Amir Zarinbal,

Ph.D., M.Sc., B.Sc.,

Expert Summary

Dr. Amir Zarinbal has more than 13 years of academic and consulting experience in different areas of Transportation Engineering and software development. Dr. Zarinbal's strengths involve using advanced computer techniques to develop algorithms, software, sensors and smartphone applications to collect, process, and analyze transportation data in real-time and offline applications. His expertise includes smart cities, the Internet of Things (IoT), big data, advanced traffic management systems, simulation, artificial intelligence (AI), and image processing.

Specialized Professional Competencies

- Intelligent Transportation Systems
- Smart Cities
- Big Data
- Arterial Intelligence
- Internet of Things

Professional Experience

- True North Safety Group: 2022 - present
- TES Information Technology: 2019-2021
- University of Waterloo: 2018
- ResultGrid: 2017 - 2018
- Intelligent System Designs: 2015 - 2017
- University of Waterloo: 2011-2016

Academic Background

- Ph.D., Civil Engineering Transportation Engineering, University of Waterloo, 2017

- M.Sc., Civil Engineering, Transportation Planning, Sharif University of Technology, 2010

- B.Sc., Civil Engineering, University of Tehran, 2007

Project Experience

TES Application Enhancement, York Region (Ongoing)

Conducted road network update.

Developed methodologies for predictive traffic signal warrants, systemic network screening, site selection for automated speed enforcement, and site selection for traffic calming locations.

Development and Implementation of Road Crash Database System in Kenya, Kenya National Highways Authority (2020 - Ongoing)

Implementing TES for Kenya, including GIS and infrastructure inventory. Developing a mobile app for iOS and Android for crash reporting for the police. Customizing reports.

Development of a Traffic Sign Inventory for the City of Ottawa, City of Ottawa (On-going)

Developed a methodology for sign detection using videos obtained from commercial cameras equipped with GPS, adjusted, and fine-tune the algorithm's accuracy. Acted as Technical Lead.

Measuring the Passing Behaviour of Motorized Vehicles When Overtaking Bicycles on Urban Arterial Roadways, University of Waterloo, 2018

Developed a custom-designed sensor array that mounts on a bicycle. The sensor array consists of a lidar, an ultrasonic sensor, a GPS receiver, and three video cameras that record the location and speed of the bike, the lateral distance to overtaking vehicles. It takes photos whenever a vehicle-cyclist interaction occurs. Developed the web services and web interface to synchronize, process, and validate the collected data.

Modeling Network of IoT Sensors for Fleet Management, Verizon (2018)

Managed the project on time and budget. Quality control of all deliverables. Developed the model to simulate tracking and monitoring status of assets and products using GPS-enabled Internet of Things (IoT) sensors and created the 3D representation of the simulation framework.

Simulation of Smart City Solution and IoT Sensors, Transitlabs for Ivory Coast, 2018

Managed day-to-day activities of the project and a team of developers. Developed a model for the simulation of IoT traffic sensors for detection, counting, and measuring traffic performance metrics.

Modeling and Simulation of Smart Vision Sensors for Estimation of Intersection Safety Analytics, Verizon, 2017

Managed day-to-day activities of the project and a team of developers. Developed a simulation framework for the simulation of vision sensors to generate traffic safety metrics. The model is used to evaluate possible improvements of such implementations in Boston for the Vision Zero project.

Implementation of Responsive Traffic Signal Control Using Bluetooth Detectors, Region of Waterloo, 2017

Managed the project and designed the architecture of the system. Quality control of all deliverables. Developed and implemented the required software (backend services, web services, and web interfaces) to collect Bluetooth data from sensors, execute the algorithms to detect atypical traffic conditions, and developed the hardware to send commands to the traffic controller to apply the responsive signal plan in real-time.

Publications/Presentations

- Simulation of the Bluetooth inquiry process for application in transportation engineering, IEEE Transactions on Intelligent Transportation Systems, 2018

- Identifying parameters for microsimulation modeling of traffic in inclement weather, Transportation Research Record, 2017

- Advanced Traffic Signal Control Using Bluetooth/Wi-Fi Detectors, CITE, 2016

- An EWMA-based method for monitoring polytomous logistic profiles, IEEE International Conference on Industrial Engineering and Engineering, 2011,

- Using type-2 fuzzy function for diagnosing brain tumors based on image processing approach, 2010

- Type-II fuzzy route choice modeling, 2010