Xia (Summer) Wang

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SUMMARY

Research experience in Cyber-Physical System, Autonomous Vehicles, Machine Learning, Deep Learning Data Mining and Formal Method. 8 years industry experience in the recommender system algorithm development, auditing, and banking.

EDUCATION

Vanderbilt University | **Ph.D.** in Computer Science   *Aug. 2022-Present*
Shanghai University of Finance and Economics | **M.S.** in Management Science and Engineering   *Sep. 2013-Jul. 2015*
Shanghai University of Finance and Economics | **B.S.** in Information System and Information Management   *Sep. 2008-Jul. 2012*

PUBLICATIONS

Xia Wang*, Ziyan An*, Taylor T. Johnson, Jonathan Sprinkle, Meiyi Ma, *Runtime Monitoring of Accidents in Driving Recordings with Multi-Type Logic in Empirical Models*, 23rd International Conference on Runtime Verification (RV'2023).

Xia Wang*, Sobenna Onwumelu, Jonathan Sprinkle, *Using Automated Vehicle Data as a Fitness Tracker for Sustainability*, 4th IEEE Forum for Innovative Sustainable Transportation Systems.

Xia Wang*, Anda Liang, Jonathan Sprinkle, Taylor T. Johnson, *Robustness Verification for Knowledge-based Logic of Risky Driving Scenes*, the 6th international workshop on "Design Automation for CPS and IoT (DESTION 2024), in processing.

Alex Richardson, **Xia Wang**, Abhishek Dubey, Jonathan Sprinkle, *Reinforcement Learning with Communication Latency with Application to Stop-and-Go Wave Dissipation*, 35th IEEE Intelligent Vehicles Symposium (IV 2024), in processing.

Jonathan Lee*, **Xia Wang**, et al., *Traffic Control via Connected and Automated Vehicles: An Open-Road Field Experiment with 100 CAVs*, IEEE Control Systems Magazine (CSM), in processing.

PROFESSIONAL EXPERIENCE

Research assistant, Institute for Software Integrated Systems, Vanderbilt University, Nashville, TN   *Aug. 2022-Present*
- Acted as a student researcher in project of CIRCLES, and participated in the 100 AI-powered cruise control cars experiment.

Business Counselor, Biaoguo Technology, Chengdu, China   *May 2022-Jul. 2022*
Algorithm Engineer, Full Truck Alliance, Shanghai, China   *Mar. 2021-May 2022*
- Conducted recommender system project with agile development workflow using Java, Hive Redis and ES.

Internal Auditor, Lufax Holding Ltd., Shanghai, China   *Nov. 2017-Mar. 2021*
- Primary job responsibility includes building internal risk control ML models, developing visual management interface, IT auditing and inspecting high risk matters, using Hive, Python, SQL and Tableau.

Project Manager, Shanghai Pudong Development Bank, Shanghai, China   *Nov. 2015-Nov. 2017*
Cloud Consultant Intern, Microsoft, Shanghai, China   *Jul. 2014-Nov. 2014*
Software Engineer, ecSolutions Corporation Ltd., Shanghai, China   *Jul. 2012-Apr. 2013*

SELECTED PROJECTS

Study of the Effect of Communication Latency in Stop-and-Go Wave Dissipation   **GitHub** | *Oct. 2023-Dec. 2023*
- Implemented RL and PI Saturation (non-RL) controller to show stop-and-go wave dissipation effect versus the Intelligent Driver Model (IDM) scenario in SUMO simulator, further introduced communication latency to such system to test the influence.

Interpretable Finite State Machine based Controller: A Case Study on Lane Merge Yield Mode   **GitHub** | *Oct. 2023-Dec. 2023*
- Deployed a merge yield controller using MATLAB/Simulink, and implemented in a Raspberry Pi to run in a real car.

Using Automated Vehicle Data as a Fitness Tracker for Sustainability   **GitHub** | *Jul. 2023-Oct. 2023*
- Decoded CAN bus data of AVs using Strym, and created a dashboard showing metrics of safety, comfort and fuel efficiency.

Runtime Monitoring of Accidents in Driving Recordings   *Apr. 2023-Jun. 2023*
- Proposed a system to detect accidents in dashcam videos. Utilized a pre-trained YOLOv3, DenseNet-201 to extract high-level time-series features, and leveraged frame difference features to capture the dynamic of the driving videos.
- Implemented a pre-trained ResNet-18 weights as the image embedding extractor, and concatenated such embeddings with high-level contextual abstraction. Used a batch normalization with ReLU activation in last layer to detect the occurrence of accidents.
- Utilized Higher Order Logic (HOL) and Signal Temporal Logic (STL) specifications to improve the anomaly detection performance.

Robustness Verification for Knowledge-Based Logic of Risky Driving Scenes   **GitHub** | *Feb. 2023-May 2023*
- Extracted knowledge-based logic that defines risky driving formats from large-scale public transportation accident using tree-based models, and deployed robustness verification on the tree-based models under multiple parameter combinations.

Analyzing Fairness in Medical Image Representations   *Oct. 2022-Dec. 2022*
- Analyzed unfairness in medical diagnosis based on image presentations using ResNet-18 and Visual Transformers (ViT).
- Utilized the image representations to conduct diagnose and sensitive attribute prediction using a fully connected MLP and CNN.

News Recommendation System, Vanderbilt University   **GitHub** | *Mar. 2023-May 2023*
- Conducted data pre-processing using NLP methods such as CountVectorize, TF-IDF, and N-grams on News Category Dataset.
- Generated reading records using K-means. Deployed XGBRegressor, KNN and NN recommenders, and evaluated MSE and RMSE.

S&CC-VO and CPS-VO Development and Management, Vanderbilt University   *Dec. 2022-Present*
- Designed user cases and developed functions on S&CC-VO and CPS-VO, using UML and Drupal.

TECHNICAL SKILLS

ML & Statistic Analysis Skills: CV, NLP, DL, ML, A/B Testing, Data Visualization, Database Management, Business Analytics
Programming Languages: Python (PyTorch, TensorFlow, Scikit-learn, Matplotlib), SQL, MATLAB, C++, Java
Platform & Tools: Jupyter, Git, Linux, MYSQL, Tableau, ITK-SNAP, Slicer, LaTeX, Microsoft office