Tirthankar Mittra

Software Engineer   Experience delivering products used by 100M+ users.

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EDUCATION

UNIVERSITY OF COLORADO BOULDER - Boulder, CO   August 2022 – December 2023
Master of Science in Computer Science
GPA: 4

Relevant coursework: Data Center Scale Computing-Methods Systems, Linux system administration, Computer Security and Ethical Hacking, Neural Networks & Deep Learning, Deep Reinforcement Learning, Advanced Robotics, Advanced topics in Computer Vision.

JADAVPUR UNIVERSITY - Kolkata, India   August 2014 – May 2018
Bachelor of Engineering in Electronics & Telecommunication
GPA: 3.6

Relevant coursework: Computer Language, Numerical Analysis, Data Structures & Algorithms, Computer Organization & Architecture, System Software, Computer Networks, Neuro-fuzzy Control, Operating Systems, Computer Architecture & System Software Lab.

PROFESSIONAL EXPERIENCE

QUALCOMM - SAN DIEGO, CALIFORNIA   May 2023 – August 2023
Interim Software Engineer

• **Led the development of a PYTEST framework** verification environment for rigorous testing of the 5G base station's MAC layer. Established a prototype unit test and development workflow, laying the foundation for future test case expansions. **Utilized Python LOGGING and SUBPROCESS module**s and deepened expertise in **GIT and GERRIT** version control systems. The framework resulted in a 30% enhancement in testing efficiency.

• Collaborated seamlessly with cross-functional higher-layer teams within the 5G network protocol stack to develop MAC unit test cases. **Enabled PF TRACE for unit tests** to log MALLOC counts, CONTEXT SWITCHES, and PAGE FAULTS; this increased the reliability of all test cases by 25%.

• Performed **data analysis with Python's PANDAS and NUMPY packages** to formulate robust pass-fail criteria for unit tests. Implemented extended test scenarios by creating bash scripts, identifying latent faults in legacy code, and fixing them, thus increasing code reliability by 5%.

SAMSUNG R&D - BANGALORE, INDIA   June 2018 – August 2022
Lead Software Engineer

• **Led the development of 5G Base Station's** physical uplink control channel's **feature releases and patches for Samsung's diverse customer base** following **agile workflow**, continuous integration, and continuous development **(CI/CD) practices**. **Mentored two junior team members** in MAC-PHY software development, resulting in a 30% increase in software feature release efficiency.

• **Improved log comprehension** and accessibility by developing an **HTML, CSS, and JAVASCRIPT-based parser** that was hosted on a server and could aggregate logs of a specific type into a downloadable Excel sheet which could then be utilized for analysis such as calculating DOWNLINK BLER and throughput, the log parser reduced the average analysis time by 90%.

• **Implemented PUCCH unit tests powered by Google's Gtest in C++** and set up Jenkins for nightly testing, which included the logging of CPU cycle consumption per module**. Automated email notifications for team-wide updates on results**, enhancing overall testing efficiency. The framework reduced bugs by 50% and was also used to increase code coverage from 20% to 75%.

• **Led pioneering research** in advancing **5G algorithms through MACHINE LEARNING** techniques. Developed an **improved LDPC layered decoder using Pytorch**, incorporating reinforcement learning and a dense neural network for function approximation which led to a 15% increase in decoder accuracy. Co-led a team in introducing a novel HARQ chase combining technique, for which a patent was awarded.

PROJECTS

FAST BOT CLASSIFIER, CU BOULDER   October 2022 – December 2022
Individual Contributor
https://github.com/tirthankarCU/SpeedyBotFlag

• **Created** a novel **cloud-hosted service** with low-latency **text classification and flagging** capabilities for social media platforms. The **REST front end would classify low-latency** risk-averse text using simple NLP models like a Bag of Words, which decreased the response latency by 35%.

- **Deployed backend workers** to use large models like **BERT** to pop out the **texts from the MinIO object store** and do classification. Workers deleted user posts if they violated the platform guidelines. **Redis key-value store** managed user authentication. This deployment removed 95% of problematic tweets.

MUSIC SEPARATION AS A SERVICE, CU BOULDER   September 2022 – October 2022
Individual Contributor
https://github.com/tirthankar95/demucs-kubernetes-tirthankarCU

- Implemented a **Kubernetes cluster** to **build a scalable Python FLASK-driven REST API** for music separation, making the process 100% automatic.
- Managed API requests, MP3 analysis, and data retrieval through a Redis queue system, employed **cloud object storage (e.g., Min.io)** for result caching; this architecture allows scaling up of workers performing music separation separately, thus reducing the cost of operations by 50% as it would now be a function of worker load.

MODELLING THE LEARNING OF NUMBERS IN CHILDREN, DELLAB CU BOULDER   January 2023 – December 2023
Graduate Research Assistant
https://github.com/tirthankarCU/NLP_RL_Docker_Version

- Investigated the role of language in children's number learning and its potential transferability to other tasks. A novel reinforcement learning environment was built using **OpenAI's gym framework**, and a **DOCKER container** was created to improve the reliability of experiments on different platforms.
- Implemented **state-of-the-art Neural Network models** like **BERT, ResNet, and ATTENTION** networks to **create a deep reinforcement learning** (proximal policy optimization **) PPO algorithm**. The models were **deployed on the Google Cloud Platform**, where the hand-built attention network produced a 20% performance improvement over other pre-trained models.

TECHNICAL SKILLS
Functional : Agile, JIRA , Git, Gerrit, Jenkins, Perforce, Linux, Windows, CI/CD.
Technical : Python, C, C++, JAVA, HTML, CSS, Computer Vision, NLP, Reinforcement Learning, Machine Learning, Large Language Models, Deep Learning, Hadoop, PySpark, Docker Container, Kubernetes, Google Cloud Platform, PyCuda, ROS, System Design, REST, AWS, Computer Networks, Cyber Security, RabbitMQ, Flask, gRPC, Operating Systems, Algorithm & Data Structure, Redis, MinIO object store, MySQL, Pytorch, GDB, TensorFlow, Node.js, JavaScript, Database, NoSQL, Spring framework.
Framework : Spring Boot, Pytest, Gtest.
Machine Learning : Pytorch, Tensorflow, Large Language Model, Computer Vision.

ACHIEVEMENTS
- **Cleared the Samsung professional software competency** exam in 2018, ranking in the top 16% of employees in the organization.
- **Was awarded the Samsung Citizen Award** for my contributions to the 5G project.
https://github.com/tirthankar95/CompletionCertificates/blob/main/SamsungCitizenAward.jpg
- Participated in **Competitive Coding,** achieving a Best Code Chef Global Rank of approximately **314 out of 11809** in the April Challenge 2019. **https://www.codechef.com/users/tirthankar_95**