WANG Pengwei

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Education

MSc Robotics *National University of Singapore* **Singapore** *08/2023 - Present*
GPA 4.6/5.0

BEng Software Engineering *Northwestern Polytechnical University* **Shannxi, China** *09/2019 - 07/2023*
GPA 85/100

Research Experience

Anomaly Detection for Brain TSC based on multi-modal MRI *Research Project* *03/2024 - present*
Cooperation with Xiamen Humanity Hospital

- Use representation learning to combine information from multiple MRI scans such as T1, T2-FLAIR.
- Use generative modeling to label the anomaly region in a non supervision manner.

Knee Angle Estimation for Active Lower-limb Prostheses *Research Project* *10/2023 - present*
Supervisor: Associate Professor Yu Haoyong

- A deep learning method for knee position estimation with seamless motion transition without explicit intention classification.
- By visualizing the attention weights, the whole-body movement is shown that contain rich information for the knee movement.
- Leader of this team, develop the idea and tried a variety of approaches. The paper is currently under development.

Deep Learning based Planning for Autonomous Vehicles *Research Project* *09/2023 - present*
Supervisor: Professor Marcelo Ang

- Planning algorithm for autonomous vehicle with generative AI.

Research Assistant for AND Lab *Research Assistant* *10/2023 - present*
Supervisor: Associate Professor Wu Haiyan

- Develop software for psychology experiment.
- Investigate the combination for research between brain activity and AI.

Research on Image Generation Methods Based on CNNs *Graduation paper* *12/2022 - 06/2023*
Supervisor: Associate Professor Tian Chunwei
Outstanding Graduation Paper/Design Award (Top 5%)

- A new image generation method based on attention mechanism, generative adversarial networks and a self-designed residual connection.
- A new image generation method based on diffusion and a self-designed loss function based on the importance prior of facial attributes against skin and background.
- A paper based on this project is further under development.

Intelligent Image Processing Algorithm Software *Research Assistant* *10/2022 - 01/2023*
Supervisor: Associate Professor Tian Chunwei | Funded by Xi'an Microelectronic Technology Institute

- Developed a traditional based algorithm to find moving object from moving camera.
- Developed the interface in C++, called modules from python.
- Object detection model selection, training, and tuning

Patent

An anti-rolling device for double wishbone suspension of FSAE race car *Utility model patents*
Chinese Patent No: ZL 2020 2 0578250.4

- A T-shape adjustable anti-rolling device for FSAE race car

Internship

Webpage development based on BIM *Full-time Intern* **China Three Gorges Corporation** *07/2022 - 08/2023*

- Completed model visualization development based on the BIM (Building Information Modeling) cloud platform.
- Built a webpage for BIM system, including front-end, back-end and database.

Academic Competitions

Formula Student China *Technical Director* **Soaring Racing Team, NWPU** *12/2019 - 10/2021*

- Awarded National 2nd Prize in 2020-2021 season as Technical Director and Head of Suspension and Steering Group, **helping the group to improve rank from 62nd to 24th**
- Awarded National 3rd Prize in 2019-2020 season as Suspension and Steering Engineer
- **Substantial experience collaborating with and managing teams**, combined with practical knowledge of project and budget management principles applied across multiple projects.

China Robot Competition, Advanced Vision, 3D Detection *Team Leader* *04/2020 - 11/2021*

- In charge of overall architecture design, Model tuning, GUI design and awarded National 3rd Prize.

Selected Course Projects

Improved Visual Foresight for Transporter Networks *10/2023-11/2023*

Course: Probabilistic Robotics for Manipulation, Professor Gregory S. Chirikjian

- Research on the rearrangement task in $SE(2)$ of manipulation arms.
- Proposed an improved vision model and achieving a better success rate and progress rate, exceeding existing state-of-the-art benchmarks.

Recruitment Information Analysis Platform *07/2022*

Course: Software System Development

- Responsible for more than half of the development tasks, the final manuscript production and reporting
- Algorithm development, Front-end design and implementation, model training
- The recruitment information can be displayed in real time, and job recommendation and salary prediction can be made by inputting professional description text and scored 94

Skills

- **AI**: Familiar with CNNs, VAE, GANs, Diffusion and Transformers
- **Programming**: Data Analysis, ML and DL based on Python; Software Development based on Python, Java, or Web; C++, JavaScript
- **Psychology Experiment Development**: Familiar with PsychoPy in Python and Psychotoolbox in MATLAB
- **Documentation**: LaTeX, Microsoft Office, HTML
- **GRE**: Verbal Reasoning and Quantitative Reasoning: 324, Analytical Writing: 3.0