

tawsif | ai researcher

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SUMMARY

I've six years of experience in Algorithms & Optimization, Data structures, Machine learning and Networking. Throughout the years, I've done personal and professional projects including working for renowned researchers and professors in the fields. Providing me with talent and knowledge to create Artificial intelligence architecture and design algorithms well-suited for Military, Advanced Mathematics, Linguistics and forecasting (prediction) purposes.

EDUCATION

Rose-Hulman Technology Institute, Terra Haute, Indiana Expected Graduation 2028
Undergraduate Degree | Major: Computer Science | Minor: Electrical Physics (Freshman Year)

TECHNICAL SKILLS

- **Computer Languages:** Python, C, Julia, Wolfram Mathematica, SQL HTML, CSS, Scilab
- **Tool:** Keras, Tensorflow, Pytorch, Jax, PennyLane, SQLite, Azure backed, render backend, flask backend, GCP and Heroku backend
- **Skills:** Simulating Monte Carlo experiments, performing Mathematical calculations, Computer Vision (Image recognition, Classification, Object recognition, landmark point recognition) GANs, Natural Language Processing, Quantum Machine Learning, Second order optimization

WORK EXPERIENCE

Donders Institute of Brain, Cognition and Behavior, *Guest researcher,* Nijmegen, Netherlands 25th of July, 2023-Present

- In 2023, started internship in Genzel lab under the supervision of Prof. Lisa Genzel on Prof. Federico Stella's Project **Path Analysis**
- Re-assigned to Prof. Paul's Neuroinformatics Project under the supervision of Prof. Paul and Prof. Lisa Genzel on Creating Brain 3D renders from 2.1 terabytes of data.

Specifics can't be shared due to active NDA (Non-disclosure agreement)

Harvard GAMI, Harvard University, *Artificial Intelligence researcher,* Cambridge, Massachusetts, USA 27th of September 2021-June 2024

- Spent two years in roles like Artificial Intelligence researcher, Research advisor, Senior Project lead. Including becoming a GAMI board member. Where I made contributions both through leadership and solving project specific machine learning problems and invented new algorithms and methods.
- While at GAMI, I worked on Cell Segmentation Project under Prof. Anna Yarsoslavsky and ML Fracture Optimization (Project lead) under Dr. Kiran Jay Agarwal Harding.
- I resigned from Harvard GAMI on June of 2024. Because I wanted to focus on doing theoretical artificial intelligence and architectures. Including exploring my talents in designing Algorithms and Quantum Machine learning.

PROJECTS

Poisoned Circuit, University team for Google Quantum Challenge, Project lead 10th of June 2024-Present

- Developing a new Algorithm to streamline the process of training both Classical and Quantum Image Classification models using Quantum Second order Algorithm

Specifics can't be shared due to competition and team rules.

Project Thunderbolt, Independent Project, Project lead 15th of July 2023-Present

- I publish large datasets on exotic categories for Artificial Intelligence research each quarter. Recently, I published Debate-2B dataset and it is awaiting to be released by LAION in a few weeks.

GITHUB PROJECTS

A* Algorithm

1. Written A* algorithm in Python
2. It's an essential algorithm in finding nearest route and solving advanced backtracking problems. A superior method than classical backtracking algorithm.

SpellChecker

1. Written a spellcheck in Python. Outlined entire procedure how advanced spellcheckers are created and its engineering structure.
2. It was a project I had written after finishing LeetCode 75 Challenge. Made use advanced algorithms that I learnt throughout LeetCode 75.

Newton Method

1. Considered one of the earliest edition of backpropagation algorithm and a method to train Neural Networks. Its working mechanism is different from backpropagation Algorithm still its second order optimization technique makes it a useful candidate for solving complex and non-linear problems at scale.
2. I have implemented this in Python

Load Balancer

1. Have written a load balancer in Go
2. Used round robin algorithm to determine how to mitigate the server traffic

ne-Xtray

1. Written ne-XT ray Stanford University's paper in Python.
2. Re-created the architecture from scratch and had the params value match exactly with the original paper

Selective search

1. Written in Python
2. It's the core algorithm behind modern Object recognition models. Where bounding boxes are sprouted on the entire image on most prominent features to receive a match and complete the detection.

Dithering Algorithm

1. Written in Python
2. It creates an illusion of colour depth in a limited colour pallet computer screen

3. Written both the classic and Mac specific algorithm

Resnet-scs

1. Written in Python. A transfer learning architecture combining resnet and sharpened cosine similarity layer to train a model and do classification task.

Check the GitHub account for all projects and updates.

SUMMER SCHOOL

MLx Health, Oxml, University of Oxford, England

June 2024-July 2024

- Received acceptance and partial scholarship to attend both remotely and in-person. Unfortunately, schedule overlap prevented me from participate this year. Although, I was considered for an invite-only opportunity to collaborate with NeurIPS authors for projects.

NeuroAI, Neuromatch Academy, Remote

July 2023

- I received full-scholarship to participate in the program and learned a new school of thought: Where Neural Network Architectures are designed and inspired from Human Brain. Example: Hopfield Neural Network.

Computational Neuroscience, Neuromatch Academy, Remote

June 2024-July 2024

- I received full-scholarship to participate in the program and learned a Computational Neuroscience from fundamentals to advanced. Where I developed fire neuron models.
- Had developed a research project and showcased Infront of the TAs. Project titled: Identifying responsible brain regions for motor response upon stimuli cue encounter. I had led the project alongside Anya and calculated the response times and correlation between responses and brain regions from Steinmetz dataset and graphed the interconnected visuals to showcase our finding.

Synthetic Biology Camp, Stanford University, California

October 2022

- Attended Synthetic Biology Camp and learned the fundamentals-Computational Biology. Including modifying DNA and RNA using computers and how to run experiments.

CONFERENCE

ICLR 2021 | Volunteer Engineer

ICLR 2022 | Volunteer Engineer

ICML 2021 | Moderator | Volunteer Engineer

NeurIPS 2021 | Volunteer Engineer

TALKS AND PRESENTATION

Under a minute, Neuromatch Academy

February 2024

- Delivered a lecture on "Finding short-term synaptic plasticity in Steinmetz dataset" at Neuromatch's Under a minute presentation program

COLLEGE CREDITS

4th Annual Conference on Disability in Healthcare and Medicine, Stanford Medicine, Stanford University

- Received 6.00 AMA PRA Category 1 Credit(s)™ for the live activity

FELLOWSHIP

Wolfram Mathematica, Wolfram Summer School, Bentley University, Massachusetts

1. I received full scholarship (5000 USD) to attend and complete my fellowship in the Science and Technology track.
2. I learnt and programmed extensively in Wolfram language and did a project under the guidance of Stephen Wolfram himself and advisor Maria Sargsyan.
3. I wrote a paper on **Analysing rare and NER words in Wikipedia**. It was a project in the intersection of Linguistics and Artificial Intelligence.

<https://education.wolfram.com/summer-school/alumni/2023/tawsif-ahmed/>