Wen Fan

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Education

2020.09 - 2021.10   **MSc.Advanced Control and System Engineering**, *University of Manchester.*
Core courses: State-space & Multivariable Control (79), Control Fundamentals (80), Digital Control & System Identification (78), Process & Model Predictive Control (84), Optimal & Robust Control (82), Applied Control (86), Nonlinear & Adaptive Control (82), Robotics & Autonomous Systems (82) .

Average score: 79.4%   Award: Distinction

2016.09 - 2020.06   **B.Eng.Automation**, *HeFei University of Technology.*
Core courses: Graduation Design (90), Single Chip Microcomputer (96), Modern Control (93), Motion Control System (93), Fundamentals of Electrical Machines & Drives (88), Data Communication & Network (92), Principles of Automatic Control (93), Sensor & Detection Technology (95) .

Average score: 88%   Average score of core modules: 90%

Honors and Awards

2019.11   The First-Class Scholarship in University (Rank Top 1% to 4%)

2017.11   The Second Award of The 2nd Engineering Robot Competition of HFUT

2017.05   The First Award of 11th Mechanical Drawing Competition (Top10 of University)

Thesis

2022.05   Graph Neural Networks for Interpretable Tactile Sensing (under review)

2022.04   One-Shot Domain-Adaptive Imitation Learning via Progressive Learning (under review)

2022.03   From Teleoperation to Autonomous Robot-Assisted Microsurgery: A Survey (under review)

2022.03   A Multi-Head Convolutional Vision Transformer Architecture for Microrobot Real-Time Depth and Out-of-Plane Pose Estimation (under review)

2021.09   Monocular Vision-based Robot Navigation in Fully Simulated Scamp5d and CoppeliaSim

2021.08   A Simulation Model Based on Artificial System to Analyze Correlation between Journal Impact Factor and Article Quality (accepted)

Researches and Projects

2022.03 - Now   **Adaptive Human-Robot Shared Control for Micromanipulation**, *Supervised by Dr.Dandan Zhang*, Bristol Robot Laboratory (BRL), funded by the Royal Society.

- Research assistant, in collaboration with the Medical Robotics Group at Imperial College Hamlyn.

- This project is motivated by the urgent need for intuitive and flexible micromanipulation systems to support manipulation of micro-object, where the poor sensory feedback, physiological tremor, and obstructive view hamper the precise micron-scale maneuvers.

- Human-robot shared control can integrate the advantages of both humans and robots. With the higher level of autonomy, operators can focus on more crucial and complex parts of micromanipulation while the repetitive and tedious work can be done by robots.

2021.10 - Now   **Graph Neural Networks for Interpretable Tactile Sensing**, *Supervised by Dr.Dandan Zhang*, Bristol Robot Laboratory(BRL), University of Bristol.

- Visiting student in BRL, work on the internship project of tactile-sensing based object classification.

- TacTip sensor can extract vision features from the finger surface deformation and predict the object shape information, which leads to the tactile-sensing ability to reconstruct the environment objects.

- Train Graphical Neural Network (GNN) method to process those vision information and apply the object recognition task. By introducing interpretable methods such as GradCAM, the proposed GNN-based model show more intuitive performance than traditional CNNs.

2021.06 - 2021.10	**Monocular vision-based robot navigation via fully simulated Scamp5d**, *Supervised by Prof.Piotr Dudek*, School of Electrical and Electronic Engineering, University of Manchester.

- Imply ScampSim simulator on image processing by C++. The Scamp5d vision system uses Pixel Processor Array (PPA) camera sensor which supports on-chip processing.
- Finish obstacle avoidance and target navigation in CoppeliaSim robot simulator depends on the feature extraction results in ScampSim which produced by convolution or flood algorithms.
- Built communication between CoppeliaSim and ScampSim via interface and API module in Python.

2021.04 - 2021.06	**Mobile robot localisation with Sonar or LIDAR**, *Coursework of Autonomous & Robotics*.

- Imply Sonar and LIDAR as perception sensors, then combine the received information of landmarks coordinates into wheeled robot navigation tasks.
- Design Baye's filter and particle filter for robot to achieve dynamic localisation and further built occupancy grid probabilistic mapping in MATLAB.

2021.03 - 2021.05	**Mobile robot trajectory tracking using SMC** , *Coursework of Applied Control.*

- Design cascade control to realise point stabilization for wheeled robot in Labview, with PID controller for inner loop of motor angular velocity and P controller for out loop of robot position.
- Design sliding mode control (SMC) to realise different trajectory tracking tasks and imply the proposed method on a real wheeled robot for evaluation.

2020.01 - 2020.05	**Graduation design of full steering controller for electric forklift truck** , *Supervised by Prof.Benxian Xiao*, School of Electrical and Automatics, Hefei University of Technology.

- A 2-dof forklift model based on the lateral motion and yaw motion has been built.
- Integrate fuzzy control with the conventional PID controller to realize the adaptive parameter tuning in MATLAB which could provide forklift the better steer performance.
- The hardware schematic diagram with software flow chart are designed.

2017.09 - 2017.12	**A tyre-track hybrid obstacle avoidance robot design** , *Engineering Robot Competitio.*

- Built a tyre-track hybrid robot whose both front wheels can transfer between rubber tracks and the default wheels, by controlling three small supporting wheels inside each front wheel.
- Use default tyres on flat ground to increase motion speed, supported by a RGB camera located at bottom to realise the trajectory tracking.
- Extend the supporting wheels to form the track when encountering obstacles such as stairs and holes.

Languages And Skills

English	IELTS:Overall: 6.5; Listening: 6.5, Reading: 6.5, Writing: 6, Speaking: 6.5.
Program	C/C++, Python
Software	Linux, ROS, MATLAB, Labview, Multisim, Coppelia

Self Evaluation

- High Learning Enthusiasm.
- Earnest and Steadfast Attitude.
- Modest and outgoing Character.