Wei Guo

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EDUCATION

George Washington University, Washington, DC   July 2019 - May 2023
  Ph.D. in Computer Science
  Advisor: Dr. Peng Wei, Dr. Robert Pless
University of Virginia, Charlottesville, VA   Aug. 2016 - Dec. 2018
  M.E. in Computer Engineering
East China Normal University, Shanghai, China   Sept. 2012 - May 2016
  B.S. in Statistics

INDUSTRY EXPERIENCE

Amazon, Seattle, WA   May 2022 - Aug. 2022

Applied Scientist Intern

- Developed an end-to-end deep learning model for anomaly detection.

- Conducted extensive feature engineering to ensure model reliability and robustness.

- Collaborated with cross-functional teams to integrate model into company system.

eBay, Shanghai, China   Apr. 2016 - Aug. 2016

Data Analyst Intern

- Designed, tracked, and evaluated a large-scale seller promotion program.

- Provided analyses by composing complex SQL queries from large data warehouses.

RESEARCH EXPERIENCE

George Washington University, Washington, DC   July 2020 - present

- Performed research on safe and trustworthy deep reinforcement learning for multiple agents. A demo is available here.

- Developed an explainable deep reinforcement learning model for autonomous collision avoidance systems. A demo is available here.

- Designed a safety validation framework for deep reinforcement learning models based on a novel multi-agent formulation. A demo is available here.

- Designed and implemented safe real-time motion planning and collision avoidance algorithms for autonomous aircraft in crowded and uncertain environments.

- Leading a technical task in a \$2.5M NASA project of developing in-time learning-based aviation safety management system (ILASMS) for scalable advanced air mobility (AAM) operations.

- Developing model-based partially observable Markov decision process (POMDP) algorithm and codebase with offline deep reinforcement learning.

George Washington University, Washington, DC   Aug. 2019 - June 2020

- Designed and implemented two algorithms to detect the semantic biases in static word embeddings.

- Designed a novel measurement of semantic bias in contextualized word embedding and constructed experiments to validate the algorithm in Elmo, Bert, GPT and GPT-2. The codebase is here.

University of Virginia, Charlottesville, VA   Jan. 2018 - June 2018

- Designed algorithms for the thermal spray operation agent with Deep Reinforcement Learning.

- Built the simulation environment for thermal spray operation agent and implemented the algorithm.

PUBLICATIONS

Conference Publications

1. **W. Guo**, P. Wei, "Explainable Deep Reinforcement Learning for Aircraft Separation Assurance", Digital Avionics Systems Conference (DASC), Portsmouth, VA, Sept. 2022. **Best of session award.** [Link]

2. **W. Guo**, M. Brittain, P. Wei, "Safety Enhancement for Deep Reinforcement Learning in Autonomous Separation Assurance", IEEE Intelligent Transportation Systems Conference (ITSC), Indianapolis, IN, Sept. 2021. [Link]

3. **W. Guo**, A. Caliskan, "Detecting Emergent Intersectional Biases: Contextualized Word Embeddings Contain a Distribution of Human-like Biases", AAAI/ACM Conference on AI, Ethics, and Society (AIES), virtual conference, May 2021. [Link] [Oral Presentation]

4. E. L. Thompson, A. G. Taye, **W. Guo**, P. Wei, M. Quinones-Grueiro, I. Ahmed, G. Biswas, J. Quattrociocchi, S. Carr, U. Topcu, J. Jones, M. Brittain, "A Survey of eVTOL Aircraft and AAM Operation Hazards", AIAA AVIATION 2022 Forum, Chicago, IL, Jun. 2022. [Link]

5. A. Toney, A. Pandey, **W. Guo**, D. Broniatowski, A. Caliskan, "Automatically Characterizing Targeted Information Operations Through Biases Present in Discourse on Twitter", International Conference on Semantic Computing (ICSC), virtual conference, Jan. 2021. [Link]

Journal Publications

6. **W. Guo**, Y. Zhou, P. Wei, "Exploring Online and Offline Explainability in Deep Reinforcement Learning for Aircraft Separation Assurance", *Frontiers in Aerospace Engineering*: 1–14, 2022.

7. **W. Guo**, K. Wang, "Analysis on the Satisfaction of Farmers to the Construction of High Standard Farmland in 12th Five-year: Case of a Town in Shanghai City", *Journal of Agrotechnical Economics*: 39–45, 2016.

Preprints

8. P. Razzaghi, A. Tabrizian, **W. Guo**, S. Chen, A. Taye, E. Thompson, A. Bregeon, A. Baheri, P. Wei, "A Survey on Reinforcement Learning in Aviation Applications", 2022. [Link]

9. A. Toney, A. Pandey, **W. Guo**, D. Broniatowski, A. Caliskan, "Pro-Russian Biases in Anti-Chinese Tweets about the Novel Coronavirus", 2020. [Link]

Doctoral Thesis

10. **W. Guo**, "Safe and Trustworthy Deep Reinforcement Learning for Aircraft Separation Assurance", Ph.D. dissertation, Department of Computer Science, George Washington University, Feb. 2023. [Link]

Submitted Works

11. **W. Guo**, M. Brittain, P. Wei, "Validating a Multi-Agent Reinforcement Learning Based Aircraft Separation Assurance System with Adaptive Stress Testing", ACM SIGKDD Conference on Knowledge Discovery and Data Mining (under review), 2023.

AWARDS

Best Paper of Session Award, DASC 2022, USA	2022
Outstanding Undergraduate Graduate Thesis, Shanghai, China	2016
Outstanding winner for 17th East China Cup College Students Mathematical Modeling Contest, Shanghai, China	2015
Scholarship for Academic Excellence, Shanghai, China	2015

SKILLS

Deep Learning, Reinforcement Learning, Natural Language Processing, Fraud Detection, Anomaly Detection

Python (TensorFlow, PyTorch), Java, SQL, AWS, LaTeX, Scala, HTML, JavaScript, R, Matlab

SELECTED COURSEWORK

Machine Learning	Reinforcement Learning
Convex Optimization	Autonomous Mobile Robots
Data Mining	Multivariate Statisticsl
Regression Analysis	Time Series
Mathematical Statistics	Probability Theory
Computer Vision (online)	Deep Learning (online)