. Mathematically, tensors are a generalization of the concepts of scalars, vectors, and matrices. Tensors occur naturally in this world, just like scalars, vectors, and matrices, with many video and machine learning applications. This tutorial focuses on the mathematical fundamentals of tensors and their application in data compression, machine learning, and other areas.

Tutorial Chair(s):

Dr. Hanumant Singh Shekhawat
IIT Guwahati, India

Dr. Hanumant Singh Shekhawat is working at the Indian Institute of Technology Guwahati as an Assistant Professor in the Department of Electronics and Electrical Engineering. He did his postdoc at the Department of Electrical Engineering, Eindhoven University of Technology, and The Netherlands. His research was on multi-linear data (tensor) reduction techniques, which have applications in video/speech processing, MRI, and (higher dimensional) data analysis. He completed his Ph.D. in Nov 2012, from the Department of Applied Mathematics, the University of Twente, The Netherlands. His research was related to optimization problems in sampling and interpolation. He has completed his master's (in 2004) from the Department of Electrical engineering and his bachelor's in Electronics and communication engineering (in 2002) from the Indian Institute of Technology Bombay and Rajasthan University in India, respectively. After the master's degree, he worked in Texas Instruments India and Sasken Communications India for around four years in the area of electronics, software, and algorithm development. He had a visiting faculty position at the University of Pardubice, the Czech Republic from May to June 2019. Currently, his work is related to problems in radar, tensor, speech, signals, and systems.

Dr. Shodhan Rao
Ghent University Global Campus, South Korea

Shodhan Rao is an Associate Professor of Applied Mathematics/ Director of Research Center for Biosystems and Biotech Data Science at Ghent University Global Campus (GUGC), Incheon, South Korea. He is also a part-time (10%) Professor with the Department of Mathematical Modelling and Data Analysis at Ghent University's main campus. He is currently pursuing research on stability, parameter estimation and model reduction of biochemical reaction networks, validity conditions of quasi-steady-state approximations, and the dynamics of competition network models in ecology. His research interests are in the areas of chemical reaction network theory, systems biology, and mathematical ecology.

Mr. Sandeep Pandey
Samsung Research and Development Institute, Bangalore, India.

Sandeep Pandey is working as a Lead Engineer at Samsung Research and Development Institute, Bangalore, and submitted thesis for Ph.D. at IIT Guwahati. His research interest lies in the area of Tensor-based signal processing, deep learning for emotion recognition in speech and text, mental health diagnosis. He has numerous publications in international conferences and reputed journals such as Biomedical Signal Processing and Control, Plos one.

Technical Tutorial-2

Title: *Introducing deep learning models for human emotion recognition and Analysis*

Summary: Human emotions account for a huge factor in their psychological and physical health. Hence, understanding human emotions is very important. Given the complexities of the human brain and its emotions, developing technologies to understand is a very challenging task. This workshop focuses on developing emotion models designed for humans. This workshop would cover topics such as collecting data and exploring emotion analysis tasks and developing novel methods for such tasks. This workshop would start from the very basics of developing deep learning models and solutions to advanced topics such as feature fusion methods. This work is focused on understanding how seq2seq models can help understand hidden patterns in human emotion, and how can such models be used to develop frameworks to build emotion understanding models. This workshop is focused on researchers and machine learning engineers who are interested to pursue research in the domain of emotion recognition. Some basic concept of machine learning and python is expected in this workshop.

Tutorial Chair(s):

Dr. Naagmani Molakatala
School of Computer and Information Sciences, University of Hyderabad, India

Faculty in school of CIS teaching AI and Computer science courses, Experienced Communications Specialist with a demonstrated history of working in the computer software industry. Skilled in C++, Java, Management, Software Development, and Leadership. Strong information technology professional with a B.Tech(ECE) focused in Signal processing from SMGH school Anantapur, Govt Polytechnic Anantapur, JNTU Anantapur, JNTU Hyderabad. PhD from University of Hyderabad

Mr. Shankhanil Ghosh
School of Computer and Information Sciences, University of Hyderabad, India

Shankhanil is a deep learning researcher who has worked in ML/DL domain for over two years in academia. He is currently working on a multi-modal deep learning solution for mental health issues detection in teens and young adults. He is focused on developing a software deliverable technology stack that can help psychologists and health care professionals track and monitor the emotional parameters of an individual. His team is a part of the India-Korea joint collaboration on battling the mental health crises. In the past, he has worked on building Connet-NoTouch, a B2B product for offering contactless dining solutions, (one of the first to do so) during the height of COVID19. He targetted smaller restaurants in the Tier-2 and Tier-3 cities in Bengal, where technological penetration was low, and thus heavily affected by COVID19.

Technical Tutorial-3

Title: ***Recent Advancement in Deep Learning: Federated Learning and Self-Supervised Learning***

Summary: Recent advancements in deep learning are solving real-world problems. Deep learning algorithms need a more diverse set of data to generalize and perform in the real world. These algorithms are largely dependent on high-quality labelled data. High-quality varied labelled data is a major obstacle in transmitting these technologies to the end users. Self-supervised learning (SSL) is a developing deep learning technique that aims to address the issues raised by the over-dependence on high-quality labelled data. Internet users generate roughly about 2.5 quintillion bytes of data daily. Most of the data is personal user data. As privacy concerns are increasing among Internet users, the privacy protection use of personal data will establish a trust to interact with user devices. Federated Learning is a technique in which we can train a global deep learning algorithm with protecting the privacy of the user's personal data. Federated learning with self-supervision on user data can help to solve many real-world problems and gain trust to interact with technology.

Tutorial Chair(s):

Dr. Bong Jun Choi
Soongsil University, South Korea

Dr Bong Jun Choi is an associate professor at the School of Computer Science & Engineering and jointly at the School of Electronic Engineering, Soongsil University, Seoul, Korea. Previously, he was an assistant professor at the Department of Computer Science, State University of New York Korea, Korea, and concurrently a research assistant professor at the Department of Computer Science, Stony Brook University, USA. He received his B.Sc. and M.Sc. degrees from Yonsei University, Korea, both in Electrical and Electronics Engineering, and his PhD from the University of Waterloo, Canada, in Electrical and Computer Engineering. His current research focuses on distributed artificial intelligence, distributed intelligent energy networks, and security. He is a senior member of the IEEE and a member of ACM.

