Vatsal Aggarwal

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Education

University at Buffalo, The State University of New York — Buffalo, NY
Master's of Science in Computer Science, Minor in Machine Learning (GPA: 3.9/4.00) — *Aug. 2022 – Jan. 2024*

Manipal Institute of Technology — Karnataka, India
Bachelor of Technology in Computer Science — *Jul. 2015 – Jul. 2019*

Experience

Samsung Research — Jul 2019 – Jul 2022
Senior Software Engineer — *Bengaluru, India*

- Enhanced the AI model performance and KPIs such as inference time, model size, and VMAF score. The new model **boosted the QoS of native video calls by 8.42%** for Samsung flagship devices in 2022.
- Refactored legacy code using clean code practices to increase test coverage by 15%.
- Developed a POC by deploying Generative Adversarial Networks to **improve existing KPIs by 12.24%** for real-time application in low bandwidth conditions.
- Built and integrated key features with Test Driven Development to enhance the user experience for native video calls on mid-tier Samsung mobile devices.
- **Reduced time consumed per issue analysis by 30 mins** (approx.) by formulating an automation software to collate a summary report and help with issue analysis

Student Trainee — *Jan 2019 – Jun 2019*

- Implemented a calendar event notification system leveraging NLP and Deep Learning approaches. Developed and trained different deep learning models, including CNNs and BiLSTMs, exploiting word and character embeddings to obtain sentence representations for input categorization.

Research Experience

University at Buffalo, The State University of New York — May 2023 – Present
Graduate Research Assistant at CUBS Lab, Dr. Nalini Ratha — *Buffalo, NY*

- Developing methods to enhance autonomous UAV security using FHE (Fully Homomorphic Encrytion) and reinforcement learning to ensure robustness against cyber attacks and reliability for critical applications.
- Strengthening fingerprint applications by refining latent representations using GANs and Vector Quantized VAEs (Variational Autoencoders) for enhanced control and reliability.

Indian Institute of Technology, Varanasi (IIT-BHU) — May 2018 – Jul 2018
Research Intern at Information Retrieval Lab, Dr. Sukomal Pal — *Varanasi, India*

- Proposed a Deep Learning and NLP-based Citation Recommender System utilizing pre-trained word2vec embeddings. Recommender System Achieved **74.46% accuracy** for Top-5 recommendations.

Projects

Haircell Counting | *Python, PyTorch, Label Studio, Git* — Apr. 2023 – Present

- Achieved an overall **accuracy of 92%** in haircell count wrt to ground truth through a novel approach of using image segmentation to isolate the ROI and used Faster-RCNN with non-maximal suppression to get haircell count.

Retrospective Cycle GAN | *Python, TensorFlow, Git* — Oct. 2020 – Jun. 2021

- Implemented Retrospective Cycle GAN (Generative Adversarial Network) for video frame prediction, mentioned in the paper. TensorFlow was employed, with multi-GPU support via distributed mirrored strategy.

Technical Skills

Languages: Python, C, C++, Shell Scripting, R Programming, Java, SQL (Postgre)
Frameworks & Libraries: Tensorflow, Keras, PyTorch, JUnit, gMock, NLTK, spaCy, scikit-learn, Librosa
Developer Tools: Git, Google Cloud Platform, VS Code, Visual Studio, PyCharm, IntelliJ, Android Studio
Methodologies: Google APIs, Agile SDLC, Object Oriented Programming, Unit Testing, Test Driven Development
Interests: Software Development, ML/AI, Back-end Development, Cloud Technologies, ML Research