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Smart and Distributed Computing Lab Seminar
September 26th , 2023
Western Sydney University

Parramatta South PS-EA.G.32 (CLS)
Zoom https://uws.zoom.us/j/88308186006?pwd=S2x0R3NEVEJtZ1RKcjcrQ1p0Y3dzUT09
Meeting ID: 883 0818 6006

Password: CDMS

12:00-12:15pm	Dr. Kenan Matawie: Policy update and announcements
12:15-12:20 pm	A/Prof. Bahman Javadi: Opening
12:20-12:40 pm	Dr. Nasser Ghadiri: Mining Temporal Data with Applications in Industry and Healthcare
12:40-1:00 pm	Dr. Reza Jabbarpour: On-board Federated Learning in Orbital Edge Computing
1:00-1:15 pm	Nishan Gunawardena: Eye Tracking on Mobile Devices using Deep Learning Techniques and Edge Computing
1:15-1:30 pm	Quoc Lap Trieu: Privacy Preserving Edge Intelligence for Smart Healthcare Applications
1:30-1:45 pm Q/A and Discussions (15 min)	
1:45-2:00 pm Closing Remarks	

Mining Temporal Data with Applications in Industry and Healthcare
This presentation explores the exciting topic of temporal data, highlighting its fundamental concepts, challenges, and practical implications in industry and healthcare. To begin, we explore the complexities of temporal data and explore the significance of time intervals. In addition, we examine Allen's temporal relations, examining their fuzziness and uncertainty, which are inherent in real-world temporal data. We demonstrate how data mining techniques can address the overwhelming flood of alarms emanating from machinery and diverse sources in the industrial sector. We also focus on extracting temporal relationships from Electronic Health Records (EHR) in healthcare.

On-Board Federated Learning in Orbital Edge Computing
Federated Learning (FL) is being used to address these challenges, although it heavily relies on the GS for model aggregation. In this talk, we consider Orbital Edge Computing (OEC) as an architecture for LEO satellite constellations and propose an on-board Federated Learning to reduce communication with the GS. We present a novel decentralised FL algorithm, called FedOrbit, based on reinforcement learning cluster formation and satellite visiting patterns to utilise intra and inter-satellite communications for model aggregation.

Eye Tracking on Mobile Devices using Deep Learning Techniques and Edge Computing
In this talk, we explore the exciting realm of eye tracking on mobile devices, revolutionizing the way we interact with video content. Leveraging cutting-edge Deep Learning techniques, including Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) such as LSTM and GRU, we delve into the intricacies of tracking user gaze patterns in real-time video scenarios. We address the critical challenge of resource constraints on mobile devices, where battery power and memory are at a premium. By harnessing the power of Edge Computing, we efficiently process video visuals without overwhelming the device's resources, making it possible to analyze and enhance the user experience while simultaneously processing two videos.

Privacy Preserving Edge Intelligence for Smart Healthcare Applications
As technology continues to advance, healthcare services have seen a remarkable trend towards leveraging the capabilities of artificial intelligence, especially at the edge. Edge AI, which involves processing data locally on nearby devices rather than relying on cloud servers, brings tremendous benefits to the healthcare sector. But among these promising advancements, there is a critical challenge – the privacy of patient data. In our interconnected world, where vast amounts of personal health data are generated every second, it becomes essential that we strike a balance between technological innovation and protecting the privacy rights of individuals. Privacy-preserving Edge AI solutions are the answer to this concern. In this talk, I will present different privacy-preserving techniques for smart healthcare applications in Edge AI.