

Erfan Abedi

GRADUATE IN MASTERS OF QUANTUM SCIENCE AND TECHNOLOGY

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Education

University of California, Los Angeles

MASTER OF QUANTUM SCIENCE AND TECHNOLOGY

Los Angeles, California, USA

Sept. 2022 - Sept. 2023

Amirkabir University of Technology

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Tehran, Iran

Sept. 2017 - Oct. 2021

Research Experience

Quantum Light-Matter Cooperative

RESEARCH ASSISTANT

- Working on numerical simulations of non-linear up-conversion processes using Recurrent Neural Networks.

Under the Supervision of

Prof. Sergio Carbajo

Jun. 2023 - Current

QuOne Lab at Phanous Research and Innovation Centre (phanous.ir)

RESEARCH ASSISTANT

- Working on the theory and numerical simulations of a paper on Quantum Lazy Training.
- Assisting the senior researchers with their ongoing research on Quantum Machine Learning.
- Reading Papers and giving talks about various QML papers at the research group's weekly meetings.
- Designing assignments and educational material for the Center's 1000qubit workshop.

Under the Supervision of

Prof. Salman Beigi

Jun. 2021 - Sept. 2022

Publications

- 2022 **E. Abedi**, S. Beigi and L. Taghavi, *Quantum Lazy Training*, Quantum 7 (2023): 989, [Journal Access](#).
- 2021 **E. Abedi**, *Maqenta: Generating music with Quantum Machine Learning*, [BSc Thesis \(in Persian\)](#).
- 2021 B. Bisgin, N. Oruz, J. G. Jarkovský, **E. Abedi** and M. Mauser, *QSVT in Qiskit*, [IBM's Qiskit Hackaton Europe 2021 Project Paper](#).

Notable Projects

LaserSTM ([On Github](#))

DEVELOPER

- LaserSTM is an ongoing part of a larger project to simulate an X-ray free electron laser using Neural Networks.
- A dataset generated from a Non-linear up-conversion process called 'dispersion-controlled nonlinear' shaping is used to simulate this laser using an LSTM architecture.
- The ML models are trained to solve the Non-Linear Schrodinger equation for a specific dataset intended to mimick the LCLS-II laser at SLAC National Laboratory.

Reimage-GPT ([On Github](#))

DEVELOPER

- Reimage-GPT is an effort to make prompt-generation easier for using diffusion models.
- In this project, we fine-tuned a Large Language Model (LLM) to come up with a good prompt for a target image.
- First, an input image is separated into a text representation of its most important elements and their respective locations using Facebook's Detectron2 model.
- Then, a GPT-like model is instructed to come up with a good image-generation prompt using the text generated in the previous step.
- Then, GPT's output text is passed onto the Stable Diffusion model to get an output image.
- Finally, the distance between the output and input images is used as loss function to fine-tune the weights of the LLM.

oxo.pdf ([On Github](#))

DEVELOPER

- oXo.pdf is a fork of Mozilla's pdf.js that is intended to be used as a PDF viewer and editor in the browser.
- oxo.pdf has the additional features of cropping pages, inserting and deleting pages, and merging multiple PDFs.
- oxo.pdf also allows the user to select any PDF file from the local storage or from the web and view it in the browser.

QSVT in Qiskit (On Github)

IBM's Qiskit Hackaton Europe 2021

RESEARCHER & DEVELOPER

- Quantum Singular Value Transformation (QSVT) is a framework that allows one to apply an arbitrary polynomial transformation to the singular values of a block-encoded unitary transformation.
- QSVT-implemented quantum search was implemented utilizing Fixed-point Amplitude Amplification.
- QSVT in Qiskit was selected as one of the top 3 winning teams of the Hackaton.

AUT-ICPC Programming Contest's website (On Github)

BACK-END DEVELOPER

- AUT-ICPC's website served as a registration and information hub for more than 300 contestants of the 2019 competition.
- AUT-ICPC's website is built using Django on the back-end and React.JS on the front-end.
- AUT-ICPC's website uses technologies such as Ngnix, PostgreSQL, REST framework and Redis.

Online Courses

- [Quantum Machine Learning - University of Toronto \(Audited\)](#)
- [Quantum Physics 1 - MIT \(Audited\)](#) — [Quantum Physics 2 - MIT \(Audited\)](#) — [Quantum Physics 3 - MIT \(Audited\)](#)
- [Differential Equations - MITx on edX \(Certificate available on Github\)](#)
- [Statistics 110: Probability - HarvardX on edX \(Certificate available on Github\)](#)
- [The Fourier Transform and its Applications - Stanford University \(Audited\)](#)

Honors & Awards

2021 **Top 3 Team**, IBM's Qiskit Hackaton Europe ([Certificate on GitHub](#))

2017 **Top 0.8% place**, The Iranian Nationwide University Entrance Exam for BSc. in Math & Engineering.

2015, 2016 **Acceptance in the 1st stage**, Iran's Chemistry Olympiad.

Extracurricular Activities

Students' Scientific Chapter of AUT's Department of Computer Engineering (CEIT-SSC.ir)

BOARD MEMBER & HEAD OF CONTESTS

Mar. 2019 - Sept. 2020

- Organized and provided technical means for the 6th Amirkabir Programming League.
- Organized the 1st Amirkabir Artificial Intelligence Summer Summit. ([AAISS.ceit.aut.ac.ir](#))
- Organized and provided technical means for the 19th Amirkabir ICPC. ([ICPC.aut.ac.ir](#))
- Organized the 11th Amirkabir Linux Festival. ([LinuxFest.aut.ac.ir](#))

Programming Languages and Frameworks

Programming Languages

PYTHON · C/C++ · RUST · Q# · C# · GO · JAVA · JAVASCRIPT/TYPESCRIPT · MATHEMATICA

Frameworks and Technologies

PENNYLANE · QISKIT · CIRQ · QUTIP · PYTORCH · NUMPY · SCIPY · PANDAS · CUDA · OPENMP · AWS
DOCKER · DJANGO · MONGODB · POSTGRESQL · MYSQL · REDIS · KOA.JS · EXPRESS.JS · REST
GRAPHQL · ARDUINO