Dr. Ajit Kumar
Soongsil University, South Korea

Dr Ajit Kumar is a Post-Doctoral researcher at Soongsil University, Seoul, South Korea. Currently, he is working in a project titled "Korea-India Joint Network Center (JCN) on Depression Diagnosis and Medication Adherence (우울증 진단 및 약물 순응도 연구 센터)" funded by MSIT, Korea". He completed his PhD in Computer Science and Engineering from the Department of Computer Science, Pondicherry University, in May 2018. His research involves applying machine learning to solve various cyber security issues. Apart from his core research area, he works with other researchers to extend the application of machine learning to other domains. He has published his research works in SCI journals and international conferences. He has won the best paper awards at two conferences for his research works. He is passionate about sharing his skills and knowledge with communities and young researchers.

Mr. Ankit Kumar
Soongsil University, South Korea

Ankit Kumar Singh is currently pursuing his Ph.D. in the field of Artificial Intelligence at Soongsil University under the supervision of Prof. Bong Jun Choi. He is a team member of the “Korea-India Joint Network Center (JCN) on Depression Diagnosis and Medication Adherence” project. His research interest includes Privacy Preserving Mental health using Multimodal data. He has worked in ‘Inferigence Quotient’ for a year as a Computer Vision Engineer. He also has experience working as an Android Application Developer. He received his Master's Degree in Computer Application from Pondicherry University. During his master degree, he founded a Student Club ‘HashInclude’ for collaborative learning dedicated to Problem Solving skills and programming.

Technical Tutorial-4

Title: ***Practical Deep Learning Based Object Detection on Aerial Images***

Summary: The objective of the workshop is to demonstrate the drone based common object detections which can be applied to satellite images too for common object detections.

Locating common objects like pedestrians, bikers and cars on roads is essential for city surveillance. This workshop presents a way that can help citywide speed up the pedestrian, bikers and car detection process by the use of drones. Any high number of presence of people, or cars can alert the authorities to take further actions. Drone technology is advancing at a rapid pace, improving drone capabilities whilst an increasingly competitive market is driving prices down. Drone capability is having an overall positive impact on society with its focus on usage in crisis and emergency response, search and rescue, automated shipping, the film industry, farming, environmental management, etc. This increases public surveillance and helps the concerned authorities to develop smart cities. Hands on using deep learning techniques of Yolov5 and other object detection techniques can help the system to detect common objects across the cities.

This orientation includes a participatory activity to introduce the concept of deep learning especially Convolution Neural Network for approaching problems in computer vision domain.

Tutorial Chair(s):

Gaurav Tripathi, Ph.D.
Senior Scientist, Central Research Lab, Bharat Electronics Limited, India

Gaurav Tripathi received his M. Tech. degree in Information Technology (Specialization: Artificial Intelligence). Indian Institute of Information Technology, Allahabad in 2007 PhD from Delhi Technological University, India. He currently works as senior scientist at Bharat Electronics Ltd. India. His research interest includes Internet of Things, Deep Learning, Convolutional Neural Networks based Computer Vision, Fog computing.

Workshop-1: *Modeling Process Maps in Process Mining Using Fluxicon Disco*

Abstract
Process Mining facilitates the study of operational processes based on event logs that links the fields of data science and process management. Process mining is to produce insights and recommendations from event data. A process in process mining is a series of activities made up of process steps with a distinct beginning and ending activity. These discrete acts or events in the process are known as process steps or process maps. Fluxicon Disco is a fantastic process mining tool that can handle big event logs, complicated models, and makes conversion and filtering simple. Performance measurements are presented in a clear and understandable way, and the model allows for the animation of historical data. Mass-scale process mining

Objectives

- To understand the concept of process mining application using in real environment for future research and introduce Process Mining as one of the emerging areas for research
- To embrace process mining technology via hands-on workshops using the available process mining tools in the market, such as Fluxicon Disco, ProM and PMiner.

Intended audience

- Students
- Researchers in the area of Data Mining, Data Analytics, Process Mining
- Academicians

Event type and duration

- Workshop / Tutorial
- 90 Minutes (Short Event)

A list of the topics and sub-topics that the workshop will address, with expected duration

- Introduction to Process Mining (30 minutes)
- Modelling process maps using Fluxicon Disco (60 minutes)

Software

- Fluxicon Disco
- Microsoft Excel
- Notepad

Organizer(s):

Husna Sarirah Husin

Husna Sarirah Husin is a Senior Lecturer at Universiti Kuala Lumpur, Malaysian Institute of Information Technology (UniKL MIIT) since 2005. She obtained her PhD in 2021 from RMIT University, Australia. Besides teaching, she is a Research Coordinator, CWAL (Centre for Women Advancement & Leadership) coordinator, and Process Mning (PmineRec) Research Cluster Leader in UniKL MIIT. She has received both internal and external university funding, taken part in research initiatives for industries, and been granted national funds. She has also published in reputable journals and conferences in the area of Web Mining and Process Mining.

Workshop-2: *Ux Design Workshop for Establishing A Relationship between Intelligent Objects and Humans Using T+E=B Toolkit*

Abstract
The emergence of various intelligent objects such as chatbots, robots, and autonomous vehicles is said to bring happiness to the future of mankind, but many people think that these objects take away human jobs and lead to misery. It can be seen that the future will depend on the relationship between the person who developed these things and the things with intelligence. This workshop aims to think about the symbiotic relationship between intelligent objects and humans from a UX design perspective, and to consider the direction of HCI design. Therefore, in this workshop, contemplate and discuss the direction of artificial intelligence (AI) chatbots or robots that can emotionally communicate with humans based on human emotions with participants from various cultural and social backgrounds. To this end, especially explore various way of acquire trust, intimacy relationship between intelligent object and human or create positive user experience.

The workshop will be conducted as follows.
Step 0: Introduce (30 min)

Step 1: Use metaphors to organize desired behaviour, actual behaviour, and obstacles (30 min)

- Metaphorically expressing the relationship between intelligent objects and humans to help participants to immerse themselves in thinking.

Step 2: Exploring the situations and emotions in which the behaviour occurs from the user's point of view (40 min)

- provide inspiring questions to design triggers that can overcome obstacle.

Step 3: Establishing a design strategy and generating ideas using the given examples (50 min)

Step 4: presentation by team (20min)

Organizer(s):

Prof. Eui-Chul Jung

Eui-Chul Jung is a professor and teaches interactive product /UX design, and human-centered design and methodology. Currently, he is conducting a nine-year project at Seoul National University about design influence on daily behaviours. He is also doing various research and academic studies on which design could solve the wicked problems encompassing technology and economy in the multidisciplinary realm.

Hyewon Kim

Hyewon Kim studies product UX design as a graduate student at Seoul National University and a researcher at HCID (Human-centered Integrated) Lab. of Seoul National University. Her research interest is design intervention strategy based on the design thinking.

