

Varun Garg, PhD (C)

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Hardworking, capable **Technical Professional** with years of dynamic data science and engineering experience. Adept at working under pressure to achieve organizational goals, both independently and in team settings. Excel to keep processes running smoothly and innovatively with little to no direct supervision. Able to deliver high-caliber results under pressure in deadline-driven settings. Determined with a strong work ethic. Seeking a role that will allow for professional growth.

Core Competencies

Data Science, Analytics, AI, Solutions Design, Software, Application Implementations, Python, Java, Android, Github

Education & Credentials

Doctor of Philosophy, Computer Engineering: Intelligent Systems, Urban Computing, University of Massachusetts Lowell, 2022

Courses: Multi-Sensor Data Fusion, Probability, and Stochastic Processes, Machine Learning, Data Analytics, Operating Systems, Software Engineering, Big Data Analytics

Bachelor of Technology, Electronics and Electrical Engineering, Indraprastha University, 2016

Work History

University of Massachusetts Lowell | Research Assistant (Thesis), 2017 – Present

- Leverage assorted crowdsource sensing approaches to assess sensor data from vehicles to predict, detect and locate spatial-temporal phenomena
- Call on machine or deep learning methods, implemented using Python and MATLAB
- Created an interactive geographical map that pulls data from cloud storage using JavaScript
- Fashioned an Android application that records sensor data in SQL database and directs it to cloud using Java

Verizon | Research Assistant, 2021

- Produced a PoC for a product used for unknown vehicle discovery; incorporated passive sensors under different traffic and sensing scenarios using Python
- Developed and executed localization, tracking, similarity measurement and anomaly identification practices using existing research literature review
- Created and implemented an algorithm to perform multi-view analysis of spurious sensor data collected by collaborative passive sensing sources
- Performed field experiments and validation of developed approaches over real-world data in Python
- Led extensive data transformation and data cleaning as well

Veoneer | Data Science Intern, Emerging Tech Team (2020)

- Established a PoC for a product, used to extract and combine valuable abundant sensor data
- Engaged in a comprehensive literature review to estimate scenario elements using multi-modality Crowdsense sensing
- Extracted features, determined geographical map properties and called on graph search methods, using these features within the map's road network
- Developed and implemented algorithms to associate spurious sensor data collected by sources

Technical Intern, Automotive Tools Team (2019)

- Formulated plugins to allow for an automated process execution, storage, and data analytics framework in Java; processed multiple files with vehicle sensor data ranges spanning from 5GB to 100GB
- Introduced a plugin to find GPS data within sensor data bundle to create a geographical map in JavaScript

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Technical Intern, Automotive Tools Team (Continued)

- Launched a plugin that performed compression and decompression included sub-features that allowed for high-speed compression and facilitation of integrity checks on the compressed file
- Employed a plugin to process sensor data using Microsoft SQL queries
- Developed a graphical user interface to detect image-based objects for different use cases using Python; also built an image stream pre-processing program to detect objects for video files using Python

Projects

Clustering Vehicle Location Data, Python (2019)

- Called on Apache Spark SQL to clean and analyze large GPS datasets to obtain regions with high taxi demand
- Created a cluster approach based on location by processing the Geohash of location coordinates
- Tested scalability of the model for different workloads, e.g. 1M data points in five seconds
- Utilized Gaussian mixture models for clustering to discover locations with similar feature data

Spatial-Temporal Prediction Using Moving Vehicle Sensor Data, Python (2019)

- Authored ROS scripts to obtain images, GPS, and IMU sensor data from Rosbag and h264 files in the University of Sydney campus dataset containing 52 trials of vehicle sensor data for the same trajectory
- Formulated an approach for monitoring spatial-temporal with a constraint of limited data

Developed Deep Learning on Images and IMU Sensor Data, Python (2019)

- Devised an ML pipeline capable of feature selection, feature extraction PCA, classification and regression using N fold cross-validation on GPU cluster
- Classified the acceleration signal into the type activity and predicted the mobility intensity

Simulation of CPU Process Scheduling Algorithms, C, C++ (2018 – 2019)

- Applied the use of Round Robin and Shortest Time First scheduling algorithms
- introduced a monitoring system to assess remaining bursts cycles of the running process, the final process ID and all processes remaining within the ready queue

Supervised and Unsupervised Learning on Vehicular Data, Python (2017 – 2019)

- Leveraged machine learning models to classify acceleration and images data
- Analyzed frequency domain and calculated features out of sensor data

Publications

Ubiquitous Sensing for Enhanced Road Situational Awareness: A Target-Tracking Approach

IEEE International Conference on Intelligent Transportation Systems (ITSC), 2018

On the Use of 3-D Accelerometers for Road Quality Assessment,

IEEE Vehicular Technology Conference, Porto, Portugal, Jun 6, 2018