Shudhanshu Ranjan

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EDUCATION

Stevens Institute of Technology, Hoboken, NJ

Masters of Science in Computer Science | **GPA: 3.63/4.0** Sep 2022 - May 2024

Coursework: Algorithmic Complexity, NLP, CV, Applied statistics with Application in Finance, RL and Sequential Decision-Making

Machine Learning Graduate Certification | **GPA: 3.75/4.0** Sep 2022 - May 2024

Coursework: Artificial intelligence, Machine Learning, Statistical Machine Learning, Deep Learning

Presidency University, Bangalore, IN

Bachelor of Technology in Computer Science and Engineering | **CGPA: 8.41/10** Aug 2018 - May 2022

Coursework: Data Structures, Algorithms, DBMS, Data Visualization, Image Processing, Neural Networks, Graph Theory

WORK EXPERIENCE

Graduate Research Assistant, Stevens Institute of Technology, Hoboken, NJ Jan 2024 – Present

- Extracted 10k tweets using the **Twitter v2 REST API** to develop a **misinformation classifier**, enhancing **AI content moderation**.
- Conducted literature review on **crowdsourced fact-checking models** (**Matrix Factorization**, **Difference in Differences**, and **Regression Discontinuity Design**), noting **Community Notes**' **improvement** from **4%** to **12.5%**, increasing **annotation relevance**.
- Assisted PhD students and postdocs in co-authoring a **research paper** on **parameter-efficient fine-tuning** & **prompt engineering**, by analyzing **10+** NLP **datasets** with various **LLMs** to benchmark performance on **time complexity**, optimizing **model efficiency**.
- Researched **style transfer** in NLP using **GPT-2 and T5 LLMs** from the **Hugging Face API**, achieving a **2.4x** improvement in **BLEU score** on the **GYAFC** and **XFORMAL** datasets with over **110k sentence pairs**, utilizing **PyTorch** and **CUDA** for efficient computation.

Deep Learning Research Intern, Prayogpeti, Bangalore, IN Sep 2021 – Jun 2022

- Constructed a **comparative study** between 3 inductive **Graph Neural Networks**, namely TexTING, In-GCN, and In-GAT, to determine the best-performing model for **text classification**. Published in IEEE: **DOI**: 10.1109/ASSIC55218.2022.10088315.
- Modified **Inductive GAT models**, finding higher **entropy** in smaller datasets like IMDB (~50k datapoints) and lower initial entropy in larger datasets like DBPedia (~630k datapoints), which led to an increase in model **accuracy** to **98.10%** on 14 different classes.

Machine Learning Engineer Intern, UAV Team, iNeuron Intelligence PVT LTD, Bangalore, IN May 2021 – Aug 2021

- Designed & implemented **UAV simulations** in ROS and Gazebo, and performed **real-time object detection** on those simulations.
- Optimized by converting a **YOLOv5** model to a **MobileNetV3** architecture, retrained on **TPU**, resulting in a **5.5x increase** in **inference speed** on **CPU** and improved frames per second (**FPS**) performance.

Machine Learning Engineer Intern, SAT IMG Team, iNeuron Intelligence PVT LTD, Bangalore, IN Nov 2020 – May 2021

- Adapted an innovative satellite **image masking** method and presented a **U-Net** with **Inception CNN model** on a 21.69 GB dataset. Devised a novel image subtraction **algorithm** and **prototype** to outline the differences between multiple reference images.
- Retrieved **MultiPolygons detailed masks** for both 3-band and 16-band format images, used said MultiPolygons to detect 10 different object classes in the image, and evaluated the performance by **Jaccard similarity** on the region of interest.

PROJECT

RL-Based Stock Trading System Utilizing Sentiments Analysis [LINK] Feb 2024

- Developed a comprehensive automated **trading** system by training 5 distinct **RL agents** (A2C, DDPG, PPO, SAC, TD3) using the **FinRL** and **OpenAI Gym**, leveraging **20 years** of data and trading 10 company **stocks** across 5 sectors for 4 years.
- Incorporated emotion and sentiment data from tweets, applied **SMOTE**, and used **BiLSTM** to **impute** missing values with **75% accuracy**, yielding **1.53x returns** over counterpart agents and improving system performance in **real-time** market conditions.
- Benchmarked against **DOW, S&P 500, NASDAQ, and MVO** across all the stock options, the best model (**PPO**) demonstrated superior performance in volatile markets, achieving a **2.98x return** with a **1.33 Sortino Ratio** for fixed 3.5% yearly risk-free rate.

NLP-Driven Analysis and NER of Vaccine Adverse Events [LINK] Dec 2023

- Engineered and trained a **bioBERT** model integrated with **Stanza** for **analyzing 140k VAERS reports**, achieving **97.9% accuracy** in **extracting** medical terminologies. This work enhanced vaccine safety analysis and supported healthcare investigations.
- Optimized NLP model performance by **fine-tuning** loss functions and embeddings, reducing model **loss to 0.0776** and increasing the **F1 score** by 18% to **0.96**, demonstrating improved efficacy in **processing clinical data**.

SKILL

Technical: Python - (Pandas, Numpy, Scikit-learn, MatPlotLib, SciPy, Statsmodels, ARIMA, Seaborn, NLTK, CV2, XGBoost, LightGBM), Generative AI - (GAN, VAE, GPT, BERT, T5, LLaMA, RAG), C++, Tensorflow, PyTorch, Keras, MatLab, SQL, GCP - (Vertex AI, BigQuery ML, Bigtable, LookML, Deployment Manager), Git, Jupyter Notebook, MLflow, Weights & Biases, Hadoop, Kubernetes, PySpark, Docker.

Certification: TensorFlow Developer Certificate (by Tensorflow); 60+ GCP skill badges of 200+ hours worth of training from **cloudskillsboost** (ML Infrastructures, Serverless Cloud Run Development, Cloud Dataflow, Pub/Sub, BigQuery, Cloud Architecture).

ACTIVITY

Co-Founder and Student Coordinator, Crescendo Developers Club, Bangalore, IN Jun 2020 – Jun 2022

- Co-founded university's first tech & research club, growing a 250+ student community, & organizing 4 hackathons & 8 webinars.

Semi-finalist (Top 2 percentiler), e-Yantra National Competetion, Bangalore, IN Sep 2020 – Mar 2021

- Represented university in a 10.4k student competition, reaching the top 55 with Bots for automation, simulated in ROS & Gazebo.