Younhee Cho

Younhee Cho is a graduate student studying product UX design at Seoul National University and a researcher at HCID (Human-centered Integrated) Lab. of Seoul National University. Her research mainly focuses on UX design of smart healthcare system using artificial intelligence technology.

Workshop-3: *User Interface for Metaverse in Personalized Autonomous Vehicles*

Abstract
Recent technological advances in the field of Human-Computer Interaction and Artificial Intelligence have accelerated the interest in the research and development of highly immersive virtual spaces. Lately, such a virtual space is popularly dubbed as Metaverse. Metaverse opens immense possibilities for its research, development, and usage due to its open-ended definition in the digital community. Among many, one of the most important research directions focuses on novel interaction devices, interfaces, or techniques to provide seamless and intuitive access to the Metaverse. The User Interface (UI) of personalized autonomous vehicles (PAVs) aims to provide higher control and quicker virtual world adaptability to the user to ensure a fluid user experience. Rapid growth in the Autonomous Vehicles research paints an optimistic opportunity for bringing the Metaverse-like facilities into the AV domain. The younger generation demands access to such virtual spaces ubiquitously; therefore, accessing the same during autonomous vehicle rides can provide unimaginable experiences in the future. Current digital interfaces such as display screens, VR headsets, etc., may hinder the complete immersion of the vehicle user. Therefore, solving the challenge of developing in-vehicle-centric interfaces and applications is crucial to facilitating future mobility. This workshop will focus on the current challenges and development of a novel User Interface for Metaverse applications in PAVs.

Topics include but are not limited to:

- Tangible user interfaces in PAVs.
- Metaverse-based services for PAVs.
- AR/VR/XR-based interaction for an immersive experience in PAVs.
- Ethical or privacy issues for AVs.
- Health issues related to UIs.
- Telepresence technologies for PAVs.

Organizer(s):

Prof. Shiho Kim (School of Integrated Technology, Yonsei University, South Korea)

Prof. Kim is a Professor in the School of Integrated Technology, Yonsei University, South Korea. He received his B.S. degree in Electronic Engineering from Yonsei University, South Korea in 1986. He received his M.S. and Ph.D. degrees in Electrical Engineering in 1988 and 1995, respectively from KAIST, South Korea. His main research interest includes the development of software and hardware technologies for intelligent vehicles, and reinforcement learning for autonomous vehicles. He is a member of the editorial board and reviewer for various Journals and International conferences. So far, he has organized two International Conferences as Technical Chair/General Chair. He is a member of IEIE (Institute of Electronics and Information Engineers of Korea), KSAE (Korean Society of Automotive Engineers), vice president of KINGC (Korean Institute of Next Generation Computing), and a senior member of IEEE. He is the co-author for over 100 papers and holding more than 50 patents in the field of information and communication technology.

Pamul Yadav (School of Integrated Technology, Yonsei University, South Korea)

Pamul Yadav is a graduate researcher in the School of Integrated Technology, Yonsei University, South Korea. He received his B.S. degree in Computer Science and Engineering from UNIST, South Korea in 2020. His research interests lie in the application of Reinforcement Learning for Autonomous Vehicles.

Workshop-4: *Introduction to DevOps Lifecycle and sample applications*

Abstract
This workshop series is designed to help researchers gain the skills and knowledge required to effectively build, manage and own their own application using modern

DevOps best practices.
- Module 1 - Introduction to DevOps
- Module 2 - DevOps Lifecycle (Case Study Based)
- Module 3 - a) Architectural principles, Installation and Configuration
- Module 3 - b) Configuring CI/CD Pipeline for sample application

Following are the tools that are going to be used in the workshop:

- Jenkins
- GitHub
- Docker
- Kubernetes
- Sample Java or React based Application

Organizer(s):

Garima Bajpai (Canada DevOps Community of Practice, Canada)

-Founder of DevOps Community of Practice Canada | Best Community Award - DOIS
-Chair Ambassador Program , TOC member (2021 - till date), Cd Foundation
-Chair Canada Chapter, DevOps Institute (2020-till date)
-Chair Industry Forum(IHCI-2022), Intelligent Human Computer Interaction Conference
-Producer Summits Canada (DevOps, DataOps & LeveeCast Podcast)
-Author InfoQ, DevOps SkillBook , DevSecOps SkillBook, whitepapers & blogs
-DevSecOps Practitioner Course contributor (DevOps Institute)

Mitesh Soni (Canada DevOps Community of Practice, Canada)
-DevOps evangelist with a focus on improvement of the daily work
-Contributor to LeveeCast Podcast - Book Review Series
-Infrastructure Automation with Terraform: Automate and Orchestrate your Infrastructure with Terraform
- Hands-on Pipeline as YAML with Jenkins: A Beginner's Guide to Implement CI/CD Pipelines
- Hands-on Pipeline as Code with Jenkins: CI/CD Implementation for Mobile, Web, and Hybrid Applications
-Hands-on Azure DevOps - CICD Implementation for Mobile, Hybrid, and Web Applications
-Agile, DevOps and Cloud Computing with Microsoft Azure: Hands-On DevOps practices implementation

IHCI 2022 Programme Oct 19, 2022 (Day - 0)						
Tashkent Time (GMT+5)			Tutorial Tracks			
Start	**End**	**Type**	**Tutorial - 1 Building - F (Room# 101)**	**Type**	**Tutorial – 2 Building - F (Room# 201)**	**Moderator**
10:00 AM	10:15 AM		Registration and Chairs' Welcome			
10:15 AM	10:30 AM	Tutorial Chairs	Introduction Dr. Hanumant Singh Shekhawat, (IIT-Guwahati, India) Dr. Shadhon Rao, (Ghent University Global Campus, Korea) Sandeep Kumar, (Samsung, India)	Tutorial Chair	Introduction Dr. Naagmani Molakatala Mr. Shankhanil Ghosh (University of Hyderabad)	Dr. Ibrohimbek Yusupov
10:30 AM	1:00 PM	Tutorial Title	Fundamentals of Tensors with applications	Tutorial Title	Introducing deep learning models for human emotion recognition and Analysis	
1:00 PM	2:00 PM		Lunch Break			**Moderator**
Start	**End**	**Type**	**Tutorial – 3 Building - F (Room# 101)**		**Tutorial – 4 Building - F (Room# 201)**	
2:00 PM	2:10 PM	Tutorial Chair	Introduction Dr. Bong Jun Choi Dr. Ajit Kumar Mr. Ankit Kumar (Soongsil University, Seoul, Korea)	Tutorial Chair	Introduction Dr. Gaurav Tripathi, Bharat Electronics Limited, India	Dr. Sarvar Makhmudjanov
2:10 PM	5:00 PM	Tutorial Lecture	Recent Advancement in Deep Learning: Federated Learning and Self-Supervised Learning	Tutorial Title	Deep Learning Based Object Detection on Aerial Images	
5:00 PM	**6:00 PM**	**Chairs**	**Brainstorming session**			

