Wang Longan

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Education

Sichuan University **September 2021 – Present**

Artificial Intelligence, College of Computer Science *Chengdu, Sichuan, China*

- Excelled in the rigorous selection that prioritizing students with mathematical talent on Artificial Intelligence.
- Stood out from the challenging environment cultivating excellence, despite intense competition among top-tier students.
- GPA of Compulsory Courses: ***3.86***/4.00, Weighted Average Mark of Compulsory Courses: ***91.13***/100.00

Relevant Coursework

- Deep Learning (***100***)
- Optimization Theory (***96***)
- GPU Programming (***96***)
- Matrix Analysis (***99***)
- Machine Learning (***96***)
- Mathematics Modeling (***95***)
- Computer Network (***98***)
- Artificial Intelligence (***96***)
- Algorithm Analysis (***94***)

Academic Performance

Machine Intelligence Laboratory, Sichuan University **June 2022 – Present**

Research Intern *Chengdu, Sichuan, China*

- Introduced a novel approach for Cross-modal Hashing on noisy labels under pytorch framework, worked with Prof. Hu Peng, Prof. Dezhong Peng, Prof. Xi Peng, Mr. Qin Yang and Mr. Yuan Sun, which can concentrate on reliable pairings and dynamically identify noisy samples with a 6.2% improvement on MAP scores compared to state-of-the-art methods.
- Developed a cerebral palsy rehabilitation training system integrating STGCN for skeletal motion tracking and analysis, along with a CNN+Transformer-based dual neural network for real-time emotion detection, aimed at enhancing collaborative training with patients' families and physicians, guided by Prof. Hu Peng and Prof. Hongchen He.
- Submitted a paper to the **MM'24** conference (**CCF-A**) as the **first author**.
- Granted ***1 utility model patent*** and ***5 software copyrights***; submitted ***2 invention patents***.

NUS SOC Summer Workshop 2023, National University of Singapore **May 2023 – August 2023**

Summer Workshop Participant *Singapore*

- Studied on techniques including statistical modeling, machine learning algorithms, and interactive dashboard creation for Big Data Analysis and Visualization, guided by Prof. Danny Poo and Ms. Kong Guoting.
- Proposed a predictive model for the Beijing property market, employing financial techniques such as K-charts and MA-charts for house price trend analysis, using DNNs to establish a feature-to-price mapping for price rationality assessments, and generating heatmaps to guide investors towards profitable locations.
- Secured ***First Prize*** and achieved an ***A+*** rating for the project.

Project Experience

Noise Resistance Cross-modal Hashing **June 2023 – Present**

- Introduced a novel approach to achieve robust contrastive Cross-modal Hashing on noisy labels.
- Devised a Robust Contrastive Hashing loss (RCH) to prioritize homologous pairs over noisy positives, enhancing reliability of binary representations for cross-modal retrieval.
- Proposed a Dynamic Noise Separator (DNS) that discerns clean and noisy labels using loss distributions, eliminating the need for manual noise level estimation and reducing noise overfitting.
- Submitted research findings as the ***first author*** to ***ACM MULTIMEDIA 2024 (CCF-A)***.

Robust Real-time Submersible Positioning System **December 2023 – February 2024**

- Developed a robust positioning system for single and multiple submersible tracking with ocean dynamics compensation.
- Formulated an optimization model with Analytic Hierarchy Process for optimal marine equipment utilization.
- Devised a rescue strategy by modeling success rates over time through integral calculus on possible location interval.
- Participate in the 2024 Mathematical Contest in Modeling as ***team leader***. (Waiting for the result)

Intelligent Apple Orchard Harvesting System **September 2023 – November 2023**

- Developed a precise and robust orchard harvesting system for the challenging real-world conditions.
- Enhanced detection accuracy under varying lighting and occlusions by Gaussian filtering and morphological operations.
- Reduced the distance and angle bias in different images by clustering apples at a pixel level with K-means algorithm.
- Achieved ***First Prize*** in the 2023 Asia and Pacific Mathematical Contest in Modeling as ***team leader***.

