Abbaas Alif Mohamed Nishar

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Education

Georgia State University — Atlanta, GA
Doctor of Philosophy - Computer Science — *Aug 2021 – Present*

Vellore Institure of Technology — Chennai, Tamil Nadu, India
Bachelors in Technology - Electronics and Communications — *Aug. 2016 – May 2020*

Technical Skills

Languages:C, C++, Java, Python, Javascript, Go, R, HTML/CSS, SQL, MATLAB
Frameworks: Django, Flask, CUDA C, Sikuli, Power BI, Tableau
Developer Tools: Git, Docker, Kubernetes, TravisCI, Jenkins, Google Cloud Platform, AWS, Azure, Mongo DB, Raspberry Pi, Arduino, Azure IoT Hub, Redis Cache, MQTT, Wireshark
Libraries: Pandas, NumPy, Matplotlib, Scikit-learn, scipy, tensorflow, Pytorch, JAX, Numba, OpenCV, GluonTS, MxNet, Prophet, Celery

Experience

Founding Engineer — July 2023 – Present
Revelio Communications Inc. — *Atlanta, GA*

- Building interactive Television experience with mobile phones. https://www.revelio.ai/
- Optimization of the encoding pipeline and achieved a speed-up of 100× using GPU optimizations.
- Developed a neural network-based multi-stage decoder for mobile phones, enhancing decodability by 60%.

Graduate Research Assistant — Aug 2021 – Present
Georgia State University — *Atlanta, GA*

- Joint sensing and communication using Optical Wireless and Neuromorphic Cameras
- Improving Imperceptibility of Flicker fusion based Encoding of Meta Information in Videos
- Data ingestion and visualization pipeline for multiple projects for asynchronous IoT communication.
- Prediction of micro-climate using Muon particle flux using ground-based fixed and mobile detectors.
- Underground radon flux data analytics and creating predictive time-series models for Radon Flux. http://tinyurl.com/radon-wsb2
- AI/ML in Network Traffic Classification
- LLM in Network Simulations.
- Data Agnostic Image Annotation using Optical Tags. https://slideslive.com/38971914

Data Science Intern — May 2022 – Aug 2022
American Family Insurance — *Remote*

- Worked on image segmentation models that aid for underwriting in home inspection.
- Optimized codebases by reducing size by 80% and implemented automated multi-GPU training.

DevOps Engineer — Aug 2020 – Aug 2021
Tata Consultancy Services — *Chennai, Tamil Nadu, India*

- Improved forecasting accuracy by 25% using Time Series and ML models for a leading retailer in UK.
- Power BI dashboards and Power Apps for WMS team, achieving 100% visibility and 60% scanning accuracy.
- CI/CD pipelines for JDA WMS with Postgres SQL with Jenkins, reducing deployment time by 50%.

Research Intern — Dec 2019 – Jun 2020
Tata Consultancy Services — *Chennai, Tamil Nadu, India*

- Developed AR/VR app for clothing pattern detection using object detection.
- Created a PoseNet-based surveillance system.
- Built text-to-avatar interface using HapFacs4.0.

Projects

freematch-improved | *Python, PyTorch* 04/23/2024

- Improved the FreeMatch self-adaptive thresholding technique for semi-supervised learning.
- Reproduced and validated experiments from the original paper, enhancing the implementation with custom modifications.
- Documented the modifications and provided a step-by-step guide for replicating the results.
- Project available at: https://github.com/abbaasalif/freematch-improved

hAIrmony | *Python, Image segmentation, DALL-E 2* 11/19/2023

- A real-time AI based hair style recommendation system.
- We integrated a hair segmentation model using roboflow API.
- Then we use the DALL-E 2's inpainting to create descriptive prompts to suggest the user how a particular hairstyle will look on them.
- Project available at: https://github.com/abbaasalif/hAIrmony

Faces generation using Generative Adversarial Networks | *Python, Tensorflow, DCGAN* 07/20/2022

- This project is about gerneation of human faces using adversarial networks.
- Implemented a DCGAN using Wassertain GAN loss function.
- Added improvements like regularization, training with adam and other GAN hacks to prevent weight explosion and stabilize training.
- Project available at: https://github.com/abbaasalif/gans_task_faces

YOLO_custom | *Python, TensorFlow, OpenCV* 12/05/2020

- Trained a custom YOLO model for ambulance detection using web-scraped and self-annotated images.
- Fine-tuned the model for improved accuracy and performance on specific detection tasks.
- Provided detailed documentation and code for training and evaluating the model.
- Attempting to create a pytorch version of YOLO models from cfg files of darknet.
- Project available at: https://github.com/abbaasalif/YOLO_custom

