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., Civil Engineering, August 2018 (expected graduation: April 2021)

SAS Data Mining Certificate, 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

Coursera, Mountain View, USA

Getting Started with AWS Machine Learning, Sep 2020

RESEARCH EXPERIENCE

University of Central Florida, Orlando, FL, USA
Graduate Research Assistant **August 2018 - present**
Advisor: Prof. Mohamed Abdel-Aty

Crash Predictions for Expedited Detection (CPED)

- Developed an ensemble machine learning method for predicting secondary crash.
- Deployed the model in real-time and send results to an interactive website.

Connecting the East Orlando Communities Project-Phase I

- Extracted traffic variables from real-time trajectory data obtained through API.
- Geocoded trajectory data for map matching with road segments.
- Developed deep learning method for predicting crash potential using trajectory data.

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

- Developed a deep learning method to detect driver behaviors using smartphone sensors.
- Deployed the method on an Android smartphone application.
- Designed warning logic to protect the vulnerable road users via smartphone.
- Validated the developed application under different conditions.

Pre-Deployment Study for Connecting the East Orlando Communities Project

- Evaluated safety and mobility at various segments and intersections with crash, traffic detector, and drone video data.

Tongji University, Shanghai, China
Graduate Research Assistant **August 2015 - June 2018**
Advisor: Prof. Rong Zhang

Traffic External Costs Estimation for China

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

Publications

Journals

1. **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* (Accepted).
2. **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*.
3. 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.
4. **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.
5. 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).
6. **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, 2020. Trajectory Fusion-based Real-Time Crash Likelihood Prediction Using LSTM-CNN with Attention Mechanism, *Safety Science*.

Honors and Awards

- UCF College of Graduate Studies Presentation Fellowship, University of Central Florida 2020
- 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, SAS, Matlab
- Deep Learning Frameworks: Tensorflow, Keras, Pytorch
- Geographic Information Systems: QGIS, ArcGIS
- Database Management Systems: SQL, PostgreSQL, MongoDB
- Traffic Simulation: SUMO, OMNeT++, Veins
- Operating Systems: Unix/Linux, Windows