

Aviraj Sinha (Avi)

Profile: [linkedin.com/in/aviraj-sinha](https://www.linkedin.com/in/aviraj-sinha)

Github: github.com/avirajs

Email: avirajs@smu.edu

OBJECTIVE

As a PhD student with experience in quantum and machine learning, I hope to obtain an internship position where I can apply my problem solving and collaboration skills to industry or research.

EDUCATION

- Southern Methodist University** Dallas, Texas
• *BS Computer science; GPA: 3.75* *Aug 2016 - May 2019*
Courses: Operating Systems, Data Structures, Digital System Design, Databases, GUI
- Southern Methodist University** Dallas, Texas
• *MS Computer Science (Data Science Specialization); GPA: 3.6* *Aug 2019 - Jan 2021*
Courses: Adaptive Algorithms, Artificial Intelligence, Machine Learning, Data Mining, Information Retrieval
- Southern Methodist University** Dallas, Texas
• *PhD Computer Engineering (Quantum Algorithms and Machine Learning); GPA: 3.9* *Jan 2021 - Current*
Courses: Quantum Informatics, Quantum Computing, Statistical Learning

SKILLS SUMMARY

- **Languages:** Python, C++, Bash, JAVA, Matlab, Mathematica, JavaScript, SQL, Verilog, L^AT_EX
- **Frameworks:** Scikit, TensorFlow, Keras, Android Studio, IBM Qiskit, Google CIRQ, ReactJS, NodeJS
- **Tools:** Docker, Singularity, Conda, GIT, PostgreSQL, MySQL, Cadence
- **Platforms:** Linux, HPC, Windows, Arduino, Raspberry, AWS
- **Certifications:** CompTia Security+, Network+, Cloud+, (CCAP) Cloud Admin, Microsoft Office Professional
- **Soft Skills:** Team Leadership/Planning, Writing, Public Speaking, Time Management

EXPERIENCE

- Darwin Deason Institute of Cybersecurity - SMU**
• *Lead Machine Learning Researcher for Anomaly Detection* *Aug 2019 - Now*
 - **Network and system anomaly detection:** Leading team to deploy network anomaly detection systems on large-scale disparate hardware systems and HPC systems. Collaborated with Fortune 100 clients to fully utilize SMU's HPC for enterprise big data analysis.
 - **Biometric Authentication:** Designed IOT biometric authentication methods by implementing state-of-art machine learning methods in TensorFlow for enterprise clients
 - **Software interface and hardware design:** Architected and implemented full stack pipelines from data collection, raw hardware sources and mobile sources such as Android, to organized cloud storage in AWS using Python
- Quantum Informatics Research Group - SMU**
• *Quantum Machine Learning Researcher* *Jan 2021 - Now*
 - **Quantum Compilation:** Lead introduction of new techniques to enhance compilation of data for quantum machine learning algorithms; supervised design of memory compilation tool using C++, Python and QASM(quantum assembly)
 - **Qudits and kernel methods:** Created new contribution on qudit enhanced quantum kernel methods
 - **Quantum fault tolerance:** Currently researching methods for improving fault tolerance

PUBLICATIONS

- **Industrial control system anomaly detection using convolutional neural network consensus - IEEE CCTA21:** We present a system monitoring capability that implements parallel multi-view neural networks to detect anomalous behavior in an industrial control system by predicting operational states.
- **Quantum Multiple Valued Kernel Circuits - ISMVL22:** In our work, we generalize recent results in binary quantum kernels to multivalued logic by using higher dimensional entanglement to create a qudit memory and show that the use of qudits offers advantages in terms of quantum memory representation as well as enhanced resolution in the outcome of the kernel calculation.
- **Automated Quantum Memory Compilation - SC22:** We consider automatic synthesis of addressable, quantum read-only memory (QROM) circuits, which act as data-encoding state-generation circuits.
- **Accurate Quantum Random Number Generation (Work in progress):**