

# Abbaas Alif Mohamed Nishar

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## EDUCATION

### Georgia State University

*Doctor of Philosophy - Computer Science*

Atlanta, GA

Aug 2021 – Present

### Vellore Institute of Technology

*Bachelors in Technology - Electronics and Communications*

Chennai, Tamil Nadu, India

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, GlueTS, MxNet, Prophet, Celery

## EXPERIENCE

### Founding Engineer

*Revelio Communications Inc.*

July 2023 – Present

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

*Georgia State University*

Aug 2021 – Present

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

*American Family Insurance*

May 2022 – Aug 2022

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

*Tata Consultancy Services*

Aug 2020 – Aug 2021

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

*Tata Consultancy Services*

Dec 2019 – Jun 2020

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.

- 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](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](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](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](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](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](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](https://github.com/abbaasalif/Generative_adversarial_networks_tf1)

- \* 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](https://github.com/abbaasalif/transformers_for_translation)

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## PUBLICATIONS - CONFERENCE PAPERS

**Paper: Toward modeling underground soil radon gas emanation**

Accepted at IEEE SouthEastCon 2024, Presented at GSU Research Conference 2023

**Paper: 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

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## POSTERS, WORKSHOP PAPERS AND DEMOS

**Workshop: DeLiDAR: Decoupling LiDARs for Pervasive Spatial Computing**

Proceedings of EWSN 2024 Workshop · Dec 10, 2024

**Poster: Joint Optical Wireless Communication and Sensing using Neuromorphic Cameras**

**Best Poster Award 3<sup>rd</sup> place**, Proceedings of ACM/IEEE CPS IoT Week (IPSN) · May 13, 2024

**Poster: Text2Net: Transforming Plain Text into Dynamic, Interactive Network Simulations**

Proceedings of ACM/IEEE CPS IoT Week (IPSN) · May 13, 2024

**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

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## 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