Zhengguang Wang

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Summary

- **Languages:** Bilingual in English and Chinese, Intermediate French
- **Programming Languages:** Python, Java, C, R, x86 assembly language; HTML/CSS/Javascript
- **Relevant Packages:** PyTorch, Transformers, Pandas, Scikit-learn, Django, Flask
- **Research Interest:** Natural Language Processing, Explainable Deep Learning and Sensitivity Analysis
- **Personal Website:** https://zhengguangw.github.io/

Education

University of Virginia | Major in *Computer Science* and *Statistics* Graduation Date: Expected May 2024
Echols Scholar at the University of Virginia (top 5% at UVA), GPA 3.895/4.0, GRE 329/340

Research Experience

Information and Language Processing Lab | *CS Department, UVA* June 2023-
Research: *Consistency of Large Language Models' Political Leaning and Reliable Text Summarization*

- Applied Selenium and Beautifulsoup to scrape news headlines from Allsides, Breitbart, and the DailyBeast; queried OpenAI API with headlines and designed prompts with both GPT 3.5-turbo and GPT 4
- Used Pytorch and Transformers package to fine-tune a DistillBERT to classify the GPT outputs on UVA Rivanna HPC GPU, then applied Spearman rank test to calculate consistency of GPT outputs across prompts
- Applied LoRA method to fine-tune a Llama-7b for text summarization; plan to integrate Statistical NLP ideas such as POS tagging to reduce hallucination
- Involved in the ILP group effort to build a LLM Parameter Efficient Fine Tuning (PEFT) codebase

UVA-MLSys | *CS Department, UVA* June 2023-
Research: *Consistency and Performances of Perturbation-based Sensitivity Analysis Methods*

- Prepared the presentation of *Global Pervasive Computational Epidemiology (GPCE) Interpreting County-level Covid Infections using Deep Learning for Time Series* for IEEE ICDH'23; won the third prize
- Led a team to build an interactive project website with an embedded U.S. county map with Javascript D3 in which user could click on counties to compare ground truth and model predictions
- Submitted a Workshop paper *"Interpreting Time Series Transformer Models in Multi-Horizon COVID-19 Infection Forecasting and Age Sensitivity Analysis"* as a coauthor; conducted sensitivity analysis using methods like feature ablation and integrated gradients and trained time-series deep learning models for benchmarking
- Submitted a research statement "*Evaluation of Interpretability Methods for Time-Series Deep Learning with Sensitivity Analysis*" to AAAI'24 Undergraduate Consortium

Teaching Experience

Data Science Teaching Assistant | *Statistics Department, UVA* | Charlottesville, Virginia Aug 2022-Dec 2022
Teaching Machine Learning Algo, KNN classification, A/B Testing, Regression, and simulation in Python

- Held Office Hour twice per week to help students with statistical concepts (A/B Testing, sampling, unbiased estimator, type I error, etc.); assisted in lectures twice per week by answering in-class questions
- Taught data wrangling, control-flow, functions, and objects in Python

Professional Experience

Analyst Intern | *Local Energy Alliance Program* | Charlottesville, Virginia Jun 2022-Aug 2022
Web-Scraping with Python Selenium and Mapping with ArcGIS; Cleaning 7-year Solarize Program Data

- Used Python Pandas package to merge and tidy the 7-year Solarize Program Data; wrote Selenium scripts to retrieve county names and geographical coordinates from customers' addresses
- Utilized ArcGIS and geocoding to generate four interactive maps of LEAP sites in Virginia; conducted geo-spatial analysis and presented the finding to the Executive Director

Economic Analyst Intern | *China Minmetals Corporation* | Beijing, China Jun 2021-Aug 2021
Identifying Merger & Acquisition (M&A) pattern by conducting Time-Series and Hypothesis testing

- Accessed the S&P Database to retrieve M&A metadata such as case time, monetary amounts, minerals, locations; employed Python Pandas and Excel V-Lookup to clean data; made visualizations and numerical summaries to examine the spatial-temporal pattern; analyzed different countries' preferences in M&A
- Illustrated the global comparisons on a world map using Python Pyechart then compiled the findings and published a 16-page report on the monthly publication of Economic Research Institute

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Publications

- Evaluation of Interpretability Methods for Time-Series Deep Learning with Sensitivity Analysis
  Zhengguang Wang
  AAAI'24 Undergraduate Consortium, Feb.2024
- Interpreting Time Series Transformer Models and Sensitivity Analysis of Population Age Groups to COVID-19 Infections
  Md Khairul Islam, Tyler Valentine, Timothy Joowon Sue, Ayush Karmacharya, Luke Neil Benham, **Zhengguang Wang**, Kingsley Kim, Judy Fox
  AAAI'24 Workshop AI4TS:AI For Time Series Analysis, Feb.2024