Zhuozhuo MAO

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Education

- **Waseda University** — Kitakyushu, Japan
  M.Eng. in Information, Production and Systems Engineering — *Sep 2022 - Sep 2024 (Expected)*
  Courses: *Bioinformatics, Biological Information Engineering, Machine Learning, Neural Networks, Design of Heuristic Search and its Application, Big Data Analysis and Security*

- **Sichuan University** — Chengdu, China
  B.Eng. in Cybersecurity — *Sep 2018 - Jun 2022*
  Courses: *Discrete Mathematics, Probability Statistics, Data Mining for Cybersecurity, Big Data Analysis and Privacy Protection, Applied Cryptography, Introduction to Artificial Intelligence*

Project / Research Experience

- **Deconvolution of Various Cellular Contents from BulkRNA-seq and ScRNA-seq** — Kitakyushu, Japan
  Advisor: Prof. Junko TAKAHASHI — *Sep 2023 - Present*
  - **Duties included:**: Dataset collection and quality control, generating reference gene expression matrix for deconvolution, simulating the generation of BulkRNA datasets, and evaluating the performance of different deconvolution methods.

- **Genomic DNA qPCR Analysis to Assess the Amount of Human and Mouse Tissue Present in Tumor Xenografts** — Kitakyushu, Japan
  Advisor: Prof. Junko TAKAHASHI — *Aug 2023 - Present*
  - **Gene Screening**: Identifying chromosomal regions that do not often occur in human diseases, selecting only genes that code for proteins, filtering out complementary genes, and ensuring that the selected genes are highly specific.
  - **Primer Design**: Considering that exons are less prone to mutation than introns, placing an amplicon sequence in one exon of a gene is preferred to improve the reliability of the results.

- **Research on the Description and Discovery of Network Virtual Resources** — Chengdu, China
  Advisor: Assoc. Prof. Shuhua RUAN — *Dec 2021 - Apr 2022*
  - **Data Collection**: A crawler capable of comprehensive and efficient data collection is implemented, and a user feature discrimination criterion is proposed for manual tagging to improve the dataset.
  - **Feature Extraction**: A total of twenty features are proposed in four categories: basic features, behavioral features, content features, and temporal features, which can better describe and distinguish these users.
  - **Methodology**: A new deep neural network model is designed to achieve effective discovery of abnormal users by combining DenseNet, BiLSTM and Attention Mechanism, which has a performance under data sets of different sizes and balances, and can be accurately and well used for the discovery of virtual users.

- **Development of a Predictive Model for Determining the Spatial Trajectory of Mobile Objects Based on Motion Patterns** — Chengdu, China
  Advisor: Assoc. Prof. Jin YANG — *Sep 2020 - Dec 2020*
  - **Methodology**: Propose a method based on Bidirecitonal-LSTMs + Markov hybrid model for the moving object location prediction problem.
  - **Optimization**: The gradient-based optimization algorithm, the adam algorithm, the overall performance of it is relatively better. Markov mainly corrects the results predicted by BiLSTMs, and the first-order Markov model is used.
  - **Result**: Experimental findings indicate that BiLSTMs show improved moving path prediction accuracy, which further improves after applying the Markov model correction. The error is only half the original. This results in significantly enhanced prediction precision and reliability.

Work Experience

- **Base for information security throughout the country** — Chengdu, China
  Internship — *Jun 2021 - Jul 2021*
  - **Duties included:** : Use SpringBoot framework to realize WEB modular development, and build a server platform for baseline verification. Python was used to complete the development of baseline configuration verification system and realize the automatic detection of unsafe configuration of Windows system

Skills Summary

- **Languages**: Proficient in Python, R, familiar with C, Java
- **Operating Systems**: Proficient in Windows and Linux environments
- **Softwares**: Proficient in Microsoft Office, Markdown, familiar with LaTeX, Git
- **Machine Learning**: Experienced in diverse ML algorithms and deep learning frameworks

Extracurricular Activities

- **Epidemic Prevention and Control Headquarter** — Korla, China
  Volunteer — *Feb 2020 - Mar 2020*
  - **Duties included:** : Took on the responsibility of meticulously verifying and cross-referencing information to ensure its accuracy, followed by proficiently executing the process of data dissemination and seamless integration into relevant systems