Han Mengrui

Telephone: +86 15611147236 | Email: hanmengrui1112@163.com

Address: Room 603, No. 1 Yard Sanxingzhuangyuan, Gongyixiqiao, Fengtai District, Beijing

EDUCATION

Beijing University of Technology **09/2017-07/2021**

- Bachelor of Science in Measurement and Control Technique and Instrument(First Class Honours Degree), Average Mark: 88.16% (Top 5%)

PATENTS & SOFTWARE COPYRIGHT & CERTIFICATE

Patents:

Utility Model Patent for an Optimisation Method of Mechanical Structure Weight Reduction for Laser Tracking Measurement System Based on 3D Topology Optimisation (No.2020108966114)	08/2020
Utility Model of a Device and Interactive Platform Algorithm for Rubik's Cube-Based Restoring Teaching and Training (No.202010246767.8)	03/2020
Utility Model Patent for Fall Prevention Walking Aid for Seniors (No. 201911384811.5)	12/2019
Utility Model Patent for A Reduction Device Featuring Slope Reversion (No. 201911384794.5)	12/2019
Utility Model Patent for Four Tracked Device for Lunar Rover to Assist Astronauts in Operations and Building Lunar Bases (No. 201910336772.5)	04/2019

Software Copyrights:

CMM Temperature Supplement Secondary Development System Based on Rational DIMS 7.1	04/2021
Measurement Uncertainty Analysis Software for Laser Heterodyne Interference System	05/2020
Stepper Motor Precision Control System Based on STM32 (V1.0)	11/2019
Rubik's Cube-Based Multifunctional Restoring Teaching Platform (V1.0)	11/2019
Support Vector Machine-Based Gear Detection Software System (V1.0)	11/2018

Certificate:

Certificate of Trainee Engineer of Instrument, Control and Measurement (awarded by China Instrument and Control Society)	10/2020

AWARDS

Outstanding Undergraduate Award in Beijing (Top 5%)	07/2021
Outstanding Undergraduate Graduation Project in Beijing (Top 1%)	07/2021
A-level Outstanding Bachelor Thesis of Engineering in Measurement and Control Technique and Instrument Major in China	07/2021
First Prize in the 14th University Computer Games Championship & National Computer Games Tournament	08/2020
Beijing University of Technology Innovation and Entrepreneurship Scholarship	09/2019
National Encouragement Scholarship	09/2019

RESEARCH EXPERIENCE

Graduation Thesis: Lightweight Method of Laser Tracing System Mechanical Structure Based on 3D Topology Optimization **12/2019-06/2021**

- Awarded Excellent Graduation Project and published a paper titled "Lightweight method of laser tracing system mechanical structure based on topology optimization" in the *Journal of Harbin Engineering University*
- Created optimised algorithms within MATLAB to improve the performance of this platform
- Used Autodesk Inventor to implement modelling, simulation and stress analysis, and finalised vibration experiment

Researcher, Support Vector Machine-Based Gear Defect Detection Software System Design 04/2018-09/2018

- Created algorithm with MATLAB and input the sound of gear rotation into support vector machine to identify whether gears were good
- Improved the accuracy of gear defect detection in the situation of small sample size, and the gear defect detection can be carried out automatically without interference

Member, A Smart Mobility Robot for Senior Citizens 05/2018-08/2018

- Obtained the First Prize (twice, national level) respectively in China Robot Competition, Service-Based Robot Band and China Robot Competition
- Build an intelligent robot based on a robot operating system (ROS) combining a laser radar, Kinect motion sensors and simultaneous localisation and mapping (SLAM) techniques allowed this robot to achieve automatic navigation
- With a facial recognition system based on OpenCV, a voice identification system and various sensors.

Researcher, Rubik's Cube-Based Restoring Robot 10/2018-06/2019

- Won the Best Popularity Award at the Science festival held by Beijing University of Technology
- Employed Autodesk Inventor to model and design a structure featuring the space to contain six motors, two cameras and a Rubik's cube
- Visualised main components of this structure by 3D printing technology
- Created algorithm based on machine vision to identify Rubik's cube's status with Python and Opencv, input it into two phase algorithm to get optimal choice to restore this cube within 21 steps
- Increased the accuracy of this algorithms to above 97% after denoising, image-splitting and recognition

Team Leader, AVG Car Design based on PID control 10/2018-12/2018

- Teamed with group members to design and make a trailing car in 2018 China Robot Ability Competition, and won the First Prize at national level
- Developed a computer programme to capture PID parameters of four wheels, and ensured this car to complete the 100-meter cruise route through analysing real-time datasets from eight infrared sensors

Member, Four Tracked Lunar Service Robot 01/2019-05/2019

- Generated 3D model of lunar service robot with Autodesk Inventor, awarded the First Prize in the 2019 National College Students' Mechanical Products Digital Design Competition
- Armed this robot with three systems, including lunar rover four tracked motion system, separable detection system and multi-functional manipulator system
- Employed worm gear, bevel gear and cylindrical gear to transfer driving force, and used clutch to control the transmission and interruption of driving force
- Adjusted the height of crawler wheel by cantilever and innovatively used a separate track system as the chassis
- Set up three transmission routes in each track systems to change its contact area with the ground according to terrains and make it proceed smoothly

Team Leader, Fall Prevention Walking Aid for Seniors 09/2019-11/2020

- Designed and generated a fall prevention device with folding seat, speed limiting device and reverse device in 2020 National Undergraduate Mechanical Innovation Competition, and got the First Place (the national level)
- Modelled and processed walking aid devices, achieved slope slip prevention by installing wedge devices and unilateral bearing in rear wheels, and reduced speed by equipping front wheels with friction centrifugal and planetary gear
- Ensured 360° rotation of this device by universal wheel linked by front wheel axle bracket and car-frame
- Prevented tumble and slipping-back by arming this walker with speed limiting device and reverse device

EXTRACURRICULAR ACTIVITIES

Director, Science and Technology Association of Beijing University of Technology **09/2018-09/2019**

- Planned and organised a wide range of contests, lectures, salons and school-level science & technology-oriented events, such as the 11th Engineering Production Innovation Competition
- Publicised these activities by posters and WeChat promotional articles

Volunteer, Volunteer Activities (100 Hours) **02/2018-09/2019**

- Joined a volunteer event launched by Sarthak Centre for Community Development & Communication, and offered voluntary services at Turtle Conservation Centre, Galle, Sri Lanka
- Instructed pupils in Nepal to learn English and scientific knowledge
- Interpreted for scientists at Israeli Pavilion in the 5th China Science Festival

INTERNSHIP EXPERIENCE

Intern, Tianjin Mengxiangyuan Technology Co., Ltd. **06/2020-07/2020**

- Kept pace with working principle, application and maintenance of experimental platforms, such as MXY8001 photoelectric technology application development comprehensive experimental platform
- Compile numerical control (NC) programmes for a turning platform

OTHER INFORMATION

Language Skills: English-good, German-good, French-primary, Korean-basic, Japanese-basic

Computer Skills: MATLAB, Inventor, SolidWorks, CAD, ANSYS, Labview, KICAD, Arduino, STM32 (keil), C++, Python

Hobbies: Mechanical Structure Design, Robot Design, Kendo, Reading, Play Chinese Chess