Naigui Xiao

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Education

M.S. *Harbin Engineering University, Harbin, China*
Naval Architecture and Ocean Engineering *2019 - 2022*
Final Grade: 3.5/5.0
Specialisms: Mainly focus on underwater robot navigation and control in underwater robot lab.
Thesis title: Research on Positioning Method of Underwater Robot Based on Multi-sensor Data Fusion
Detail: In this paper, a ROV localization method is proposed, which integrates multiple sensors such as camera, sonar and IMU through nonlinear optimization method to adapt to the special underwater environment.

B.Eng. *Nanjing University of Aeronautics and Astronautics, Nanjing, China*
Automation *2015 - 2019*
Final grade: 3.1/5.0
Specialisms: automatic control theory; Embedded System development; Signal processing; Visual SLAM
Thesis title: The Research and Implementation of SLAM System Based on Binocular Vision

Experience

Engineer of LiDAR Algorithm and Application *FEB 2022 - NOW*
Fulltime in Innovusion Co. *Suzhou, China*

- Develop multi-sensor fusion Lidar localization and perception algorithms for autonomous driving and road end applications.

ROV localization using SBS(Short Baseline Sonar) *JUN 2021 - AUG 2021*
Internship in Feimabin (Qingdao) Intelligent Technology Co., Ltd. *Qingdao, China*

- Responsible for the design of the positioning scheme of the ship cleaning robot, and code implementation.

ROV sea trial for coral protection in Sourth China Sea *MAR 2021 - MAY 2021*
Harbin Engineering University underwater robot lab *Sourth China Sea, China*

- In charge of the ROV control system design and to maintain and test. This experiment was designed to test the effect of using ROV to clean up acanthaster planci flooding in shallow waters, which feeds mainly on coral.

Pratical project of bionic UAV *SEP 2017 - JAN 2018*
Internship in Shenzhen DAMODA Intelligent Control Technology Company *Nanjing, China*

- Use Solidworks to design bionic butterfly ornithopteric aircraft. Write control program, make and test the prototype.

Human gesture recognition and 3D modeling *JUL 2018 - OCT 2018*
A campus science and innovation project *Nanjing, China*

- Using STM32 and six-axis inertial sensors make a wearable glove, which could colect the movement of human hand. Based on these information, Unity3D was used to build 3D models for visualization.

Motion-sensing game design based on FPGA *APR 2018 - JUN 2018*
A campus FPGA Design Competition *Nanjing, China*

- A Flappy Bird like game using FPGA, sound transducer was used to control character's movement.

Internship in AVIC Jiangxi Hongdu Aviation Industry Group Company *JUL 2017 - AUG 2017*
AVIC Jiangxi Hongdu Aviation Industry Group Company *Nanchang, China*

Skills

Skills: Robotics Related

My interest in robotics throughout my studies, and my knowledge of the field, has led me to develop skills in the following areas:

SLAM and mulit-sensor fusion: start with visual SLAM; and then explored the fusion of vision, sonar and IMU on underwater robot for application in underwater scenes(in my master's studies); also have experience in LiDAR odometry, LiDAR-IMU odometry and GPS-IMU fusion for autonomous driving(at work).

LiDAR data processing and application: handling LiDAR data in various methods, including registration, motion compentation, cluster, etc.

Design and execution of prototype experiments: over two years experience working cooperatively in ROV laboratory; self-motivated and tough enough to endure poor experimental environment.

Multi-platform development: develop on ROS and Baidu APOLLO.

Control theory: systematically studied in university, and used in many projects.

Design and modeling of robot structure: in development of bionic aircraft, CAD and Solidworks was used to design the prototype.

PCB design and embedded circuit programming: using STM32 series chips to develop control program in ROV and other project; also have FPGA development experience.

Design and modeling of robot structure: in development of bionic aircraft, CAD and Solidworks was used to design the prototype.

Skills: Data Analysis and Computing

During years of study, work and practice, the following computing abilities have been developed:

C/C++ for development: is my primary programming language, familiar with tools and utilities available in C++(CMake, Bazel, etc.)

Python for data processing: use python as an efficient tool for processing data and previewing new ideas; in a period of time, tried to use neural network for pointcloud classification.

Use MATLAB to process data: used for control system simulation in some projects during undergraduate years.

Use git to manage projects and collaborate with others: proficient in git management of project code with team.

Skills: Reading and Communication

Keep reading papers: this is where I get new knowledge and keep up with trends.

Collaborate and communicate with people from different backgrounds: shared workspace, materials, and knowledge.

Language competence: proficient in English for communication, presentation and reading.

Open Source Projects

MobileGPS2PC	Transmit mobile phone GPS to server in Baidu APOLLO module using web-socket.
GIOODOM	GPS IMU Fusion via ESKF on ROS.
LIGO	A robust odometry that fused LiDAR, IMU and GPS, which can still work when different sensors join and exit.
LiDAR-IMU Calibration	LiDAR to IMU calibration using hand-eye method.
LiDAR-IMU Extrinsic refine	GPS Refine extrinsic of LiDAR to IMU.
Highway mapping	Build LiDAR pointcloud map through RTK and IMU measurements.

Grants and Awards

2x academic scholarships in HEU

1x academic scholarship in NUAA

Third prize of Aircraft Design Competition

Second Prize in Anlu Cup FPGA Competition

Outstanding Student Certificate of Visual SLAM Course of Deep Blue Institute(Online course)

3x Runner-up of the Intercollegiate Cup Football Competition in 15/16, 16/17 and 17/18 academic year:(

Academic Interests

Robotics Related

1. A robust and fast SLAM algorithm can be adapted to various challenging scenarios.
2. How to enhance the perception of computer through various sensors.
3. How to integrate new technologies and knowledge from different fields into robotics, deep learning etc.
4. How to make robots more intelligent and more human-like.
5. Map reuse and update in dynamic environment.
6. Go deeper into the robot localization method and do something challenging and interesting.

Robotics Related

1. Use sensor fusion and SLAM to improve this new method for human and computer interaction.
2. Any novel research and applications.

Other Interests

Hobbies: football, cycling, reading, play electric guitar(still amateur:P)