Ruyi Zhang

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EDUCATION

MSc Robotics (Ongoing) Sep. 2023 – Sep. 2024
University of Manchester Manchester, U.K

- **Relevant modules**: Autonomous Mobile Robots, Robotic Systems Design Project, Robotic Systems, Robotic Manipulators, Software for Robots

BSc Artificial Intelligence Aug. 2020 – June 2023
University of Manchester Manchester, U.K

- **Classification**: First Class, with Honours
- **Relevant modules**: Cognitive Robotics, Knowledge-based AI, AI & Games, Machine Learning, Computer Vision, Algorithms & Data Structures, Database, Mathematical Systems & Computation, Distributed Systems, Logic Models

EXPERIENCE

Heilongjiang Harbin Engineering Intelligent Assets Co., Ltd. June 2022 – Sept. 2022
Algorithm Engineer Internship Harbin, China

- Studied and optimized deep learning models for image recognition tasks. Tested and experimented with advanced Convolutional Neural Network (CNN) architectures, conducted hyperparameter tuning, model training, and optimization to enhance the accuracy and performance of image recognition.
- Explored and fine-tuned natural language processing (NLP) models for text analysis and semantic understanding tasks, adjusting and fine-tuning them based on specific requirements.

Heilongjiang Agricultural Investment Big Data Technology Co., Ltd. June 2021 – Sept. 2021
Data Analyst Internship Harbin, China

- Preliminary inspection of data, elimination of erroneous data and duplicate data, classification of data, and dimensionality reduction.
- Design an intelligent greenhouse through the collected data. It has a comprehensive environmental control system, which can directly adjust the indoor temperature, light, water, fertiliser, gas and many other factors.

PASS June 2021 – June 2023
PASS Leader Manchester, UK

- Together with two other PASS leaders provided a relaxed, informal environment for 10-15 more junior students to receive support with their studies.
- Provided a space for more junior students to work together on the processes, learning styles and critical thinking needed to succeed.

PROJECTS

Third Year Project (Undergraduate Dissertation) June 2022 - May 2023

- Title: *Comparative Analysis of Several Dimension Reduction Methods on High-Dimensional Datasets*
- Evaluated the performance and limitations of popular dimension reduction techniques, namely PCA, LDA, t-SNE, and UMAP

- Some key results: UMAP generally performed best, PCA's extensions are mostly suitable in distinct use cases, investigated the dependency of optimal perplexity in t-SNE.
- This project identified optimal methods for each type of dataset, understood properties of low-dimensional representations and compared the performance of each method on noisy and complex high-dimensional data.

Cognitive Robotics Report April 2023

- Title: *Optimising Deep Neural Networks for Robotics Vision Applications, A Study of Layer Number and Dropout Rate using the iCub Dataset and VGG Model*
- Contextualised the current state of the art in robotics and deep learning. Used iCub World Transformation as the classification dataset and VGG11 as the machine learning model.
- Evaluated the role of two hyperparameters; the number of layers and dropout rate, in the performance of the experiment. Interpreted the general pattern of results to optimise the training for robotics applications.

AI & Game Team Project Nov. 2022

- In a team of three people developed an AI algorithm to play hex (board game) and achieved around 75% win rate versus all other algorithms developed by classmates.
- Implemented an evaluation strategy to compute values for hex positions, based on FastVC (Virtual Connections) Search. This approach recursively builds up complex VC from simple ones, in accordance with defined deduction rules. Additionally, agent heuristics, opening and swap strategies were incorporated.

Research Project: Machine learning and Deep learning in Genomics and Health Aug. 2021

- Team member in B2, led by Prof Manolis Kellis, MIT University.
- Produced an auto-encoder-based model for the scRNA and scATAC, containing two VAEs, one for the scRNA-seq transaction and the other for decoding and encoding.
- Conducted research of a comparison of the effect of each possible factor and its significance, and technology suggestions based on the results to improve its efficiency.
- Completed project paper: "scRNA and scATAC Data Translation via Autoencoders" and made the final presentation with teammates.

SKILLS

Programming Languages: Python, Java, HTML5, CSS, JavaScript, SQL, C++, R, Markdown, Prolog, LaTeX

Tools: VSCode, Jupyter Notebook, Git, PyTorch, Sklearn, Spring, Apache, PHPMyAdmin, Eclipse, AWS

Natural Languages: Chinese, English