VISHAL JAYAKUMAR

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TECHNICAL SKILLS

Languages: C++, Python, C#, HTML/CSS, SQL, R, Bash, Javascript
Frameworks & Tools: Docker, Selenium, ROS, Git, Snowflake, AWS, Jenkins
Libraries: NumPy, PyTorch, Matplotlib, Pandas, Polars, Scikit-Learn, TailwindCSS

EXPERIENCE

Python Developer   September 2024 - December 2024
Burkett Statistical Consulting
- Used Pandas for data processing of utility meter data, producing a 90% smaller clean dataset
- Engineered features for EV load prediction and fitted numerous machine learning models achieving 80% accuracy
- Automated assembly line scheduling using Google OR-tools, Python and R, reducing manual effort and achieving a potential 5% reduction in production costs while meeting all production constraints
- Created energy arbitrage optimization model in Python, cutting maximum profit computation time by over 99.9%

WiFi Software Test Developer   January 2024 - April 2024
Ford Motor Company
- Implemented and tested Python automation test scripts, using the Slash testing framework, for in-vehicle WiFi connectivity modules extending test coverage to new hardware automating 10% of manual testing

Junior Data Scientist Intern   July 2023 – September 2023
Exponential Exchange
- Scraped price history of over 30 major market indices using Selenium and Python for data analysis
- Used Snowflake and SQL to compute correlations and created an interactive dashboard in Looker to visualize and compare the different indices

Junior Software Engineer   May 2023 – August 2023
Inwards Inc.
- Upgraded company website using HTML/CSS, JavaScript & PHP, adding pages and improving load times by 50%

Robotics & RL Researcher   October 2023 - Present
Data-driven autonomy research group under supervision of Dr. Mohammad Al-Sharman
- Investigating learned stochastic world models for overcoming sim-to-real gap (targetting EOY publication)
- Co-authored "*Autonomous Driving at Unsignalized Intersections: A Review of Decision-Making Challenges and Reinforcement Learning-Based Solutions*"
  * Conducted an in-depth literature review on both classical and deep-learning based (RNN, LSTM, Bi-LSTM with attention, etc.) Driver Intention Inference schemes and synthesized findings
- Contributed to research project into integration of MPC with Reinforcement Learning
  * Adapted Hybrid Policy Optimization algorithm to use MPC demonstrations to guide reinforcement learning
  * Wrote custom SAC implementation in PyTorch to get baselines for experimental validation

Autonomy Software Lead   January 2024 – Present
WATOnomous - University of Waterloo Autonomous Vehicle Design Team
- Used Docker, CARLA and ROS2 to leverage in-house HPC cluster for high-fidelity AV simulation
- Led team of 10 in development of ROS2 nodes for various world-modeling solutions for autonomy stack
  * HD-map that constructs environment as a series of lanelets with defined behaviour and rules
  * Localization using EKF to fuse IMU, Odometry and GPS to accurately determine vehicle position
  * Occupancy grid generation using LiDAR point cloud filtering and compression into 2-D costmap
  * High-level vehicle behaviour using behaviour trees that are closely integrated with the HD-map

EDUCATION

University of Waterloo   Waterloo, Canada
Bachelor of Computer Science, 90.25% CAV, 3.92 GPA   *September 2022 - April 2027*