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SenSIP Seminar Series

Investigating Quantum Information Processing Algorithms for Machine Learning

Presenter: Glen Uehara, General Dynamics, Quantum Lab
(enrolled also in the PhD program at ASU)

January 10, 2022, 3:00 PM / Zoom https://asu.zoom.us/j/89438472269

Abstract

It is generally recognized that quantum inspired algorithms have the potential to achieve an exponential speed over classical algorithms. These advantages are seen when these quantum algorithms run on quantum systems. We are currently in the noisy intermediate-scale quantum (NISQ) era, where we have 50 to 100 qubits systems. Still, the near-term quantum processors are still unpredictable and in their infancy. They are also cost-prohibitive, and reliability is sometimes an issue. However, to gain insight into the effectiveness of the new quantum and quantum-inspired algorithms, quantum system simulators are available to model and develop the algorithms.

We are currently investigating and researching quantum algorithms using a simulated system on a classical computing system due to limited access to real quantum hardware. One of the areas that are of interest for our research is applying Quantum Algorithms for Signal and Information processing. We start our research by comparing various machine learning algorithms on classical and hybrid quantum-classical systems. The research that we have begun looks at the algorithms to determine if there are quantum supremacy. The current research looks at the quantum algorithm approach on information classification, detection, and recognition using quantum simulators

Biography:

I have a BS and MSE in Electrical Engineering, from University of Hawaii and Arizona State University, respectively. Since my first degree, I have been working as a communication and signal processing engineering in both commercial and defense industry. In the recent years, I have also earned several certifications in cyber security and have applied these techniques to my programs.   Currently, Ph.D. student in theSchool of Electrical, Computer and Energy Engineering at ASU, specializing in Quantum Information Algorithms specifically for Signal & Information Processing and Machine Learning. I am also currently working in the Quantum Laboratory at General Dynamics. I am hoping to explore new techniques and methods in Quantum Algorithms to grow this knowledge for both ASU and GD.