Outline of Plenary Speech - Human-Computer Interaction Track

Navigating through Human-Computer Interaction Curriculum and Research Trends

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Human-Computer Interaction (HCI) is an interdisciplinary field of research and practice that focuses on both the interaction between computers and users (human) and the design of interfaces that enable the interaction between them to be more effective. Learning HCI as a field has been challenging in comparison to traditional areas in computer science. Mainly, due to the rapid changes in technology, and thus, changes in user populations and their needs, it is evident that many researchers have identified the dynamic nature of HCI discipline. HCI education is required to provide foundational knowledge on HCI methods and practices thus igniting interdisciplinary interest for researchers to work on multiple research areas. Navigating through the HCI education landscape, it is evident that many institutions in Global North are working through a living curriculum for HCI. This presentation is framed to provide an overview of HCI pedagogical landscape and elaborate on the latest HCI research themes. It will help the participants to navigate their research interests and incorporate such interests applicable to the wider HCI domains and conjunction with a variety of interdisciplinary research.

Outline of Plenary Speech - Software Engineering Track

Continuous Software Engineering for AI Powered Cyber Physical Systems

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Development and evolution of modern cyber-physical systems (CPS) that incorporate various types of Artificial Intelligence (AI) and Machine Learning (ML) algorithms are a challenging due to the versatility of architectures and cascading effects subtle changes in the IOT, AI and ML configurations. A cyber-physical system (CPS) is a system of collaborating computational elements controlling physical entities. CPS are physical and engineered systems whose operations are monitored, coordinated, controlled and integrated by a computing and communication core. They allow us to add capabilities to physical systems by merging computing and communication with physical processes. CPS with AI-components such as distributed heuristics employing Multi Agent Systems (MAS) or ANNs have become popular in the domain of CPS. Verification of these software using the established software engineering practices are risky. Continuous Software Engineering (CSE) addresses the need for continuous software planning, building, operation and evaluation, which is vital for systems that have components such as AI,ML, and IOT found in CPS. CSE aims to establish a continuous flow between software-related activities, taking into consideration the entire software life cycle. It is a recent topic that seeks to transform discrete development practices into more iterative, flexible and continuous alternatives, keeping the goal of building and delivering quality products according to established time and costs. In this session I present the current state of the art in CSE pertaining to the development of modern software such as CPS with AI and ML components and the recommended best practices.

Outline of Plenary Speech - Data Science and Applications Track

Improving the Performance of Sinhala to English Translation Using Neural Machine Translation Approach

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Machine Translation is an automatic translation from one natural language to another. Automatic Translation of local languages in Sri Lanka to other languages is challenging due to many reasons. Sri Lanka's culture mixes many cultures with modern and traditional aspects and is known for its regional diversity. Sri Lanka has three official languages, and most of the informal conversations are happening in a mix of these languages. Majority of Sri Lankans do code mixing in informal contexts or casual conversations like in social media, online chats/ reviews or personnel communications. This type of noisy text carries a higher level of spelling and grammar mistakes, improper language use (e.g.:'good job putha'), wordplay ('helloooo' for 'hello'), creative spelling ('Gud 9t' for 'good night'), abbreviations ('TC' for 'Take Care'), Meta tags (URLs), and so on. Most language processing models in today's world are monolingual, which shows poor performances in these multilingual platforms. Besides, there is a minimal number of resources to train local language models, including Sinhala and Tamil. These challenges badly affect the performance of the Machine Translation approaches focused on Sinhala to other language translations. This research is focused on improving the performance of Singlish to English translation systems used in Sinhala – English Code-Mixed Text. The research proposes a seq2seq Neural Machine Translation based on the attention mechanism. The proposed approach achieved 24.13 BLEU score on Singlish-English.

Outline of Plenary Speech - Knowledge Management and Information Systems Track

Science of Ontological Designs for Information System Engineering

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Ontological analysis Designing of Information Systems (IS) and their operational eco-system could result in precise and complete awareness of the spectrum of "artefacts" of interests with utmost importance. However, such sound Ontological foundations in Information Systems Engineering processes are yet to receive adequate attention both in IS literature as well as in relevant professional/industrial IS sectors. This necessity could be framed into two perspectives; 1) having its root to ontological basis and 2) methodological adoption for IS developments. Such a framework could be adopted as a structural approach to the IS engineering paradigm which combines the philosophical foundations ranging from ontological and epistemological levels to the concrete methodological choices in designing artefacts of concerned IS eco-systems.In this plenary session, discussions are centered around establishment of ontological analysis for IS and emerging methodologies for design and development of artefacts to eco-system of IS solutions.

Outline of Plenary Speech - Open Track

The Significance of Multidisciplinary Studies on the Path Towards a Digitally Empowered Society

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The intelligent and smart man is always looking for ways to ease up his arduous tasks. From the Stone Age, humans have been a unique group of animals in appreciating taste and smell. Further, humans were ahead of other animals in mathematics and logic, but it was insufficient to cope with the expected rapid progress in lifestyle. Hence, the man was always looking to find effective solutions to solve complex problems.The rapid advancements of the computer have paved the way for creating interactive computer-based solutions in many different fields, which is therefore, the approach has become multidisciplinary. This spans from tiny scale macroscopic computing to large-scale computing solutions. Besides, the increasing complexity of global problems urges the need for new fast methods of problem-solving competencies. Further, the complexity of deep problems requires new problem-solving skills. Therefore, an extensive study is essential in providing computer-based solutions to various fields such as management, medicine, engineering, law, astrology, social sciences, aesthetics, culture, etc...No matter how advanced the computer technology is, it is vital to recognize the limitations of providing practical computing solutions. For example, if a graphic system cannot update the display faster than ten times per second, the animation's illusion will begin to crash. Recognizing such limitations and exploring new research opportunities will inspire the multidisciplinary studies in the journey to a digitally empowered society.

Outline of Plenary Speech - Parallel and Distributed Computing Track

Parallel and Distributed Computing for Cloud Computing

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Parallel and distributed computing gained the attention of technological world, as a solution for solving complex problems by first using multiple processing elements and then multiple computing nodes in a network. The transition from sequential to parallel and distributed processing offers high performances and reliability for applications. Cloud computing leverages these models, abstractions, and technologies and provides a more efficient way to design and use distributed cloud systems by making entire systems or components available on demand. However, there are several new challenges to be addressed, in terms of hardware architectures, technologies for inter-process communication, and algorithms and system design. In this talk, I will discuss how parallel and distributed computing is being used with cloud computing, its challenges, and possible research directions.