Pei Li

CONTACT INFORMATION

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RESEARCH INTERESTS

Traffic safety, Deep learning, Connected Vehicles, Big Data, Spatial Analysis

EDUCATION

University of Central Florida, Orlando, FL, USA

Ph.D. Candidate, Civil Engineering, August 2018 (expected graduation date: April 2021)

Certificate, SAS Data Mining, Dec 2020

M.S., Smart Cities, May 2020

Tongji University, Shanghai, China

M.Eng., Communication and Transportation Engineering, June 2018

B.Eng., Logistic Engineering, June 2015

RESEARCH EXPERIENCE

University of Central Florida, Orlando, FL, USA

Graduate Research Assistant **August 2018 - present**

Crash Predictions for Expedited Detection (CPED)

- Develop ensemble machine learning methods for predicting secondary crash.
- Design logic for sending warnings via an interactive website.

Connecting the East Orlando Communities Project-Phase I

- Extract traffic variables from real-time trajectory data obtained through API.
- Develop deep learning method for predicting crash risk using trajectory data.
- Deploy the developed method on remote server and send results to interactive website.

Using Smartphone as On-board unit (OBU) Emulator Implementation Study

- Collect and clean data from various sensors on smartphone.
- Develop machine learning methods to detect driver behaviors at the intersection.
- Deploy the developed methods on an Android smartphone application.
- Design warning logic to protect the vulnerable road users via smartphone.
- Field test the developed application under different conditions.

Pre-Deployment Study for Connecting the East Orlando Communities Project

- Evaluate safety and mobility at various segments and intersections by using crash, traffic detector, and drone video data.

Tongji University, Shanghai, China

Graduate Research Assistant **August 2015 - June 2018**

Traffic External Costs Estimation for China

- Estimate traffic external costs for China and compare with other countries.
- Provide policy suggestions to decrease external costs by expanding railway freight.
- Evaluate the proposed suggestions by discrete choice models.

Publications

Journals

1. **Li, P.**, Abdel-Aty, M., Cai, Q. and Islam, Z., 2020. A Deep Learning Approach to Detect Real-Time Vehicle Maneuvers Based on Smartphone Sensors. *IEEE Transactions on Intelligent Transportation Systems*.
2. Zhang, S., Abdel-Aty, M., Cai, Q., **Li, P.** and Ugan, J., 2020. Prediction of pedestrian-vehicle conflicts at signalized intersections based on long short-term memory neural network. *Accident Analysis and Prevention*, 148.
3. **Li, P.**, Abdel-Aty, M., Cai, Q. and Yuan, C., 2020. The Application of Novel Connected Vehicles Emulated Data on Real-Time Crash Potential Prediction for Arterials. *Accident Analysis and Prevention*, 144.
4. Zhang, S., Abdel-Aty, M., Yuan, J. and **Li, P.**, 2020. Prediction of pedestrian crossing intentions at intersections based on long short-term memory recurrent neural network, *Transportation Research Record*, 2674(4).
5. **Li, P.**, Abdel-Aty, M. and Yuan, J., 2020. Real-time crash risk prediction on arterials based on LSTM-CNN. *Accident Analysis and Prevention*, 135.

Conferences

1. **Li, P.**, Abdel-Aty, M. Trajectory Fusion-based Real-Time Crash Likelihood Prediction Using LSTM-CNN with Attention Mechanism, *Presentation at the 100th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2021.
2. **Li, P.**, Abdel-Aty, M. and Islam, Z, Driving Behavior Detection Using Semi-supervised LSTM and Smartphone Sensors, *Presentation at the 100th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2021.
3. **Li, P.**, Abdel-Aty, M. Using Bus Driving Events as Surrogate Safety Measures for Pedestrian and Bicycle Based on GPS Trajectory Data, *Presentation at the 100th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2021.
4. **Li, P.**, Abdel-Aty. M, Cai, Q, and Islam, Z, Real-time Vehicle Maneuvers Detection Based on Smartphone Sensors and Deep Learning, *Presentation at the 99th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2020.
5. Zhang. R, **Li, P.**, Calculation of External costs of Road and Railway Freight Transportation and Internalization, *Presentation at the 95th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2016.

Under review

1. **Li, P.**, Abdel-Aty. M, 2020. Driving Behaviors Detection Using Semi-supervised LSTM and Smartphone Sensors, *Transportation Research Record*.
2. **Li, P.**, Abdel-Aty. M, and Yuan, J., 2020. Using Bus Driving Events as Surrogate Safety Measures for Pedestrian and Bicycle Based on GPS Trajectory Data, *Accident Analysis and Prevention*.
3. **Li, P.**, Abdel-Aty. M, 2020. Trajectory Fusion-based Real-Time Crash Likelihood Prediction Using LSTM-CNN with Attention Mechanism, *Safety Science*.

Honors and Awards

- Stage III Winner in the USDOT's Solving for Safety Visualization Challenge, U.S. DOT 2019
- UCF College of Graduate Studies Presentation Fellowship, University of Central Florida 2019
- ORC Doctoral Fellowship, University of Central Florida 2018
- Best Undergraduate Thesis, Tongji University 2015

Academic Service

- Reviewer, Accident Analysis and Prevention
- Reviewer, Traffic Injury Prevention
- Reviewer, Journal of Advanced Transportation
- Reviewer, Transportation Research Board

Computer Skills

- Programming Languages: Python, R, some experience with SAS, SQL, and Matlab
- Deep Learning Frameworks: Tensorflow, Keras, Pytorch
- Spatial Analysis: QGIS, ArcGIS
- Traffic Simulation: Sumo, OMNeT++, Veins
- Operating Systems: Unix/Linux, Windows