

Zheng Zhang

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EDUCATION

2021 - 2024	Ph.D. (Computer Science) at Auburn University	(GPA: 4.0/4.0)
2016 - 2018	M.S. (Computer Science) at Auburn University	(GPA: 3.7/4.0)
2012 - 2014	M.S. (Electrical Engineering) at New Jersey Institute of Technology	(GPA: 3.5/4.0)

RESEARCH AREA

- Natural Language Processing
- Deep Learning
- Machine Learning
- Bioinformatics

WORK EXPERIENCE

Assistant Professor - Murray State University 08/2024 - present

– Teaching Advanced Machine Learning, Artificial Intelligence, Discrete Structure.

Graduate Research Assistant - Auburn University 08/2021 - 05/2022

- TIDES: Trustworthy Interactive DEcision-making Using Symbolic Planning. [Link](#)
Our research aims to develop new algorithms for real-world applications in fields like robotics and healthcare, focusing on explainable, data-efficient reinforcement learning. It includes a hierarchical decision-making framework, an explainable policy-search framework integrating logic programming, and improved risk-sensitive policy search methods. The theoretical goal is to enhance data-driven policy search in interactive systems through trust-based theory.
Supervisor: Dr. Bo Liu, Dr. Levent Yilmaz Python Prolog CaptionGAN ∂ILP

Graduate Research Assistant - Auburn University 05/2018 - 08/2019

- Drivers' status estimation in automated driving mode. South Korea Electronics and Telecommunications Research Institute (ETRI) Research Grant - 18TLRP-B131486-02.
I am leading the project that delves into autonomous driving, with a specific focus on evaluating driver readiness in Level-3 autonomy through a unique Inference Architecture. This architecture consists of three models: Behavior, Inference, and Cognition. The Behavior Model is responsible for classifying driver behavior, the Inference Model for predicting potential states, and the Cognition Model for determining driver readiness. Our model improves the safety and reliability of autonomous vehicles by facilitating informed decision-making in critical situations.
Supervisor: Dr. Bo Liu, Dr. Hari Narayanan Python VGG LSTM Sklearn

Graduate Research Assistant - Auburn University 08/2018 - 12/2018

- Auburn PAIR program - A Prototype Framework of Climate Services for Decision Making. [Link](#)
I lead a data analysis team using modules to download, aggregate, and manage daily GRB files from the Global Forecast System into netCDF format for future forecasting. The project aims to analyze new climate and remote sensing data, enhance models for environmental and health simulations, and create a user-friendly platform for data sharing.
Supervisor: Dr. Bo Liu, Dr. Di Tian Pandas Numpy Sklearn netCDF4

- Experienced Machine Learning Engineer specialized in developing advanced Question Answering (QA) Systems. Proficient in end-to-end system development, from requirement analysis to deployment. Skilled in data preprocessing, feature engineering, and leveraging traditional machine learning models like XGBoost and Random Forest, and state-of-the-art models like BERT and GPT. Demonstrated ability to optimize models for real-world scenarios, ensuring unbiased, user-friendly, and scalable solutions. Collaborated closely with domain experts, software engineers, and UX designers to deliver high-quality QA systems. Committed to continuous learning, ethical AI practices, and integrating user feedback for system refinement. Strong documentation and communication skills, ensuring clarity and reproducibility in all projects.

BERT GPT XGBoost Random Forest Pytorch Scikit-learn

Web Designer - Inner Mongolia Irrigation Center, China

03/2014 - 06/2016

- Skilled web developer with expertise in both frontend and backend website design. Proficient in creating responsive and user-friendly interfaces, ensuring seamless user experiences. Demonstrated ability in backend infrastructure development, ensuring optimal site performance and security. Adept at data maintenance, ensuring data integrity and accuracy. Proactive in conducting regular website updates, keeping content fresh and relevant. Committed to delivering high-quality web solutions that meet client needs and drive user engagement. Detail-oriented with a strong focus on delivering consistent and reliable web platforms.

