Maahir Gupta

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Skills

Languages: Python, C++, Go, JavaScript, Bash
Tools: AWS (EC2, S3), Docker, gRPC, Linux, MongoDB, MERN Stack, REST API's
Libraries: PyData Stack, PyTorch, TensorFlow, Dash Web, MLFlow, ROS (Distrib. Sys.), TensorRT, OpenCV
Fields: Backend, Distributed Systems, ML Backend/Deployment/Platform, Deep Learning, Computer Vision, Robotics

Experience

Wish | Software Engineer Intern – Search & Recommendations | San Francisco, CA
Sept - Dec 2021

- Building data driven backend microservices for search, relevance, and recommendation engines to optimize user product feeds.
- Developed and parallelized a gRPC microservice supporting **~1B queries per day**, built to generate retail user category preferences.
- Designed and implemented an **expandable API** enabling centralized access of user data for **3 high priority company use cases**.
- Enabled training of ML models by building and integrating asynchronous **user data logging** pipelines into the service using Go.

Technologies: Golang, Python, gRPC, Kubernetes, Grafana, Flink ETL, Docker, MongoDB, Memcached, Fluent HTTP, Git

PerkinElmer, Inc. | Software Engineer Intern – Machine Learning | Waterloo, ON
Jan - Apr 2021

- Developed an end-to-end **deep learning** recommendation system to streamline analysis of time series data from medical devices.
- Leveraged Python, PyTorch, AWS, and Databricks MLFlow, to execute **ML lifecycle tasks** - research, data handling, model implementation (LSTM, Transformer), systems design, **application building**, metric tracking, and cloud deployment.
- Worked towards projected savings of **xxx hrs/week** for labs across multiple countries by reducing human intervention by **~98%**.
- Built a framework to simplify ML development for the Data Science team.
- [System Design Diagram]

Technologies: Python, PyTorch, Linux, PyData Stack, Dash Webapp, AWS, MLFlow, MongoDB, Git, Img Segment: CNN, U-Net

TopHat Robotics | Software Engineer Intern – Robotics | Waterloo, ON
May - Aug 2020

- Built a robot-mounted image classification system to flag sidewalk defects, deployed by **6 municipalities** for over **xxx km**.
- Developed a modular C++ backend for depth camera interfacing, image processing and real-time CNN model use.
- Implemented robotic controls in C++ enabling use of in-house hardware, resulting in **78% cost savings** by eliminating controller.
- Supported team with software breakdowns and demos while pitching to clients and investors.

Technologies: C++, Python, Linux, TensorRT, Embedded Systems, ROS, TensorFlow, Convolutional Neural Net (CNN), Git

WATonomous UW | Software Engineer – Autonomous Vehicles | Waterloo, ON
Apr 2020 - Current

- Simplified complex self-driving decision modules into human-like queries: "is this route passable?".
- Built a real time model to logically structure traffic systems (signs, lights, obstacles) and integrate their meanings into a routing graph in C++; **emulating driver understanding** and used in car, on real roads. (Algo: Max Depth Graph DFS + Dijkstra) [Demo]
- **Co-authored research paper** acting as a candidate to ICRA, iROS and RA-L Robotics societies and conferences. [Publication]
- Developed vehicle tracking SLAM [algorithm] by fusing clustered camera & radar data with predicted position data at 86% accuracy.

Technologies: C++, ROS, Rviz, Carla Vehicle Simulator, Linux, CMake, Docker, Git

Projects

Autonomous Mini Car | [DEMO]
Aug 2020 - May 2021

- Built an autonomous mini car from scratch with **multi-processing** for remote video streaming and autonomous driving.
- Implemented **obstacle mapping and avoidance**, and real-time **shortest distance path planning** integrated with a **perception pipeline** in Python - visualized through video feed or simulation. [Short Video]
- Converted initial RPi based system, maneuvered with PS3 controller to drive autonomously on an embedded Jetson Nano board.

Technologies: Python, C++, Linux, TensorRT, OpenCV, ROS, Docker, PyData Stack, CMake, Git

Education

University of Waterloo | Software Engineering 2024 | CGPA: 3.85/4.0

Relevant Courses: Data Structures & Algorithms, Software Design, Operating Systems, Compilers, Microprocessors, Linear Algebra

Accomplishments & Interests

- Waterloo Varsity Baseball, Dean's Honours, AAA baseball 2019 provincial champions, French certification, Valedictorian
- Tinkering, RPi/NVIDIA Boards, Big Data (Hadoop, MapReduce), Clean energy, Baseball, Mountaineering, Beautifying my desk setup