IHCI 2022 Programme Oct. 20, 2022 (Day-1)							
Tashkent Time (GMT+5)			**Conference Tracks**				
Start	**End**	**Type**	Main Building - Block A (Conference Hall 3rd Floor)				**Moderator**
10:00 AM	10:30 AM	Plenary Speakers	**Opening Ceremony** Mr. Sherzod Shermatov, The Ministry for Development of Information Technologies and Communications of the Republic of Uzbekistan Mr. Ibrokhim Abdurakhmonov, Minister of Innovative Development of the Republic of Uzbekistan Prof. Bakhtiyor Makhkamov, Rector, Tashkent University of Information Technology named after Muhammad al-Khwarizmi, Uzbekistan				Dr. Nigora Gulomova & Dr. Ibrohimbek Yusupov
10:30 AM	11:00 AM	Welcome Speaker	Prof. Hakimjon Zaynidinov, TUIT, Uzbekistan Prof. Uma Shanker Tiwary, IIIT-Allahabad, India Prof. Dhananjay Singh, HUFS, South Korea				Prof. Dhananjay Singh
11:00 AM	12:00 PM	Keynote Speaker	Prof. Musaev Mukhamadjan Makhmudovich Department of Artificial Intelligence, TUIT named after Muhammad al Khwarizmi, Tashkent, Uzbekistan				
12:00 PM	1:00 PM	Keynote Speaker	**Title: Bayesian Brain and Schizophrenia** Prof. Venkatasubramanian Ganesan Department of Psychiatry, National Institute of Mental Health & Neurosciences [NIMHANS], Bangalore, India				
1:00PM	2:00 PM		Lunch Break (Block - B Kitchen/Cafeteria)				**Moderator**
Start	**End**	**Type**	**Building - F Session – 1 (Room# 101)**		**Building - F Session – 2 (Room # 201)**	**Building - F Workshop - 1 (Room # 301)**	
2:00 PM	2:30 PM	Invited Speaker	**Dr. Mukesh Saini,** IIT-Ropar, India Title: Online Mashup Methods for Interesting and Informative Presentation	Invited Speaker	**Dr. Abhishek Shrivastava** IIT-Guwahati Title: Taking turns in conversation with a Voice User Interface: Learnings for HCI.	Dr. Husna Sarirah Husin Universiti Kuala Lumpur, Malaysia Dr. Mohd Helmy Bin Abd Wahab University Tun Hussein Onn Malaysia, Title: Modeling Process Maps in Process Mining Using Fluxicon Disco	Dr. Sarvar Makhmudjanov
2:30 PM	4:00 PM	Session Title & Chairs	Brain Comp. Interface through AI **Dr. Nagamani Molakatala** University of Hyderabad, India	Session Title & Chairs	Adaptive Security in HCI **Dr. Pritee Parwekar,** SRM-IST, Ghaziabad, India **Dr. Irish Singh, COIKOSITY**		
4:00 PM	4:10 PM		Break				**Moderator**
Start	**End**	**Type**	**Building - F Session – 3 (Room# 101)**		**Building - F Session – 4 (Room # 201)**	**Building - F Workshop - 2 (Room # 301)**	
4:10 PM	4:40 PM	Invited Speaker	**Dr. Nagarajan Prabakar** Florida International Univ., USA Title: Prospects and challenges of HCI in Quantum Computing	Invited Speaker	**Dr. Jan-Willem van 't Klooster** The University of Twente, Netherlands Title: No bell will ring if the human may fail	Workshop Chairs Prof. Eui-Chul Jung, SNU, Seoul Hyewon Kim, SNU, Seoul Younhee Cho, SNU, Seoul Title: Ux Design Workshop for Establishing a Relationship between Intelligent Objects and Humans using T+E=B	Dr. Ibrohimbek Yusupov
4:40 PM	6:10 PM	Session Title & Chairs	HCI in E-Health Monitoring and Management Dr. Mark D. Whitaker, SUNY Korea	Title Session Chairs	Beyond AI: Human-In-The-Loop Intelligence **Prof. Uma Shanker Tiwary**, IIIT-Allahabad **Dr. Madhusudan Singh**, WSU, Korea		
6:10 PM	**8:30 PM**	**Day 1- Banquet Dinner**					

IHCI 2022 Programme Oct. 21, 2022 (Day-2)							
Tashkent Time (GMT+5)			**Conference Tracks**				
Start	**End**	**Type**					**Moderator**
10:00 AM	10:45 AM	Keynote Speaker	**Title: Smart HCI for HPC in Big Data Proteogenomics: Challenges and Opportunities** Prof. Ajay Gupta, Western Michigan University, USA				
10:45 AM	11:45 AM	Keynote Speaker	**Title: From Multimodal Interaction to Multimodal Synchrony to Behavioral Adaptivity and Back: a Multi-Adaptive Agent Modeling Approach** Prof. Jan Treur and Sophie C.F. Hendrickse and Jan Treur, Vrije Universiteit Amsterdam, Netherlands				Dr. Dhananjay Singh
11:45 AM	12:00 PM		Break				
12:00 AM	12:30 PM	Keynote Speaker	**Title: Technological Revolution and the future of ownership in the Digital Era** Prof. Shiho Kim, Yonsei University, Korea				Prof. Hakimjon Zaynidinov
12:30 AM	1:00 PM	Topical Speaker & Panel Discussion	**Topic: Interactive Technologies for post-Covid Era** Prof. Uma Shanker Tiwary, IIIT-Allahabad, India Dr. Hanumant Singh Shekhawat, IIT-Guwahati, India Prof. Dhananjay Singh, HUFS, Korea				
1:00 PM	2:00 PM		Lunch Break				**Moderator**
Start	**End**	**Type**	**Building - F Session – 5 (Room# 101)**		**Building - F Session – 6 (Room # 201)**	**Building - F Workshop - 3 (Room # 301)**	
2:00 PM	2:30 PM	Invited Speaker	**Dr. Irish Singh,** COIKOSITY Title: Role of Self-Adaptive Security for HCI applications.	Invited Speaker	**Dr. Antonio J. Jara** Smart Cities at Libelium, Spain Title: Democratizing Smart Cities to replicate success stories	Workshop Chairs **Prof. Shiho Kim and Mr. Pamul Yadav** Yonsei University, Korea User Interface for Metaverse in Personalized Autonomous Vehicles	Dr. Sarvar Makhmudjanov
2:30 PM	4:00 PM	Session Title & Chairs	**Theory & App. of Intelligent Systems** Dr. Mohd Helmy Abd Wahab UTHM, Malaysia	Session Title & Chairs	**The principle and practice of human-centered AI** Dr. Jee Hand Lee, and Dr. Eui-Chul Lee Samgmyung University, Korea		
4:00 PM	4:15 PM		Break				**Building – F Room #102 Poster Session**
Start	**End**	**Type**	**Building - F Session – 7 (Room# 101)**		**Building - F Session – 8 (Room # 201)**	**Building - F Workshop - 4 (Room # 301)**	
4:15 PM	4:45 PM	Invited Speaker	**Dr. Koumudi Patil** IIT-Kanpur, Kanpur, India Title: Digital Desis: Interfacing Street Maths on Computer Tracks	Invited Speaker	**Dr. Rodrigo da Rosa Righi** **UNISINOS, Brazil** Title: On Defining and Deploying Health Services in Fog-Cloud Architecture	**Chairs** Garima Bajpai and Mitesh Soni Capital Carbon Consulting, Canada **Introduction to DevOps Lifecycle and sample applications**	**Digital signal and image processing methods** Dr. Sarvarbek Makhmudjanov Dr. Ibrohimbek Yusupov Dr. Ajit Kumar
4:45 PM	6:15 PM	Session Title & Chairs	HCI for Design Dr. Abhishek Shrivastava, IIT-Guwahati	Session Title & Chairs	Cyber-Physical Systems for HCI Dr. Mukesh Saini, IIT-Ropar, India Dr. Ajit Kumar, SSU, Korea		
6:15 PM	6:30 PM	**Day 2- Closing remarks**					

