Wenzhi Bai

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Education

Huazhong University of Science and Technology, China *Sept. 2014 - Jun. 2017*
Master of Engineering in Mechatronic Engineering
GPA: 86/100
Thesis: *Study on Lidar-based Map-building for Service Robots*

- The Excellent Postgraduate Graduate awarded in May. 2017
- The Merits Postgraduate Student awarded in Dec. 2015 (Top 5%)
- The National Scholarship for Postgraduates awarded in Dec. 2015 (Top 2%, 20,000 RMB)
- The First-class Scholarship for Postgraduates (Top 20%, 10,000 RMB, three times)

Huazhong University of Science and Technology, China *Sept. 2010 - Jun. 2014*
Bachelor of Engineering in Mechanical Design, Manufacturing and Automation
GPA: 87.38/100 (top 25 out of 252)

- The Excellent Graduate awarded in Jun. 2014
- The Merits Student awarded in Dec. 2013 (Top 5%)
- The National Scholarship awarded in Nov. 2013 (Top 2%, 8,000 RMB)
- The Outstanding Individual in the Undergraduate Innovation Activities in Dec. 2012 (TOP 10%)

Computer Skills

Programming Languages: C/C++ (very strong), Python (fair)
Algorithm Libraries: OpenCV, Eigen, Ceres Solver, OpenGL
Tools: Linux/Ubuntu, ROS, Git, CMake

Work Experiences

Senior Algorithm Engineer of Intelligent Driving Group, **BAIDU** *Nov. 2018 - Apr. 2020*

Project 1: APA (Automatic Parking Assist)

- Constructed the Occupancy Grid Map by making the Ultrasonic Radars equivalent to the Lidar observation model modeling, used RB-Tree as the data structure and combined with the Bresenham algorithm to improve the effect and efficiency of mapping
- Applied the Kalman filter to estimate parking spaces detected from the panoramic image based on machine learning, which improved the accuracy and robustness of estimation of parking space parameters

Project 2: P-AVP (Public zone – Autonomous Valet Parking)

- Regarded the interframe relative pose relationship obtained via Visual-Inertial Odometry as the trusted edge, HD-map landmark as the trusted vertex, the relative pose relationship between camera and landmark obtained via EPnP as the untrusted edge, camera posed obtained via calculation as the untrusted vertex and then put the above information to use in constructing pose-graph and realized the vehicle dynamic relocalization and initialization through getting the optimal solution by RANSAC plus Global Bundle Adjustment for untrusted edge and vertex
- Constructed a set of automatic testing and recording module that could check and visualize our relocalization algorithm

Project 3: H-AVP (Home zone – Autonomous Valet Parking)

- Built a sensor data repository based on Ring Buffer, provided data access interface with low complexity and high reliability and resolved data caching and access issues in the system
- Realized the online automatic calibration module of camera external parameters, completed the online calibration for the vehicle front wide-angle camera and timely repaired errors and detected if the camera was moved or dropped

Algorithm Engineer/Pre-research Project Team Leader, **LDROBOT** *Jul. 2017 - Nov. 2018*

Project 1: SLAM Module Development of Mass Production Vacuum Cleaning Robots based on Lidar

- Developed and optimized the Lidar-based SLAM module, involving the processing and fusion of lidar and other sensor data, map updating and long-term maintenance and the improvement of relocalization accuracy
- This kind of Vacuum Cleaning Robots has been shipped more than 100,000 units by the time of my departure

Project 2: SLAM Automatic Test System Construction

- Constructed a SLAM automatic test system and realized the playback of real machine recording data, simulation data and public data sets
- Performed the SLAM and relocalization and evaluated the generated map and localization accuracy, to quantify the SLAM algorithm improvement status and improved the relocalization classification model by training the sample data using SVM

Project 3: Contactless Visual Obstacle Avoidance Preliminary Study

- Took charge of the depth camera selection and verification and used the depth camera data to construct the environmental 3D map and to detect the 3D environmental free space

Projects

Autonomous Mobile Platform Control System *Mar. 2016 - Jun. 2017*

Main responsibility: SLAM Algorithm Design

- Completed an autonomous mobile platform control system based on Lidar, mainly in charge of sensor data processing and lidar-based SLAM module development
- ICIRA2017, EI paper: *Correction Algorithm of LIDAR Data for Mobile Robots* (the first author)

CNC Sewing Equipment CAD/CAM Software *Oct. 2013 - Dec. 2015*

Main responsibility: Software Development **Position:** Team Leader

- Developed a CAD/CAM software adapted to CNC sewing equipment, mainly responsible for graphics operation module and a visual import graphics module
- Funded by HUST Graduate Base of Innovation and Entrepreneurship and finished the project with "Excellent" results. The equipment and its CAD/CAM software were exhibited in CISMA (one of the largest exhibitions in this field).

Researcher in 60th Anniversary University History Museum Navigation Robot *Jun. 2012 - Oct. 2012*

- Took charge of three-wheel omnidirectional chassis design of navigation robot and adopted Mecanum Wheel

Leadership Experience

Founder & Leader of RoboMaster STAR Club *Sept. 2014 - Oct. 2015*

- Set up a club of more than 40 people on campus (including undergraduate and graduate students), obtained various support funds of the university innovation team of 200,000 RMB, and attracted about 200,000 RMB from institutions and social enterprises on campus
- Served as the chief architect of the technical direction of the team, involved in the scheme design and review of machinery, embedded hardware and software, and target recognition algorithm
- The club has been one of the largest robot societies on campus since its establishment

Awards

The First Place of Central China Division and **the National Second Place** in the RoboMaster of 14th National Undergraduate Robot Competition *Aug. 2015*

The First Place in the National Undergraduate Electronic Design Competition (Subject: The Control System of Unmanned Aerial Vehicles), Hubei Division *Nov. 2013*

The First Place in the 5th National Undergraduate Mechanical Innovation Design Competition, Hubei Sectional Preliminaries *May 2012*

Patents

As an inventor, I have applied for more than 10 patents, most of which have been granted. These patents focus on Autonomous Vehicles, Vacuum Cleaning Robots, and Automatic Control Equipments.