Junbiao Li

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Education

Dalian University of Technology Sep. 2020 – Present

Bachelor in Mathematical Basic Science, expected Jun. 2024
Leicester International Institute with double degree of University of Leicester
Main Courses **(All taught in English)**:

- **Calculus & Analysis** (Credit: 5; Score: 97)
- **Introduction to Computing** (Credit: 4; Score: 99)
- **Markov Processes** (Credit: 3; Score: 96)
- **Artificial Intelligence and Information Society** (Credit: 2; Score: 98)

Skills

- **Programming Languages**: Python > Rust > C++ = Java
- **Platform**: Linux
  - Server Management: Experienced in setting up and maintaining FreeBSD servers, running services like Docker and SMB.
  - Networking: Proficient in networking setups, with hands-on experience in OpenWRT, WireGuard.
- **Software Libraries**: Proficient in PyTorch, OpenMMLab, OpenCV, and Open3D
- **Web Servers**: Well-versed in configuring and optimizing Nginx for various use-cases.
- Fluent in spoken English with strong capabilities in academic reading.

Experience

Computer Science, Great Bay University Guangdong, China Jul. 2023 – Present

Intern Research Assistant Under the supervision of **Sikun Yang**

Denoising Diffusion Probabilistic Models; Score Matching with Neural Networks (In Progress)

- Engaged in cutting-edge research on Denoising Diffusion Mode, focusing on implementing score matching using neural networks for predictive modeling.
- Conducted an in-depth review of seminal papers, including DDPM, Aligned Diffusion Schrödinger Bridges, Diffusion Schrödinger Bridge with Applications to Score-Based Generative Modeling, and Simulating Diffusion Bridges with Score Matching.
- Successfully completed the model verification in two-dimensional scenarios using Brownian bridges.
- Responsible for literature review, data construction, code development, model architecture design, and model training.
- Planned to further investigate Aligned Diffusion Bridge, with a focus on finding diffusion bridges in data-aligned scenarios.

Both the advisor and other faculty members commented on my strong programming skills and ability to implement experiments independently and quickly. Li Xiaoming, Dean of the School of Information Science and Technology commented in the end-of-summer summary that my research approach is logically clear. Professor Sikun Yang thinks that I have a solid foundation in coding and can quickly validate ideas. Currently I am in contact with him remotely to complete the research project.

XPENG Robotics Guangdong, China Jul. 2022 – Sep. 2022

Summer Intern Autonomous Driving Deep Learning Intern

XPENG Robotics, subsidiary of XPENG, providing cutting-edge intelligent hardware and software solutions for Xpeng's electric vehicle products.

- 3D Point Cloud Registration and Optimization (Traditional ICP algorithm and Deep Learning approaches)
- Open3D-based GUI tool for rapid point cloud classification

- Stereo Depth Estimation evaluation metrics computation
- Semantic Segmentation data processing and optimization
- Camera Calibration (Model) overview

My supervisor speaks highly of my expertise in developing concise and elegant code based on my deep understanding on many recent research papers. Furthermore, I always maintained smooth communication with my colleagues while doing my task and often exceeded their expecatations by taking extra tasks. As a result, my supervisor invited me to continue the internship the next summer holiday.

Kaggle Competition
Sep. 2023 – Dec. 2023

Competition project Detect Sleep States - **Solo · Bronze Medal · Top 7% (390/1877)**

The dataset consists of approximately 500 multi-day recordings of wristband accelerometer data annotated with two event types: sleep onset and awakening. My task is to detect the occurrence of these two events in the accelerometer sequence. The difficulty with this task is that there are very few features. Only the magnitude of the acceleration and an angle.

- Developed a model consists of three parts: feature extractor, encoder and decoder.
  - **Feature Extractor** - Extracts an image-like waveform map from the original waveform.
  - **Encoder (DeepLabV3+)** - Converts the waveform graph into a 2D heat map.
  - **Decoder** - outputs from the heatmap the probability of an event occurring at each time point (sleep, start, wake).
- Applying NMS (Non-Maximum Suppression) improved the mAP from approximately 0.5 to around 0.7.

Kaggle Competition
Mar. 2023 – Jun. 2023

Competition project Detecting ink on ancient library scrolls - **Top 32% (390/1249)**

The goal of the competition is to use deep learning techniques to read ancient papyrus scrolls carbonised by volcanic ash, which may contain the secrets of Roman and Greek philosophy, science, literature, mathematics, poetry and politics.

- **Model development**: UNet-based deep learning models were selected and developed for image segmentation and text recognition. EfficientNet was used as the backbone and a multi-scale ConvLSTM layer was added to the encoder to enhance the model's ability to process high resolution images.
- **Model optimisation**: Learned how to solve bottlenecks in the model through analysis and tuning. Successfully improved the performance of the model under the f0.5 evaluation function from 0.3 to 0.5 by maximising the pooling of the channel dimensions
- **Data processing and analysis**: Coaching team members on data processing and working with the team on data analysis to optimise model performance.
- **Image post-processing**: Responsible for image post-processing, including denoising, repairing and enhancing text identified from papyrus rolls.

ROS-based Autonomous Car
Sep. 2022 – May. 2023

Individual Projects

Key modules studied and developed included:

- Automatic localization, mapping, and navigation with LiDAR, cameras, IMUs, and SLAM technology.
- Intelligent following module utilizing computer vision for pedestrian tracking, drivable space segmentation, and obstacle avoidance.
- Comprehensive visual perception integrating obstacle detection, lane detection, and drivable space prediction for safe decision-making.

Acquired hands-on experience in robotics, computer vision, sensor fusion, and autonomous systems while honing problem-solving and system integration skills.

College Official Media
Oct. 2020 – Sep. 2022

Television Station Station Manager

As TV station manager, lead a team of 80+ staff to film, edit, and livestream campus events. Recruited and Trained new members, maintained quality control and provided technical support. Successfully filmed and livestreamed 10+ large-scale events (1000+ Participants), all of which are published on college official account.