IHCI 2022 Programme Oct 22, 2022 (Day-3)							
Tashkent Time (GMT+5)			**Conference Tracks**				
Start	**End**	**Type**					**Moderator** Dr. Dhananjay Singh
10:00 AM	10:45 AM	Keynote Speaker	**Prof. Ingmar Weber** Qatar Computing Research Institute, Doha, Qatar Title: Societal Computing: Using Data to Study and Improve Society				
			Building - F **Session – 9 (Room# 101)**		**Building - F** **Session – 10 (Room# 201)**	**Building - F** **Session – 11 (Room# 301)**	**Meeting**
10:45 AM	11:15 AM	Invited Speaker	**Dr. Muhammad Taqi Raza** University of Arizona, USA. Title: Breaking the Unbreakable Human-Machine Interaction in 5G Networks.	Invited Speaker	**Dr. Chintan Amrit** University of Amsterdam, Netherlands Title: Novel Data Analytic Methods to Improve Burden Estimates for Wasting	**Dr. Jitendra P. Khatait** IIT-Delhi, India Title: Human Robot Interaction in the Context of Surgical Robotics	IHCI-2022 Steering Committee and Key Members
11:15 AM	1:00 PM	Session Title & Chairs	**5G Internet for HCI** Dr. Ikechi Ukaegbu, Nazarbayev University, Kazakhstan	Session Title & Chairs	**Educational Applications of Interactive Computer Systems** Dr. Nagarajan Prabakar, FIU, USA Dr. Jong- Hoon Kim, KSU, USA	**AI-Inspired Solutions for Mental Health Ailments** Dr. David (Bong Jun) Choi, SSU, Korea Dr. Hanumant S Shekhawat, IIT-Guwahati Dr. Dhananjay Singh, HUFS, South Korea	
1:00 PM	2:00 PM		Lunch Break				**Remarks**
2:00 PM	3:30 PM		***Day 3: Award Ceremony and Closing remarks***				

IHCI 2022 Programme (Tentative) Oct 23, 2022 (Day-4)			
Tashkent Time (GMT+5)			
5:30 AM	7:30 AM	Management by Dr. Ibrohimbek Yusupov	**Trip to Samarkand or Bukhara**
7:30 AM	9:30 AM		**Back to Tashkent**

IHCI 2022 Programme (Sessions) Oct. 20, 2022 (Day-1)				
Start PM	**End** PM	Session Chair/ Paper ID	Brain Comp. Interface through AI **Dr. Nagamani Molakatala,** University of Hyderabad, India	Remark
Building - F Session – 1 (Room# 101)			Chairs' Welcome	
2:00	2:30	Invited Speaker	**Dr. Mukesh Saini,** IIT-Ropar, India Title: Online Mashup Methods for Interesting and Informative Presentation	
2:30	2:45	470	*Seongyun Ku, Sungwhan Kim, Minji You and Mark Douglas Whitaker.* Building the Groundwork for a Natural Search, to Make Accurate and Trustworthy Filtered Searches: The Case of a New Educational Platform with a Global Heat Map to Geolocate Innovations in Renewable Energy	
2:45	3:00	6307	*Narzillo Mamatov, Nilufar Niyozmatova, Yusuf Yuldoshev, Sherzod Abdullaevand Abdurashid Samijonov.* Automatic speech recognition on the neutral network based on attention mechanism	
3:00	3:15	886	*Nagamani Molakatala, Csn Prasad, Srujana Srujana and B Venkata Prasad Babu.* A IoT based on-site data acquisition framework for next generation Aggrotech infrastructure	
3:15	3:30	4948	*Aos Mulahuwaish, Manish Osti, Kevin Gyorick, Majdi Maabreh, Ajay Guptaand BasheerQolomany.* CovidMis20: COVID- 19 Misinformation Detection System on Twitter Tweets using Deep Learning Models	
3:30	3:45	8442	*Akmalbek Abdusalomov, Mukhriddin Mukhiddinov, Oybek Djuraev, Abdinabi Mukhamadiyev and UIugbek Abdullaev.* Al-based Estimation from Images of Food Portion Size and Calories for Healthcare Systems	
3:45	4:00	733	*Malika Abdullaeva, Dilshod Juraev, Mannon Ochilov and MekhriddinRakhimov.* Uzbek Speech Synthesis Using Deep Learning Algorithms	
4:00	4:10	Break		
Start PM	**End** PM	Session Chair/ Paper ID	HCI in E-Health Monitoring and Management **Dr. Mark D. Whitaker,** SUNY Korea	
Building - F Session – 3 (Room# 101)			Chairs' Welcome	
4:10	4:40	Invited Speaker	**Dr. Nagarajan Prabakar,** Florida International Univ., USA Title: Prospects and challenges of HCI in Quantum Computing	
4:40	4:55	7029	*Jayesh Soni, Nagarajan Prabakar and Himanshu Upadhyay.* A Multi-Layered Deep Learning Approach for Human Stress Detection	
4:55	5:10	4644	*Mayuri Jakkanwar and Arvind Kiwelekar.* Brain Mapping Disease Identification System	
5:10	5:25	7364	*Mukhriddin Abduganiev, Rakhimjon Azimov and Lazizbek Muydinov* Digital Processing Algorithms of Biomedical Signals using Cubic Base Splines	
5:25	5:40	3736	*Hakimjon Zaynidinov, Umidjon Juraev, Sulton Tishlikov and Jahongir Modullayev.* Application of Daubechies Wavelets in Digital Processing of Biomedicine Signals	
5:40	5:55	8246	*Lori Minyoung Kim, Jung-Ryun Kwon and Eui-Chul Jung.* User Experience Virtual Reality using Threshold Space in between Different Physical Laws	.
5:55	6:10	2766	*Mohammad Asif, Majithia Tejas Vmodbhai, Sudhakar Mishra, Aditya Gupta and Uma Shanker Tiwary.* Emotion Recognition in VAD space during Emotional Events using CNN-GRU hybrid model on EEG Signals	
6:10	6:15	Chairs	Closing remarks	

