Henry Yu

henry.yu094@gmail.com | +1 901-359-1068

auroraarc.github.io | henry-yu09

Education

Bachelor of Science - Computer Science — **May 2027**

Indiana University, School of Informatics and Computing — *Bloomington, IN*

Relevant Courses

Data Structures and Algorithms | Data Modeling and Inference | Discrete Mathematics | Linear Algebra

Skills

Languages Python | Java | C/C++

Developer Tools Git | Fork | Docker | Kubernetes | VS Code | Tableau | Qiskit

Libraries Pandas | NumPy | Matplotlib | Seaborn | Scikit-learn | Keras | Pytorch

Experience

Quantum Computing Research — **Sep 2023 - May 2024**

Indiana University — *Bloomington, IN*

- Conducted research focusing on assessing correlations between qubit features and error probabilities and the effect of noise on quantum ML models.
- Leveraged sophisticated data analysis methodologies, such as regression modeling and covariance visualizations, and developed advanced technical solutions, including a quantum classifier and artificial noise models.

Private CS and Math Tutor — **Sep 2023 - Dec 2023**

Indiana University — *Bloomington, IN*

- Provided small custom study plans for customized learning experiences for 3 total Java, Python, and linear algebra students.
- Improved code proficiency to the point where self-dependency was achieved.
- Improved grades by an average of a whole letter grade above class average by end of semester.

Notable Projects

Improving QML Models Using Noise — **Jan 2024 - May 2024**

Undergraduate Researcher | Qiskit, Matplotlib, Scikit-learn — *Bloomington, IN*

- Analyzed impact of controlled noise introduction on performance of quantum machine learning models.
- Constructed multiple artificial noise models, visualized impact on a quantum variational classifier, and benchmarked results against a support vector classifier.
- Observed a slight performance boost from addition of amplitude dampening error; further investigation needed to confirm the consistency and significance of the improvement.

Influence of Qubit Features on Error Rates — **Sep 2023 - Dec 2023**

Undergraduate Researcher | Qiskit, Matplotlib, Scikit-learn — *Bloomington, IN*

- Conducted time series analysis and regression modeling on 7-qubit and 127-qubit quantum systems using IBM's Qiskit SDK.
- Analyzed qubit features such as decoherence time, gate errors, and readout errors to predict error probabilities, achieving an average R-squared score of 0.105 for 127-qubit system predictions.
- Nominated as one of the top posters in end-of-semester event for professionalism and deep knowledge of topics researched.

Breaking the Cycle: Reducing Recidivism in Iowa State Prisons — **Sep 2022 - Apr 2023**

Pandas, Matplotlib, Keras, LaTeX — *Memphis, TN*

- Analyzed probability of prisoners re-offending by developing a feedforward neural network.
- Tested FNN using AUC-ROC score, SHAP analysis, multiple regressions, and Monte Carlo simulations.
- Discovered that Class A felons, on average, cost the prison approximately $170,000.
- Placed 2nd nationwide with a publication; $15,000 team reward.

Riding into the Future: Evaluating E-Bikes — **Apr 2023**

Pandas, Matplotlib, Keras, LaTeX — *Memphis, TN*

- Conducted long-term impact of e-bike usage by determining popularity of e-bikes using sentiment analysis on Twitter tweets in the past year and implemented regression analysis and Monte Carlo simulations.
- Found that group of 10,000 e-bike users reduce 1,190 CO_2 emissions per year, saving government around $220,000 per year.
- Acknowledged as one of the top 3% of teams in technical computing.

Publications

- Lou Zhou, Henry Yu, Amar Kanakamedala, Jeffrey Liu, and Evan Wu, "Breaking the Cycle: Reducing Recidivism in Iowa State Prisons," *2023.2 ARCH*, Education and Research Section of the Society of Actuaries.