Fresh Grocery Supermarket Replenishment and Pricing System **June 2023 – September 2023**

- Employed statistical analysis and seasonal time series to discern sales distribution and correlations in big data.
- Utilized genetic algorithms for cost-efficient pricing and inventory strategies to optimize supermarket profits.

- Applied simulated annealing in an enhanced model for individual product profit maximization, considering spatial and inventory constraints.
- Achieved ***First Provincial Prize*** in National College Students' Mathematical Modeling Competition as ***team leader***.

Spastic Cerebral Palsy Cognitive Rehabilitation Training System **June 2022 – October 2023**

- Developed a home-based cerebral palsy rehabilitation system tailored for children with spastic cerebral palsy, enhancing engagement and customization through game-like training modules informed by monitored movement patterns.
- Implemented a Spatio-Temporal Graph Convolutional Network (STGCN) based on OpenPose for precise, real-time motion detection to identify and track human keypoints from video streams.
- Engineered a dual neural network combining CNN and Transformer architectures while achieving 84.25% on emotion detection accuracy in real world scenarios.
- Translated research outcomes into ***2 software copyrights*** and ***1 utility model patent***, while selected as the provincial ***outstanding project*** in College Students' Innovation and Entrepreneurship Program as the ***project leader***.

Three-Dimensional Imaging Bronchial Navigation System **January 2023 – August 2023**

- Developed a multimodal 3D imaging bronchoscopy navigation system for precise lesion localization, efficient path planning, and real-time dynamic guidance,.
- Innovated a two-stage segmentation framework based on Deeplabv3, improving lesion detection rates to 98% .
- Formulated a dynamic domain offline path planning algorithm, reaching full-lung-navigability rates above 97%.
- Implemented real-scene fusion for dynamic navigation, integrating real-time respiratory motion compensation.
- Secured ***First Prize*** in the 17th "Challenge Cup" Sichuan College Student Curricular Academic Science and Technology Works Competition as a core member.

Awards and Achievements

- ***First National Prize***, Asia and Pacific Mathematical Contest in Modeling, November 2023.
- ***Second National Prize***, MathorCup College Mathematical Modeling Challenge, July 2023.
- ***Second National Prize***, Mathematical Contest In Modeling, February 2023.
- ***First Provincial Prize***, National College Students' Mathematical Modeling Competition, September 2023.
- ***First Provincial Prize***, Sichuan College Student Academic Science and Technology Competition, September 2023.
- ***Provincial Outstanding Project, Leader***, Undergrad Innovation and Entrepreneurship Program, December 2023.
- ***First Prize***, NUS SoC Summer Workshop, July 2023.
- ***Outstanding Student***, Sichuan University, October 2023.
- ***Outstanding Student***, Sichuan University, October 2022.
- ***Utility Model Patent***, ***First Inventor***, CN 219501919 U, August 2023.
- ***Software Copyright***, 2024SR0511512, April 2024.
- ***Software Copyright***, 2023SR0406133, March 2023.
- ***Software Copyright***, 2023SR0379563, March 2023.
- ***Software Copyright***, 2023SR0649892, May 2023.
- ***Software Copyright***, 2023SR0649414, April 2023.

Technical Skills

- ***English Skills***: IELTS—7.0 (December 2023), CET-6—567 (June 2022)
- ***Programming Skills***: Python, C++, C, Java, SQL, JavaScript, HTML, CSS, Markdown, LaTeX
- ***Developer Tools***: VS Code, Visual Studio, Idea, MySQL, Google Colab, Matlab, SPSS, Stata, Overleaf, VMware
- ***Technologies/Frameworks***: Linux, GitHub, Pytorch, Tensorflow, CMake, OpenCV, OpenPose, Scikit-learn

Interest Areas

- Machine Learning and Deep Learning
- Data Science and Big Data Analytics
- Multimodal Learning and Multimedia Search
- Information System
- Optimization Problem
- Computer Vision
- Natural Language Processing