IHCI 2022 Programme (Session) Oct. 20, 2022 (Day-1)				
Start PM	**End** PM	Session Chair/ Paper ID	Adaptive Security in HCI **Dr. Pritee Parwekar**, SRM-IST, Ghaziabad, India **Dr. Irish Singh**, COIKOSITY	Remark
Building - F Session – 2 (Room # 201)			Chairs' Welcome	
2:00	2:30	Invited Speaker	**Dr. Abhishek Shrivastava,** IIT-Guwahati **Title:** Taking turns in conversation with a Voice User Interface: Learnings for HCI.	
2:30	2:45	1888	*Khamdamov Utkir, Umarov Mukhriddin, Khalilov Sirojiddin, Kayumov Aziz and Abidova Feruza.* Traffic Sign Recognition by Image Preprocessing and Deep Learning	
2:45	3:00	8542	*Yves Simmen, Tabea Eggler, Alexander Legath, Doris Agotai and Hilko Cords.* Non-Overlayed Guidance in Augmented Reality: User Study in radio- pharmacy	
3:00	3:15	348	*Bakhrom Omirov, Doston Jumaniyozov and Otaxon Khudayberganov.* The Rule Matrices of 2D Linear Pentagonal Cellular Automata	
3:15	3:30	7772	*Karam Park and Eui-Chul Jung* How can humans and robots live together? The 5 types of human-robot relationship	
3:30	3:45	548	*Elov Botir, Hamroyeva ShahIo and Axmedova Xolisxon.* Methods for creating a morphological analyzer	
3:45	4:00	978	*Muhammadjon Musaev, Ilyos Khujayorov and Mannon Ochilov.* SpeechRecognition Technologies Based on Artificial Intelligence Algorithms	
4:00	4:10	Break		
Start PM	**End** PM	Session Chair/ Paper ID	Beyond AI: Human-In-The-Loop Intelligence **Prof. Uma Shanker Tiwary**, IIIT-Allahabad and **Dr. Madhusudan Singh**, WSU, Korea	
Building - F Session – 4 (Room # 201)			Session Chairs' Welcome	
4:10	4:40	Invited Speaker	**Dr. Jan-Willem van 't Klooster,** The University of Twente, Netherlands **Title:** No bell will ring if the human may fail	
4:40	4:55	3317	*Priyanka Sharma and Pritee Parwekar.* Multiclass Classification of online reviews using NLP & Machine Learning for Non-English Language	
4:55	5:10	1804	*Ayan Dutta and Gokarna Sharma*. A Constant-Factor Approximation Algorithm for Online Coverage Path Planning with Energy Constraint	
5:10	5:25	2270	*Sonal Jain, Dwarikanath Mahapatra and Mukesh Saini.* Real-time Image based Plant phenotyping using Tiny-YOLOv4	
5:25	5:40	520	*Narzillo Mamatov, Bakhtiyor Abdukadirov and Boymirzo Samijonov.* Method of False Attack Detection Based on Image Texture Analysis	
5:40	5:55	3066	*Liang Tang, Masooda Bashir and Priscilla Ferronato.* Do Users'Values Influence Trust in Automation?	
5:55	6:10	9646	*Tauheed Mohd, Noah Rettig, Furman Doty II, Rijan Kafle and Parajwal Sarkar.* From Angular to Vue: A Cross-Language Comparative Survey of Web Frameworks	
6:10 PM	6:15 PM	Chairs	Closing remarks	

IHCI 2022 Programme (Session) Oct. 21, 2022 (Day-2)				
Start PM	End PM	Session Chair/ Paper ID	Theory & App. of Intelligent Systems Dr. Mohd Helmy Abd Wahab, UTHM, Malaysia	Remark
Building - F Session – 5 (Room# 101)			Chairs' Welcome	
2:00	2:30	Invited Speaker	Dr. Irish Singh, COIKOSITY Title: Role of Self-Adaptive Security for HCI applications.	
2:30	2:45	3756	*Abeer Banerjee, Shyam Sunder Prasad, Naval Kishore Mehta, Himanshu Kumar, Sumeet Saurav and Sanjay S*. Gaze Detection using Encoded Retinomorphic Events	
2:45	3:00	3904	*Ravikant Gautam and Dr. Nagamani Molakatala*. Simulation Modelling of Terrorist Attack using Deep Methods	
3:00	3:15	3979	*Vimal Babu Undru, Dr. Nagamani Molakatala, Shalem Raju T, Tejaswini M, Teja Kiran and M Seshadri.* Automation of Calibration Procedure for Milk Non-Automatic Weighing Instrument (NAWI) Process	
3:15	3:30	4098	*Muhammad Mustafa Hassan.* Experimenting with Polymorphic Design Aids to support Innovation in Participatory Ideation	
3:30	3:45	7186	*Varsha Singh, Ravi Kumar Singh and Uma Shanker Tiwary* Emotion classification through facial expressions using SVM and Convolutional Neural Classifier	
3:45	4:00	5155	*Zhandos Yessenbayev and Zhanibek Kozhirbayev.* Unsupervised processing of unaligned audio and text data using persistent homology	
4:00	4:15	Break		
Start PM	End PM	Session Chair/ Paper ID	HCI for Design, Dr. Abhishek Shrivastava, IIT-Guwahati	
Building - F Session – 7 (Room# 101)			Session Chairs' Welcome	
4:15	4:45	Invited Speaker	Dr. Koumudi Patil, IIT-Kanpur, Kanpur, India Title: Digital Desis: Interfacing Street Maths on Computer Tracks	
4:45	5:00	5181	Marat Rakhmatullaev and Sherbek Normatov. Development of School Library Network Based on Cloud Technologies in Uzbekistan	
5:00	5:15	5519	*Blayne Rogers, Ajay Gupta and Pranjal Minocha.* Parallel Resource Defined Fitness Sharing	
5:15	5:30	5633	*Javohir Nurmurodov, Ibrohimbek Yusupov, Sanjarbek Ibragimov, Muhammadali Gofurjonov and Sirojiddin Qobilov.* Calculation of Spectral Coefficients of Signals on The Basis of Haar By The Method Of Machine Learning	
5:30	5:45	8403	*Oybek Narzulloyev, Fakhriddin Nuraliev and Saida Tastanova.* Optimization of fractal structure pattern colors in carpet design using genetic algorithm	
5:44	6:00	5933	*Paola Patricia Ariza-Colpas, Guillermo Hernandez-Sanchez, Guillermo Serrano-Torne, Marlon Alberto Piñeres- Melo, Shariq Butt-Aziz and Roberto Morales-Ortega.* Intelligent multi-tariff payment collection system for inter-municipal buses in the Dept. of Atlántico-Colombia	
6:00	6:15	6167	Ankita Shah and Uma Shanker Tiwary. Dominance Submissiveness Predisposition Scale (DSPS) : Development and Validation	
6:15PM	6:30 PM	Chairs	Closing remarks	

