Luo Fuming (Calvin)

Undergraduate Student

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Education

- **Oxford Brookes University** *September 2021 - Present*

  BSc (Hons) Software Engineering
  - **GPA: 3.94/4.00**
  - Joint degree program with Chengdu University of Technology (CDUT) and Oxford Brookes University (OBU).

Research Projects

- **Diffusion Based Recommendation System with Federated Learning**

  Research Assistant *July 2024 - Present*
  - Extended the Collaborative Diffusion Generative Model (CODIGEM) to a federated learning setup, enabling privacy-preserving and distributed recommendations.
  - Utilized the Flower framework to implement federated training, allowing collaborative learning across multiple clients while ensuring data privacy.
  - Designed client-specific diffusion models to handle heterogeneous user-item interaction data and aggregated updates to maintain model consistency across federated rounds.
  - Conducted comprehensive experiments, demonstrating that the federated CODIGEM version retains its superior recommendation performance while achieving privacy compliance and computational efficiency.
  - Optimized communication strategies and federated learning hyperparameters to minimize performance degradation from data heterogeneity and network latency.

- **Performance Analysis and Feature Selection in Predictive Models for Myocardial Infarction Complications**

  Research Assistant *September 2024 - November 2024*
  - Evaluated the performance of 10 machine learning models (Support SVM, LR, KNN, DT, RF, GNB, AdaBoost, Bagging, Stacking, and Voting Classifiers).
  - Achieved the best performance using the Stacking Classifier, which achieve Accuracy of 93.33%, F1-score of 93.31%, and an impressive AUROC of 99.34%.
  - Implemented three state-of-the-art feature selection methods to optimize input variables: Recursive Feature Elimination (RFE), Boruta, and Lasso Regression.
  - Implemented single and integrated dimensional reduction technology: PCA, LDA and FA.
  - Applied SHAP (SHapley Additive exPlanations) to interpret model predictions, identify key features that impact classification outcomes, and improve model transparency.

- **Anomaly Detection Based Intrusion Detection System Using Deep Autoencoder**

  Research Assistant *January 2024 - June 2024*
  - Trained a single deep autoencoder model on the CICIDS 2017 dataset for intrusion detection, achieving Recall with 97.8%, Precision:96.6% and F1 score:97.2%.
  - Explore the impact of autoencoder hidden layer and parameter input on the performance of the detection system. Find that using 5 hidden layers, a bottleneck layer of 8 neurons, and using 68 features can get the best results.
  - Evaluated the model using semi-supervised learning techniques, leveraging benign traffic for training and reconstruction error thresholds for anomaly detection.
  - Investigated the role of feature selection in improving detection metrics while maintaining robustness against unseen attacks.

- **Auto labeled Based Sentiment Analysis Dataset in Education**

  Research Assistant *March 2023 - October 2023*
  - Crawled over 9 million English reviews from Udemy, Coursera, and YouTube by using the selenium and API and then create a sentiment analysis dataset.
  - Leveraged 12 popular sentiment analysis models from Hugging Face to auto-label the dataset, generating sentiment scores.

Experience

- **Sichuan Huadi Information Technology Co., Ltd.** *January 2023 - March 2023*
  Backend Development Intern Chengdu, China
  - Developed a robust user authentication system using Django's built-in features, integrating OAuth for secure third-party login options.
  - Implemented payment gateway integrations, including WeChat Pay and AliPay, to streamline online ticket sales.
  - Designed and built RESTful APIs with Django Rest Framework (DRF), enabling seamless external integrations with third-party services.
- **Chengdu Chuanxing Tech Ltd.** *June 2022 - September 2022*
  DevOps Intern Chengdu, China
  - Optimized database schemas by identifying inefficiencies, redesigning tables, and refining relationships, resulting in improved data management and system scalability.
  - Maintained and monitored IT infrastructure by conducting server inspections, applying updates, and ensuring that the ERP system is running properly, significantly reducing downtime and enhancing operational productivity.
  - Utilized server remote management tools to monitor server performance, diagnose hardware issues, and implement timely fixes, ensuring system reliability and reducing operational disruptions.
  - Leveraged Docker to containerize infrastructure monitoring tools and services, streamlining deployment, ensuring consistent configurations, and simplifying updates across the server infrastructure.

Skills

- **Data Science & Machine Learning:** Pytorch, Tensorflow, Flower, scikit-learn, Pandas, Numpy, Keras, Matplotlib, Seaborn, Hugging Face, LangChain
- **Programming Languages:** Python, Java, C++, C, JavaScript
- **Web Technologies:** Django, Flask, React, Node.js
- **Database Systems:** MySQL, MongoDB, SQLite, PostgreSQL
- **DevOps & Version Control:** Jira, Git
- **Research:** Latex, Zotero

References

1. **Joojo Walker**
   Senior Lecturer and Level Head, Computer Science and Software Engineering Department
   Oxford Brookes University and Chengdu University of Technology
   Email: joojo.walker@zy.cdut.edu.cn
   Relationship: Supervisor