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| Tirthankar Mittra |
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| |  | | --- | | EDUCATION | | |  |  | | --- | --- | | University Of Colorado Boulder , Boulder | Aug 2022 - Dec 2023 | | ***Master of Science in Computer Science*** | GPA: 4 | | Relevant coursework: Data Center Scale Computing-Methods Systems & Techniques, Linux system administration, Computer Security and Ethical Hacking, Neural Networks & Deep Learning, Deep Reinforcement Learning, Advanced Robotics, Chaotic Dynamics, Numerical Linear Algebra, Foundations of Quantum Engineering, Advanced topics in Computer Vision. | | | | |  |  | | --- | --- | | Jadavpur University , India | Aug 2014 - May 2018 | | BE in Electronics & Telecommunication | GPA: 3.6 | |  | | | | PROFESSIONAL EXPERIENCE | | |  |  | | --- | --- | | Qualcomm - San Diego, California | 05, 2023 - 08, 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 streamlined test development workflow and a prototype unit test, laying the foundation for future test case expansions. Utilized python logging, subprocess modules, and deepened expertise in Git and Gerrit version control systems. | | • 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. | | • Used data analysis using Python's Pandas and NumPy frameworks to formulate robust pass-fail criteria for unit tests. Implemented extended test scenarios through the creation of bash scripts that helped me identify latent faults in legacy code which I also fixed. | | | | | |  |  | | --- | --- | | Samsung R&D - Bangalore, India | 06, 2018 - 08, 2022 | | Lead Software Engineer | | | |  | | --- | | • Led the development of 5G Base Station's physical uplink control channel's(Pucch) code releases and patches for Samsung's diverse customer base. Customized features for specific clients based on High-Level Design and 3GPP specifications, Followed agile workflow, continous integration and continuous development(CI/CD) practices. Mentored two junior team members in PUCCH development. | | • During testing, comprehension of logs was limited to module experts due to their real-time verbose sequential presentation on the console. Recognizing the need for accessibility, I proposed and implemented a log parser solution. This parser, developed with HTML and CSS, was hosted on a server. The log parser aggregated logs of a specific type into a downloadable Excel sheet. This sheet could then be utilized for meta-analysis, such as calculating downlink BLER and throughput | | • Implemented PUCCH unit tests using Google Test in C++. Set up Jenkins for nightly testing, which also included the logging of CPU cycle consumption per module. Automated email notifications for team-wide updates on test results, enhancing overall testing efficiency. | | • Enhanced legacy code by optimizing PUCCH resource allocation from O(n^2) to O(n) through efficient hashing techniques. Identified an issue where 'N' parallel pucch reports were overwriting each other during field tests, I implemented the bakery algorithm to solve the critical section problem. | | • Received Samsung Citizen Award for my contributions to pucch code development and testing. Additionally, I earned the Samsung Professional Certificate for successfully clearing their professional coding exam, achieving a distinction as one of the top 16% of employees at that time. | | • 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. Proposed innovative traffic balancing strategies in 5G systems through an open-ended intelligent search for multiple UAV base stations. Co-led a team in introducing a novel HARQ chase combining technique, for which we got a patent. | | | | | PROJECTS | | |  |  | | --- | --- | | Fast Bot Classifier, CU Boulder | Oct, 2022 - Dec, 2022 | | |  | | --- | | • Constructed a cloud-hosted service with low-latency text classification and flagging capabilities for social media platforms. The rest front end would do low latency risk averse text classification using simple NLP models like bag of words. | | • The backend workers would use large models like BERT, pop out the texts from MinIO object store and once the classification is done it would notify the user and the post would be deleted from the user’s feed if it violated platform guidelines. User authentication and posts are tracked using Redis key value store. | | | | | |  |  | | --- | --- | | Demucs music separation, CU Boulder | Sept, 2022 - Oct, 2022 | | |  | | --- | | • Implemented a Kubernetes cluster to create a REST API-driven music separation service. | | • Managed API requests, MP3 analysis, and data retrieval through a Redis queue system. Employed cloud object storage (e.g., Min.io) for result caching. | | | | | |  |  | | --- | --- | | Modelling the learning of numbers in children using Large Language Model and Reinforcement Learning, CU Boulder | Jan, 2023 - Dec, 2023 | | |  | | --- | | • The focus of this research was on investigating the role of language in children's number learning and its potential transferability to other tasks. A novel reinforcement learning environment was implement using OpenAI's gym framework and a docker container was created to improve reliability of results on different platforms. | | • Implemented state-of-the-art Neural Networks, including BERT and ResNet, which were utilized to develop a deep reinforcement learning (proximal policy optimization ) PPO model. | | | | | |  |  | | --- | --- | | Traffic Balancing & maintaining other KPIs in 5G systems: An open-ended intelligent search approach. | Aug, 2020 - Aug, 2021 | | |  | | --- | | • Developed and implemented a form of deep reinforcement learning ( open-ended search algorithm) , to address load and traffic balancing challenges among multiple UAV-mounted base stations. | | • The implemented solution ensures the optimization of system Key Performance Indicators (KPIs), such as throughput and efficient data transmission with minimal power usage, in the context of dynamically changing traffic and channel conditions. | | | | | 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 84% 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 | | • Participate in Competitive Coding, achieving a Best Code Chef Global Rank of approximately 314 out of 11809 in the April Challenge 2019. | | | |