IHCI 2022 Programme (Session) Oct. 21, 2022 (Day-2)				
Start PM	**End** PM	Session Chair/ Paper ID	**The principle and practice of human-centered AI** Dr. Jee Hand Lee, and Dr. Eui-Chul Lee, Samgmyung University, Korea	Remark
Building - F Session – 6 (Room # 201)			Chairs' Welcome	
2:00	2:30	Invited Speaker	**Dr. Antonio J. Jara, GM,** Smart Cities at Libelium, Spain Title: Democratizing Smart Cities to replicate success stories	
2:30	2:45	6254	*Seung Gun Lee, Seung Min Jeong, Chae Lin Seok and Eui Chul Lee.* Comparison for Polyp Segmentation Models: Focusing on Inference Speed	
2:45	3:00	624	*Hyeonah Seong, Seunghyun Kim and Eui Chul Lee.* Masked FaceRecognition Model with Explainable AI	
3:00	3:15	6627	*Seung Hyun Kim, Seung Gun Lee, Jee Hang Lee and Eui Chul Lee.* Improving Gaze Estimation Performance using Ensemble Loss Function	
3:15	3:30	5417	*Chaewon Lee, Seunghyun Kim and Eui Chul Lee.* A converting model 3D gaze direction to 2D gaze position	
3:30	3:45	2594	*Su Min Jeon, Hyeon Ah Seong and Eui Chul Lee.* Deep fake video detection using the frequency characteristic of remote photopethysmography	
3:45	4:00	4101	Kunyoung Lee, Hojoon You, Jaemu Oh and Eui Chul Lee. Extremely Lightweight Skin Segmentation Networks to Improve Remote Photoplethysmography Measurement	
4:00	4:15	Break		
Start PM	**End** PM	Session Chair/ Paper ID	**Cyber-Physical Systems for HCI** Dr. Mukesh Saini, IIT-Ropar, India and Dr. Ajit Kumar, SSU, Korea	
Building - F Session – 8 (Room # 201)			Session Chairs' Welcome	
4:15	4:45	Invited Speaker	**Dr. Rodrigo da Rosa Righi,** UNISINOS, Brazil Title: On Defining and Deploying Health Services in Fog-Cloud Architecture	
4:45	5:00	8059	*Amrth Ashok Shenava, Saifudd in Mahmud, Jong-Hoon Kim and Gokarna Sharma.* Exploiting Security and Privacy Vulnerability in Human-IoT Interaction through Virtual Assistant Tech. in Amazon Alexa	
5:00	5:15	7873	*Sophie Ensing and Chintan Amrit.* Agent-based modelling and simulation of public transport to identify effects of network changes on passenger flows	
5:15	5:30	8393	*Sayfiddin Baxromov, Bunyod Azimov and Dilbar Karimova.* Application of Two-Dimensional Rybenky Spline in Digital Processing of Signals	
5:30	5:45	8848	*Hye-Jin Hong, So-Hyeon Kim and Jee- Hang Lee.* On the Evaluation of Stylised Lyrics using Deep Generative Models: A Preliminary Study	
5:44	6:00	9053	*Vani Chandna, Sumit Singh, Puja Burman, Anmol Jain and Uma Shankar Tiwary.* GWD: Graded Word Drop Model for When Type Questions for Hindi QA	
6:00	6:15	9090	*Shohruh Begmatov, Mukhriddin Arabboev, Khabibullo Nosirov, Shakhzod Tashmetov, Jean Chamberlain Chedjou and Kyandoghere Kyamakya;* Development of a Novel Method for Image Resizing Using Artificial Neural Network	
6:15PM	6:30 PM	Chairs	Closing remarks	

IHCI 2022 Programme (Poster & Presentation Session) Oct. 21, 2022 (Day-2) Venue: Building – F (Room #102)				
Start PM	**End** PM	Session Chair/ Paper ID	**Digital signal and image processing methods** Dr. Sarvarbek Makhmudjanov Dr. Ibrohimbek Yusupov Dr. Ajit Kumar	Remark
4:15 PM	6:15 PM	5655	*Shavkat Fazilov, Olimjon Mirzaev and Shukrullo Kakharov*. Building a Local Classifier for Component-Based Face Recognition	
		6419	*Gulrukh Memonova, Javlon Tursunov, Bekzod Hamroyev and BakhtiyorDjabborov.* Custom Object Segmentation by Training R-CNN	
		7943	*Kamola Abdurashidova, Farkhat Rajabov, Nozima Karimova and Khusniya Salimova.* Visual-Sensory Information Processing Using Multichannel EEG Signals	
		4850	*Oybek Mallaev, Bunyod Azimov, Muslimjon Kuchkarov and Kamola Ahmadova.* Algorithm for digital processing of seismic signals in distributed systems	
		1095	*Jonibek Juraev, Umid Juraev, Kattabek Abdiyiv, Gulnoza Saparova and Damira Khodjaeva.* Mathematical model of the process of digital- processing of images from an ultrasound device in wavelet method	
		8529	*Khalilov Sirojiddin, Yusupov Ibrohimbek, Mannapova Maftuna,Nurbek Nasrullayev and Fayzullo Botirov* Effectiveness of Deep Learning Based Filtering Algorithm In Separation Of Human Objects From Images	
		9169	*Shokir Ura kov, Jonibek Juraev, Asror Boytemirov, Latif Xurramov and Nafisa Sha rapova.* Digital signal processing with polynomial and Dobechi wavelets	
		5799	*Ibrokhimov Nodirbek Ikromjonovich, Rasulov Akbarali Makhamatovich, Yadgarov Ishmumin Djabbarovich* Geometric Structure Manipulating for HCI Applications using Copper Clusters	
		4332	*Jie Yong Shin and Dae-Ki Kang* *A Higher Performing DARTS Model for CIFAR-10*	
		2639	*Dilmurod Davronbekov, Jaxongir Aripov, Shukhrat Djabbarov, Rustam Djuraev and Dilshod Matkurbonov.* Influence Of Packet Switching And Routing Methods On The Reliability Of The Data Transmission Network And The Application Of Artificial Neural Networks	
6:15	6:20		Closing Remarks	

