Junkai Li

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EDUCATION

University of Nottingham Ningbo China (UNNC) Sep. 2020 - Jul. 2024
B.Eng. in Electrical and Electronic Engineering (Honours) **GPA:** 3.78/4.00

Core Courses: Power and Energy, Information and Systems, Engineering Mathematics, Applied Electrical and Electronic Engineering: Construction Project, Introduction to Software Engineering and Programming, Contemporary Engineering Themes

University of Nottingham (UoN) Sep. 2022 - Jul. 2023
B.Eng. in Electrical and Electronic Engineering (Honours)

Core Courses: Electronic Processing and Communications, Electrical Energy Conditioning and Control, Practical Engineering Design Solutions and Project Development, Modelling: Methods and Tools, Design and Implementation of Engineering Software, Contemporary Engineering Themes

PATENTS

- **Li,J.**, Xiang,Y., Li, H., et al. (2023). Equipment for double galvanometer diamond processing. Chinese Patent Application No. CN202310019492.8. Pending.
- **Li,J.,** Xiang,Y., Li, H., et al. (2023). A four-axis linkage laser processing method. Chinese Patent Application No. CN202310019502.8. Pending.

WORK EXPERIENCE

Siemens Power Automation Ltd. Jul. 2024 - Aug. 2024
Product Department

- Utilized Knime to process production data tables, replacing tableau for data analysis of production data.
- Implemented desktop automation using UiPath, leveraging regular expressions to extract information from production orders.
- Assisted in measuring path positioning for loading and unloading tasks in the aging room of Hikvision's automated robot system.

FUYAO GROUP MACHINERY MANUFACTURING Au. 2023 - Sep. 2023
Software Engineering Intern, R & D Technology Department

- Led PLC programming through the TIA portal software, specializing in optimizing the intricate stamping module code for an aluminum parts production line.
- Managed the milling logic control process, integrating a crucial Radio Frequency Identification (RFID) system, and established a robust alarm system specifically for milling robots.
- Employed ABB RobotStudio to streamline the calibration of the machine's stamping module user coordinate system (UCS), ensuring precise positioning of the manufactured products.
- Implemented a 9-position calibration method for robot hand-eye synchronization using HALCON software.

ACADEMIC PROJECTS

Calibration and Fusion of Traffic Detection with Video and Radar Sep. 2023 - Present
*Supervisor: Dr. C.F. Kwong, **UNNC***

- Collaborated with Zhejiang Communication Investment Group Co. Ltd. (CICO) on an industrial program focused on the development of a Camera-Radar fusion traffic detection system to enhance highway monitoring through a reliable equipment deployment scheme.
- Designed Python scripts for analyzing and processing erroneous data in traffic datasets.
- Developed LCSS and DTW algorithms to stitch paths from different traffic datasets.

Ultrasonic SLAM for Robots Navigating in Low-visibility Environments Jun. 2023 - Aug. 2023
*Advisor: Dr. Adam Rushworth, **UNNC***

- Elevated robot navigation precision by implementing ROS (Robot Operating System) in the Ubuntu environment.
- Translated data from 2D laser sensors into actionable maps utilizing cartographer and gmapping

algorithms, ensuring precise navigation with move_base.
- Incorporated 12 ultrasonic sensors on the robot's roof, capable of generating point clouds but sparse in smoke environments, with plans to expand the point clouds through neural networks.

Two Switch Forward Converter with Regulated Output Voltage Feb. 2023 – Jun. 2023
Advisor: Dr. Alan Wotson, ***UON***
- Engineered a two-switch forward converter, transforming 230V AC to a stable 8V DC output voltage.
- Crafted the converter's PCB layout in Ki-Cad based on an in-depth authoritative literature review; assembled and calibrated the PCB board for a stable 8V output under 35V and 230V AC power supplies.
- Conducted PLECS simulations to optimize the converter, guaranteeing component accuracy and validating system feasibility.

Doppler Radar Tachometer Development Sep. 2022 – Jan. 2023
Advisor: Dr. Alan Wotson, ***UON***
- Programmed the STM32 board in C++, using FFT for ADC signal analysis to determine primary frequency.
- Improved data handling efficiency by 50% through the implementation of a DMA channel.
- Designed and simulated logical circuit on Xilinx using VHDL, programming a microcontroller CPLD to showcase speed on the seven-segment LEDs.
- Assembled modules to display detection frequency and speed through an LCD encoder and LEDs, achieving a detection range of 0 to 20 km/s.

Desktop-level 4-axis Laser Galvanometer Cutting Machine Design Jun. 2022 – Aug. 2022
Advisor: Dr. Haonan Li, ***UNNC***
- Contributed to the electrical design, build, and debugging phases of the machine tool, validating the feasibility of the design and the layered cutting strategy's effectiveness.
- Adopted Visual Studio MFC tool to design intuitive HMI interfaces and realize multi-axis linkage control.
- Conducted iterative laser cutting experiments, refining the strategy and achieving an impressive 96% boost in diamond cutting efficiency compared to traditional industrial methods.

Raspberry Pi-based Advanced Vehicle Routing Recognition Feb. 2022 – Jun. 2022
Advisor: Dr. C.F Kwong, ***UNNC***
- Configured a Raspberry Pi setup, integrating key components like a camera and buzzer for the robot.
- Leveraged the OpenCV library for camera signal transmission, employing Gaussian filtering, grayscale conversion, and contour extraction to detect 12 specific symbols in processed images.
- Programmed the robot vehicle in C++ within the Raspberry Pi environment to execute designated tasks upon recognizing specific signs.

Arduino-based Robot Routing Control Sep. 2021 – Jan. 2022
Advisor: Dr. Jing Wang, ***UNNC***
- Assembled an embedded car controlled by an Arduino Nano board following PCB schematics.
- Established communication control for diverse hardware components, including a microphone and buzzer, enabling wireless and real-time control via the Arduino IDE.
- Designed a PID algorithm to regulate trolley movement and fine-tuned path by parameters debugging.
- Constructed a versatile robot equipped with sensors, utilizing PID line following and sensor-driven controls to perform tasks like varying speed based on colored paths.

EXTRA-CURRICULAR

Group Leader, RoboPixel LEGO EV3 Robot Programming Competition Mar. – Apr. 2021
Group Leader, LEGO EV3 Robot Programming Competition Nov. – Dec. 2020

TECHNICAL STRENGTHS

- **Languages**: English (fluent, IELTS 7 band), Mandarin(native)
- **Programming skills:** C, C++, Python, PLC programming, Assembly language
- **Proficient Tools:** Visual Studio, MATLAB, PLECS, STM32CUBE, Arduino IDE, TIA portal, LTspice, MPLAB IDE, Codeblocks, PLECS, ADS