HTML CSS JavaScript PHP Node.js

PUBLICATIONS

1. Amit Das, Mostafa Rahgouy, Dongji Feng, **Zheng Zhang**, Tathagata Bhattacharya, Nilanjana Raychawdhary, Fatemeh Jamshidi et al. (2024). OffensiveLang: A Community Based Implicit Offensive Language Dataset. *IEEE Access*.
2. Liu, Li, Lu Han, Kaiyuan Han, **Zheng Zhang**, Haojiang Zhang, and Lirong Zhang (2024). Identification of co-localised transcription factors based on paired motifs analysis. *IET Systems Biology*.
3. Ren, Jun, Zhiling Guo, Yixuan Qi, **Zheng Zhang**, and Li Liu. Prediction of YY1 loop anchor based on multi-omics features. *Methods* 232 (2024): 96-106.
4. Amit Das, **Zheng Zhang**, Najib Hasan, Souvika Sarkar, Fatemeh Jamshidi, Tathagata Bhattacharya, Mostafa Rahgouy, Nilanjana Raychawdhary, Dongji Feng, Vinija Jain, Aman Chadha, Mary Sandage, Lauramarie Pope, Gerry Dozier, Cheryl Seals (2024). Investigating Annotator Bias in Large Language Models for Hate Speech Detection. *Neurips Safe Generative AI Workshop 2024*.
5. Longwei Wang, Aashish Ghimire, KC Santosh, **Zheng Zhang**, Xueqian Li (2024). Enhanced Robustness by Symmetry Enforcement. *IEEE Conference on Artificial Intelligence Practical Deep Learning Workshop 2024*.
6. Zhaoyue Zhang, **Zheng Zhang**, Xiucui Ye, Yasunori Futamura, Tetsuya Sakurai, Hao Lin (2024). iLoc-lncRNA-BERT: A BERT-based model for the prediction of lncRNA subcellular localization in Homo sapiens. *International Journal of Biological Macromolecules*.
7. **Zheng Zhang**, Amit Das, Mostafa Rahgouy, Yida Bao, Sanjeev Baskiyar (2023). Multi-Label Classification of CS Papers Using Natural Language Processing Models. *International Conference on Machine Learning and Applications* (acceptance rate: ~25%).
8. **Zheng Zhang**, Liangliang Xu, Yida Bao, Sanjeev Baskiyar (2023). Towards the Diagnosis of Heart Disease Using an Ensemble Learning Approach. *International Conference on Machine Learning and Applications* (acceptance rate: ~25%).
9. **Zheng Zhang**, Levent Yilmaz, Bo Liu (2023). A Critical Review of Inductive Logic Programming Techniques for Explainable AI. *IEEE Transactions on Neural Networks and Learning Systems*. (Impact factor: 10.5).
10. Amit Das, Mostafa Rahgouy, **Zheng Zhang**, Tathagata Bhattacharya, Gerry Dozier, Cheryl D. Seals (2023). Online Sexism Detection and Classification by Injecting User Gender Information. *In The IEEE International Conference on Artificial Intelligence, Blockchain, and Internet of Things*.
11. Yizhi Cui, Hongzhi Liu, Yutong Ming, **Zheng Zhang**, Li Liu, Ruijun Liu (2023). Prediction of strand-specific and cell-type-specific G-quadruplexes based on high-resolution CUT&Tag data. *Briefings in Functional Genomics* (Impact factor: 4.8).

REVIEWER

- **UAI**: Conference on Uncertainty in Artificial Intelligence 2021-2023
- **ICMLA**: International Conference on Machine Learning and Applications 2021-PRESENT
- **TNNLS**: IEEE Transactions on Neural Networks and Learning Systems
- **TITS**: IEEE Transactions on Intelligent Transportation Systems
- **TII**: IEEE Transactions on Industrial Informatics
- **THMS**: IEEE Transactions on Human-Machine Systems
- **CogMI**: IEEE Conference on Cognitive Machine Intelligence

PROJECTS

Network Intrusion Detection System 08/2022 - Present [Github](#)

- Proposed heterogeneous ensemble deep architecture combining a 1D Convolutional Neural Network, FT-Transformer, and XGBoost for network intrusion detection. The optimized ensemble model reports **SOTA results** on various network intrusion detection benchmark datasets. [XGBoost](#) [Transformer](#) [CNN](#)

An Inference Architecture for Drivers' Status Estimation in L3 Driving Mode 05/2018 - 08/2019 [Github](#)

- Led the development of three interconnected models - Behavior Model, Inference Model, and Cognition Model, to ensemble a deep learning-based architecture for estimating drivers' status in automated driving mode. [Python](#) [VGG](#) [LSTM](#)

