2021 CDL-Quantum Week 1 Challenge: Simulating Quantum Advantage with Trapped Ions (Team 3)

Financial
- Credit Card Fraud Losses Reached US**$27.85 Billion** Worldwide last year
- The U.S. accounted for 33.6% of global card fraud losses last year

Healthcare
- In **2018, US$3.6 trillion** spent on health care in US
- Conservative estimate is **3%** of total health care expenditures involves fraud
- Some agencies estimate as high as **10%** which is **US$300 billion**

These costs are passed on to consumers in some form or another. In general, this raises the cost of premiums for health insurance and credit card costs to businesses. Which impacts vulnerable populations.

Proposal
Our proposal is to use a fraud detection model where the Generative Adversarial Network is trained using Random Numbers from a Quantum Random Circuit. This is inspired by the Google Supremacy Experiment.

Claim
Quantum random number from this circuit could provide richer fraud data for machine learning. This could lead to better efficiency of the Machine Learning model and, also allow it to adapt faster to changing patterns in Fraud Behavior.

Value Prop
- Improved Fraud Detection of even 1% is a substantial increase to the bottom line for any company. UHG had Medical costs of US$160B in 2020. If up to 10% is undetected fraud that accounts for a loss of US$16B. If even an additional 1% of that could be detected by this new method, that is a saving of US$160M annually.
- By increasing fraud detection, the savings can be passed to consumers which allows startups and businesses in lower income areas to be able to afford credit card use fees and healthcare premiums for their employees.
- The high randomness of this method raises the bar for hackers overcoming the machine learning model
- Incorporating quantum computers into the technology roadmap also sets a trajectory towards a greener company and helping the environment because quantum computers use less energy than equivalent classical compute resources.

Team

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