ML_trees_boosts | *Python, XGBoost, CatBoost, scikit-learn* 12/02/2021

- Applied gradient boosting algorithms (XGBoost and CatBoost) to a breast cancer dataset.
- Performed hyperparameter tuning using GridSearchCV, illustrating expertise in model optimization.
- Visualized the results and performance metrics to provide insights into model effectiveness.
- Project available at: https://github.com/abbaasalif/ML_trees_boosts

vanilla_policy_gradients | *Python, TensorFlow, OpenAI Gym* 03/01/2021

- Implemented vanilla policy gradients using TensorFlow 1 API and OpenAI Gym Cartpole.
- Demonstrated foundational understanding of reinforcement learning algorithms and practical implementation.
- Included detailed code and explanations for the reinforcement learning process and results.
- Project available at: https://github.com/abbaasalif/vanilla_policy_gradients

q_learning | *Python, NumPy* 02/20/2021

- Developed a Q-learning algorithm to optimize warehouse flows.
- Applied reinforcement learning techniques to real-world logistics problems of managing warehouse flows as a graph representation.
- Provided detailed documentation and code for replicating the optimization process.
- Project available at: https://github.com/abbaasalif/q_learning

cost_minimization_Deep_Q_learning | *Python, TensorFlow, Keras* 02/25/2021

- Used deep Q-learning to minimize cooling energy consumption.
- Applied ML to optimize energy efficiency, showcasing practical and impactful applications.
- Provided comprehensive documentation and code for implementing the deep Q-learning algorithm.
- Project available at: https://github.com/abbaasalif/cost_minimization_Deep_Q_learning

Generative_adversarial_networks_tf1 | *Python, TensorFlow* 03/03/2021

- Implemented GANs using TensorFlow for tasks such as image generation.
- Showcased advanced neural network architectures and their applications in data augmentation and generation.

- Provided detailed documentation and examples for training and evaluating GANs.
- Project available at: https://github.com/abbaasalif/Generative_adversarial_networks_tf1

Transformers for Translation | *Python, Tensorflow, Keras, Numpy* 02/02/2021

- Developed a Transformer-based model for machine translation, showcasing a practical implementation of the "Attention Is All You Need" architecture from scratch in Tensorflow and Keras.
- Demonstrated the model's effectiveness in translating languages through Jupyter Notebooks, providing a hands-on learning experience. The data is taken from open source French to English translation and also demonstrated how to remove stop words from a large corpus.
- Contributed to the open-source community by sharing a simplified version of the Transformer model, enabling enthusiasts and researchers to explore and understand deep learning translation techniques. https://github.com/abbaasalif/transformers_for_translation

Publications - Conference Papers

Toward modeling underground soil radon gas emanation
Accepted at IEEE SouthEastCon 2024, Presented at GSU Research Conference 2023

A Framework for Classifying Applications from Raw Network Traffic Traces
Accepted at IEEE SouthEastCon 2024, Best Student Paper Award at IEEE SoutEastCon , Presented at GSU Research Conference 2023

Revelio: A Real-World Screen-Camera Communication System with Visually Imperceptible Data Embedding
Submitted at IEEE ICASSP 2025

Posters, Workshop papers and demos

Workshop: DeLiDAR: Decoupling LiDARs for Pervasive Spatial Computing
Proceedings of EWSN 2024 Workshop

Poster: Joint Optical Wireless Communication and Sensing using Neuromorphic Cameras
Best Poster Award 3^{rd} place , Proceedings of ACM/IEEE CPS IoT Week (IPSN)

Poster: Text2Net: Transforming Plain Text into Dynamic, Interactive Network Simulations
Proceedings of ACM/IEEE CPS IoT Week (IPSN)

Talk:Monitoring Solar Effect with CubeSats on Cosmic Ray Flux Variation at Sea Levels
Proceedings of Cubesat Developers Workshop 2023

Poster: Field-to-Cloud IoT System using GSU ARCTIC Virtual Machines
Proceedings of Scientific Computing Day 2023

Poster: OpenRadon Lab: Democratizing Soil Radon Modeling and Mapping
Proceedings of ACM MobiSys 2022, Scientific Computing Day 2022, AARST Symposium 2022

Workshop: Data Agnostic Image Annotations
Proceedings of NeurIPS DCAI 2021

Patents

Methods for invisible content modifications and machine learning based decoding to enable screen-to-camera interaction
Provisional Patent# 63/515,108 Submitted on: 07/23/2023

Methods for invisible content modifications and correlation-based decoding to enable robust and secure screen-to-camera interaction
Provisional Patent Submitted on: 09/11/2023

Methods for content modifications and for upsampling videos to enable invisible and flicker-free screen-to-camera interaction
Provisional Patent# 63/614,779 Submitted on: 12/26/2023