End-to-end Neural-Symbolic Reinforcement Learning 09/2019 - 09/2022 [Project](#), [Github](#)

- The model integrates policy gradient methods and differentiable inductive logic programming with CaptionGAN in a Neural-Symbolic Reinforcement Learning framework, offering enhanced interpretability and generalizability in supervised tasks. [Python](#) [Prolog](#) [CaptionGAN](#) [\$\partial\$ ILP](#) [Reinforcement Learning](#) [Explainable AI](#)

Auburn PAIR program 08/2018 - 12/2018 [Project](#), [Github](#)

- The prototype framework for climate services aims to enhance decision-making by consolidating and exploring climate and remote sensing datasets. It focuses on improving models for hydrology, water quality, crop growth, and disease transmission. The interactive platform integrates input from scientists and stakeholders for effective data dissemination. [Pandas](#) [Numpy](#) [Sklearn](#) [netCDF4](#)

Pfogsim 2022 - Present [Github](#)

- A new simulator designed for large-scale fog networks, enabling testing of various fog computing configurations across extensive geographical areas. It supports multi-layered environments, differing from traditional single or two-layered designs, and accommodates fog nodes and network links of various capacities. This tool addresses the gap in simulating realistic, large fog networks. [Java](#) [MATLAB](#)

TEACHING EXPERIENCE

Teaching Assistant - Auburn University

- COMP1210, Fundamentals of Computing (Java) 01/2023 - 05/2023
- COMP3270, Introduction to Algorithms 01/22 - 05/22, 08/22 - 08/23
- COMP3350, Comp. Organization and Assembly Language 05/23 - 12/23
- COMP6120, Database Systems 05/23 - 08/23
- COMP6130, Data Mining 01/22 - 05/22
- COMP6600, Artificial Intelligence 08/21 - 12/21
- COMP3240, Discrete Structures 01/24 - 05/24

Guest Lecturer - Auburn University

- COMP3240, Discrete Structures 01/24 - 05/24

TEACHING INTEREST

- **Basic**

Fundamentals of Computing, Introduction to Computing (Java, Python, C, MATLAB), Formal Languages, Data Structure, Database Systems

- **Intermediate**

Principles of Programming Languages, Introduction to Algorithms, Object-Oriented Programming Languages (JAVA, Python), Web Application Development, Computational Biology

- **Advance**

Artificial Intelligence, Machine Learning, Deep Learning, Data Mining, Computational Statistics, Experimental Statistics

SKILLS

- **Language:** English, Mandarin(native)

- **Programming Language:** Python, Java, JavaScript, R, and C

- **Deep Learning framework:** Pytorch, Huggingface, Tensorflow, Fastai

- **Python Library:** Numpy, Pandas, NLTK, Scikit-learn, SciPy, Statsmodels, OpenCV, Matplotlib, Seaborn

TALKS AND SERVICES

- Presented my paper “Multi-Label Classification of CS Papers Using Natural Language Processing Models” at IEEE-ICMLA conference 2023.

- Presented my paper “Towards the Diagnosis of Heart Disease Using an Ensemble Learning Approach” at IEEE-ICMLA conference 2023.

- Presented our paper “Online Sexism Detection and Classification by Injecting User Gender Information” at IEEE-AIBThings conference 2023.

- Served as an E-Day Volunteer for prospective Ph.D. students (Spring 2022 - Present).

- Served as a volunteer for Auburn Engineering Together Day (Spring 2022 - Present).

- Presented my project “An Inference Architecture for Drivers’ Status Estimation in L3 Driving Mode”, Auburn Graduate Student Research Symposium, 2018.

CERTIFICATIONS

- [Applications of AI for Anomaly Detection](#) | Nvidia

GAN XGBoost Autoencoder

- Deep Learning Specialization | Coursera

Deep Learning Hyperparameter Optimization CNN Sequence Models

REFERENCES

- **Dr. Sanjeev Baskiyar:** Professor, Auburn University baskisa at auburn.edu

- **Dr. Xiao Qin:** Alumni Professor, Auburn University xqin at auburn.edu

- **Dr. Cheryl Seals:** Charles W. Barkley Professor, Auburn University sealscd at auburn.edu

- **Dr. Longwei Wang:** Assistant Professor, University of South Dakota Longwei.Wang at usd.edu

More available upon request