Maahir Gupta

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Skills

Languages: Python, C++, Go, JavaScript (familiar), Bash
Tools: AWS (EC2, S3), Docker, gRPC, Linux, MongoDB, MERN Stack (familiar), REST APIs
Libraries: PyData Stack, PyTorch, 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

- Designed, proposed, and built an expandable gRPC microservice paired with a client-side API to enable simple & centralized retrieval of user data; resulting in consistent low latency retrievals, minimized dev lead time and a cleaner codebase.
- Led development and emphasized 4 key design pillars: concurrency, expandability, modularity, and usability; resulting in project rollout with **~1B queries/day** from 3 critical business use cases (homepage, for you page, search).
- Improved personalized search and recommendations (internal metric) by integrating inferred category preferences into service.
- Facilitated ML model training by building asynchronous user data logging pipelines using Go.

Technologies: Golang, Python, gRPC, Kubernetes, Grafana, Flink ETL, Airflow, SQS, 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 **x . . hrs/week** for labs across multiple countries by reducing human intervention by **~98%**.

Technologies: Python, PyTorch, Linux, PyData Stack, Dash (Webapp), AWS, MLFlow, MongoDB, Git, Img Segment: CNN, U-Net
Link: [System Design Diagram]

Swap 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 **x . . 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

Design Team & Projects

WATonomous & EcoCar | Software Engineer – Autonomous Vehicles | Waterloo, ON — Apr 2020 - Current

- Facilitated driver scene understanding and simplified complex driving modules into human-like queries – built a real time model to logically structure traffic systems (signs, lights, obstacles) and their effects on the environment into a routing graph in C++.
- Co-authored research paper acting as a candidate to ICRA, iROS and RA-L Robotics societies and conferences.
- 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, CAN, Nearest Neighbor, Kalman Filter, Git
Links: [Demo], [Publication], [Sensor Fusion Paper], [Vehicle Tracking System Diagram]

Autonomous Mini Car Project — Aug 2020 - May 2021

- Built an autonomous mini car along with, top-down driving visualization, remote video streaming & manual control, I/O interfacing.
- Implemented: perception pipeline that maps new obstacles (object detection) to a dynamically updating occupancy grid, which communicates with the path planning module (multiprocessing), resulting in realtime updates to the shortest path that is followed.

Technologies: Python, C++, Linux, TensorRT, OpenCV, ROS, Docker, PyData Stack, CMake, Jetson Nano Board, Git
Links: [Demo], [Short Explainer Video]

Education

University of Waterloo | Software Engineering 2019 - 2024 | CGPA: 3.85/4.0

Relevant Courses: Data Structures & Algorithms, Software Design, Operating Systems, Compilers, Microprocessors, Linear Algebra
Activities: Career Fair Outreach Director, Student Mentor, WATonomous Design Team, EcoCar Design Team, Waterloo Varsity Baseball

Accomplishments & Interests

- Dean's Honours List, Heasley & President's scholarships, AAA Baseball 2019 provincial champions, French certification, Valedictorian
- Baseball, Clean energy, RPi/NVIDIA Boards, Big Data (Hadoop, MapReduce), Documenting my life daily, Beautifying my desk setup