IHCI 2022 Programme (Session) Oct. 22, 2022 (Day-3)				
Start PM	**End** PM	Session Chair/ Paper ID	**5G Internet for HCI** Dr. Ikechi Ukaegbu, Nazarbayev University, Kazakhstan	Remark
Building - F Session – 9 (Room# 101)			Chairs' Welcome	
10:45	11:15	Invited Speaker	**Dr. Muhammad Taqi Raza** University of Arizona, USA: Title: Breaking the Unbreakable Human-Machine Interaction in 5G Networks.	
11:15	11:30	*3060*	*Mumtozali Tukhtasinov.* Algorithms for selecting and comparing features of digital image vectors based on the analysis of local extrema	
11:30	11:45	4389	*Temurbek Kuchkorov, Jamoljon Djumanov, Temur Ochilov and NazokatSabitova.* Satellite imagery super resolution using classical and deep learning algorithms	
11:45	12:00	4760	*Prakash Shekhar, Abdolla Hegazy, Ajay Gupta and Ammar Kamel.* Creating a Modular and Decentralized Smart Mailbox System Using LoRaWan Networks	
12:15	12:30	3162	*Bazani Shaik, M uralidhara Rao and Gaddem Chitti Babu.* Metallurgical Investigations for Non-Ferrous Alloys	
12:30	12:45	5904	*Ruslan Zakirov, Azizbek Umarov and Oripjon Zaripov.* Application of fiber optic sensors in aircraft fuel management system	
12:45	1:00	8909	*Gafur Djaykov, Nietbay Uteuliev and Azamat Pirimbetov.* Modelling the problem of integral geometry on the family of broken lines based on Tikhonov regularization	
1:00	2:00	Break	Lunch	
Start PM	**End** PM	Session Chair/ Paper ID	**Educational Applications of Interactive Computer Systems** Dr. Nagarajan Prabakar, FIU, USA and Dr. Jong- Hoon Kim, KSU, USA	
Building - F Session – 10 (Room# 201)			Session Chairs' Welcome	
10:45	11:15	Invited Speaker	**Dr. Chintan Amrit** University of Amsterdam, Netherlands, **Title:** Novel Data Analytics Methods to improve Burden Estimates for W	
11:15	11:30	1041	*Uipil Chong and Shokhzod Alimardov* Implementation of Virtual Sea Environment with 3D whale Animation	
11:30	11:45	1231	*Aelita Skarzauskiene and Monika Maciuliene* Co-creating Computer Supported Collective Intelligence in Citizen Science Hubs	
11:45	12:00	4645	*Bailey Wimer, Justin Dannemiller, Saifuddin Mahmud and Jong Hoon Kim* Low-cost Entry-Level Educational Drone with Associated K-12 Educational Strategy	
12:15	12:30	6734	*D.V.K. Vasudevan, Ravikant Gautam and Dr. Nagamani Molakathala*. Equal Temperament and Just intonation Feature based Emotion Predictions in Carnatic Music	
12:30	12:45	9399	*Nisrine Safeh, Othmane Aitlmoudden, Mohammed Rachdi and Abdelouahed* A recommendation system in an e-learning platform	
12:45	1:00	6509	*Sophia Matar, Alfred Shaker, Saifuddin Mahmud, Jong Hoon Kim and Jan- Willem Van'T Klooster.* Design of a Mixed Reality-based Immersive Virtual Environment System for Social Interaction and Behavioral Studies	
1:00	**2:00**	**Break**	**Lunch**	

IHCI 2022 Programme (Session) Oct. 22, 2022 (Day-3)				
Start PM	**End** PM	Session Chair/ Paper ID	**AI-Inspired Solutions for Mental Health Ailments** Dr. David (Bong Jun), Songsil University, Korea Dr. Hanumant S Shekhawat, IIT-Guwahati, India Dr. Dhananjay Singh, HUFS, Korea	Remark
Building - F **Session – 11 (Room# 301)**			Chairs' Welcome	
10:45	11:00	Invited Speaker	**Dr. Jitendra P. Khatait** IIT-Delhi, India Title: Human Robot Interaction in the Context of Surgical Robotics	
11:15	11:30	2153	Sandeep Pandey, Mohit Nirgulkar, and Hanumant Singh Shekhawat A Longitudinal Study of the Emotional Content in Indian Political Speeches	
11:30	11:45	4701	Junyong Yoon and Bong Jun Choi Privacy-Friendly Phishing Attack Detection using Personalized Federated Learning	
11:45	12:00	7542	Ankit Kumar Singh, Ajit Kumar, and Bong Jun Choi Privacy-preserving Digital Intervention for Mental Health using Federated Learning	
12:00	12:15	5964	Wan-Young Chung, Ngoc-Dau Mai and Ha-Trung Nguyen. EEG-based Key Generation Cryptosystem for Strengthening Security of Blockchain Transactions	
12:15	12:30	9806	Ericka Pamela Bermudez Pillado, Tori Andika Bukit, Sean Yonathan Tanjung, Hyun-Woo Lim, Ignatius Iwan, Bernardo Nugroho Yahya and Seok- Lyong Lee. A Framework for Privacy-Preserved Collaborative Learning in Smart Factory Environment	
12:30	12:45	2653	Kavitha Karimbi Mahesh, Mohammed Ridhun, Rayan Smith Lewis, Shane Christopher Misquith and Sushanth Poojary. Multimodal Human Computer Interaction using Hand Gestures and Speech	
12:45	1:00	8442	Vinit Kujur, Anterpreet Kaur Bedi and Mukesh Saini Monitoring Pollination by Honeybee using Computer Vision	
Chair's Closing remarks				
1:00	**2:00**	**Break**	**Lunch**	
2:00	**3:30**		**Awards and announcement of next year IHCI-2023**	

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