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 10% in 250+ students)

- 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%)

Publications

- **Wenzhi BAI**, Gen LI, Liya HAN, **Correction algorithm of LIDAR data for mobile robots**, In International Conference on Intelligent Robotics and Applications (ICIRA), 2017.
- **Wenzhi BAI**, **Study on Lidar-based Map-building for Service Robots**, Huazhong University of Science and Technology, ME thesis, 2017.

Computer Skills

Programming Languages: C/C++ (very strong), Python (fair), Shell (fair)

Algorithm Libraries: OpenCV, Eigen, Ceres Solver, OpenGL, PCL

Tools: Linux/Ubuntu, ROS, Git, Cmake, Embedded System

Work Experiences

Senior Algorithm Engineer of Intelligent Driving Group, **BAIDU**   *Nov. 2018 – Now*

Project 1: H-ANP (Highway – Autonomous Navigation Pilot)

- Constructed the decision frame of navigation lane change and efficiency lane change by using FSM.
- Constructed quadratic programming problem to optimize lateral trajectory and longitudinal trajectory and solved with the Gaussian pseudo-spectral method.
- Estimated 2D/3D states of obstacles by Kalman Filter. For data association, the Mahalanobis distance is used for single-sensor data association, and the KM algorithm is used for multi-sensor data association.

Project 2: H-AVP (Home zone – Autonomous Valet Parking)

- Built basic modules such as data buffer manager, transformation manager, OpenGL visual debugging tool, etc., which provided the solid foundation for the whole SFM 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.

Project 3: P-AVP (Public zone – Autonomous Valet Parking)

- Realized the vehicle dynamic relocalization and parameters initialization through getting the optimal solution by RANSAC and Bundle Adjustment.
- Constructed a set of automatic recording and testing modules that could verify the relocalization algorithm.ß

Project 4: APA (Automatic Parking Assist)

- Constructed the Bayesian Probabilistic Occupancy Grid Map by making the Ultrasonic Radars equivalent to the Lidar observation model, 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 the estimation of parking space parameters.

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

Project 1: SLAM module of Lidar-based Vacuum Cleaning Robots

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

Project 2: SLAM Automatic Test System

- Constructed a SLAM automatic test system and realized the playback of real machine recording data, simulation data and public data sets.
- Evaluated the SLAM and relocalization accuracy to quantify the algorithm improvements and improved the relocalization classification model by training the sample data using SVM.

Project 3: Contactless Visual Obstacle Avoidance

- 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.

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 the 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).

Leadership Experience

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

- Set up a club of more than 40 students on campus (including undergraduate and graduate students), obtained various support fundings of 400,000 RMB from internal institutions and external social enterprises
- 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

Awards

The First Place of the Central China Division and **the National Second Place** in the RoboMaster of the 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 dozens of patents, most of which have been granted, focusing on Autonomous Vehicles, Service Robots, and Automatic Control Equipment.