



OU ZHENG

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Summary

Experienced Algorithm Engineer with a demonstrated history of working in traffic safety related research. Has been instrumental in many major projects with our team, including the USDOT award-winning safety system, UCF SST A.R.C.I.S Computer vision system, and FODT ATCMTD Smartphone applications in connected vehicles. Skilled in Python, C++, Distributed Systems, Deep Learning, and Computer Vision. Strong engineering professional with a Master's degree focused on Smart City(Traffic), Computer Vision from the University of Central Florida.

Skills

- Traffic Safety
- Traffic flow theory
- Crash risk prediction
- Programming in python/c++/javascript
- Deep learning(Computer Vision)
- Distributed Computing with Spark
- System architecture design
- Project management
- Complex problem-solver
- Web & App Development.

Experience

University of Central Florida | Orlando, FL
Software Engineer I
05/2020 - Current

- FHWA-Advanced Transportation and Congestion Management Phase II&III
Role: Lead software engineer & CO-PI
Project Description: USDOT's ATCMTD Initiative is an extraordinary opportunity to advance key connection opportunities in East Orlando and the Central Florida region by leveraging local, regional and state resources with federal funds to improve mobility and safety
Duties and responsibilities: Enhancing the software algorithms utilized by ARCIS. And deploy system for FDOT District 5 to accelerate wide-scale adoption of our traffic safety-capabilities in Florida;
- USDOT NOFO **Role: Lead software engineer**
Project Description: uses real-time traffic conditions to estimate the likelihood of a crash at specific locations and help system operators target monitoring of video feeds to identify crashes, deploy first responders, and clear crash scenes more quickly, reducing the probability of secondary crashes occurring at those locations.
Duties and responsibilities: Built service-oriented secondary crash prediction software and platforms using javascript.

University Of Central Florida | Orlando, FL
Computer Vision Research Engineer
12/2019 - 05/2020

- UCF SST A.R.C.I.S(Automatic Road Conflicts Identify platform),
Role: Computer Vision Research Engineer
Project Description: UCF SST A.R.C.I.S(Automatic Road Conflicts Identify platform), a computer vision powered traffic safety diagnostic platform, to boost traffic safety data analytics productivity and research application development by providing precise vehicle trajectory data and vulnerable road user behavior from any traffic-related video.
Duties and responsibilities: Initiated UCF SST A.R.C.I.S(Automatic Road Conflicts Identify platform),Integrate multiple algorithm modules onto UAV Videos to automatic identify road conflicts and conflict type. Developed and maintained our own vision library, including image un-distortion, object RE-ID, bounding box calibration, and video stabilization.
- USDOT Safety Data Initiative(SDI) tool (Real-Time Crash Risk Visualization platform)
Role: Lead software system engineer
Project Description: Real-Time Crash Risk Visualization Tools for Traffic Safety

Management provides real-time crash risk visualizations using integrated tools for traffic safety evaluation and management. Focused on highway safety, the tool will integrate real-time and static data, providing predictive analytics and diagnosing real-time traffic safety conditions. With the user-centered design, the tool uses Artificial Intelligence to suggest real-time interventions and long-term countermeasures to decision-makers and operators and informs the public of zip-code level safety conditions.

Duties and Responsibilities: Responsible for developing, maintain, and administer USDOT SDI tool(Real-Time Crash Risk Visualization platform) and it related computing environments, including computer hardware, front-end, back-end, database, and data filter pipeline.

University Of Central Florida | Orlando, FL
Graduate Research Assistant (Algorithm)
01/2018 - 12/2019

- Develop lead for UCF SST Real-Time Crash Risk Visualization Tools for Traffic Safety Management and won USDOT Solving for Safety Visualization Challenge. Beating out more than 50 other teams including Uber, Ford motor, VHB.
- Applied deep learning and computer vision techniques to extract a vehicle's Trajectories from drone video for the research team to do further analysis.
- Developed smart-phone(ios) based OBU emulator for connected vehicle

Education and Training

University Of Central Florida | Orlando, FL
Ph.D. in Civil Engineering- Transportation
Expected in 12/2022

University Of Central Florida | Orlando
Master of Science in Civil Engineering- Smart City
12/2019

Stetson University | Deland, FL
Bachelor of Science in Computer Science
05/2017

Activities and Honors

- 2019 Prince Michael International Road Safety Awards
- USDOT Solving for Safety Visualization Challenge 1st place
- Green Cross for Safety Award Excellence finalist. National Safety Council
- University of Central Florida Graduate Dean's Fellowship
- University of Central Florida Graduate Presentation Fellowship
- GENE W.MEDLIN Award for Outstanding Senior Research

Publications

- **Zheng, Ou**, "Developing a Traffic Safety Diagnostics System for Unmanned Aerial Vehicles Using Deep Learning Algorithms" (2019). *Electronic Theses and Dissertations, 2004-2019*. 6885.
<https://stars.library.ucf.edu/etd/6885>
- **Zheng, O.**, & ElAarag, H. (2018, April). Simultaneous localization and mapping using UAVs equipped with inexpensive sensors. In *Proceedings of the Communications and Networking Symposium* (p. 1). Society for Computer Simulation International.
- Yue, L., Abdel-Aty, M., Wu, Y., Hasan, S. and **Zheng, O.**, 2020. Identifying pedestrian crash contributing factors using association analysis and their implications for development of active pedestrian safety system. *Transportation research record*, 2674(8), pp.861-874.
- Zhang, S., Abdel-Aty, M., Wu, Y. and **Zheng, O.**, 2020. Modeling pedestrians' near-accident events at signalized intersections using gated recurrent unit (GRU). *Accident Analysis & Prevention*, 148, p.105844.
- Wu, Y., Abdel-Aty, M., Cai, Q., **Zheng, O.**, Zhang, S., 2020. Automated safety diagnosis based on unmanned aerial vehicle videos and deep learning algorithm. Transportation Research Board 99th Annual Meeting, Washington, D.C.
- Wu, Y., Abdel-Aty, M., **Zheng, O.**, Cai, Q., & Yue, L. (2019). Developing a Crash Warning System for the Bike Lane Area at Intersections with Connected Vehicle Technology. *Transportation Research Record*, 0361198119840617.
- Xing, L., He, J., Abdel-Aty, M., Cai, Q., Li, Y., & **Zheng, O.** (2019). Examining traffic conflicts of up stream toll plaza area using vehicles' trajectory data. *Accident Analysis & Prevention*, 125, 174-187.
- Yue, L., Abdel-Aty, M., Wu, Y., **Zheng, O.**, & Yuan, J. (2020). In-depth approach for identifying crash causation patterns and its implications for pedestrian crash prevention. *Journal of Safety Research*.