

BANGGUO YU

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🎓 EDUCATION

ShanDong University 2018.9 - Now

M.S. in Control Engineering

Overall GPA: 87.95/100

ShanDong University of Science and Technology 2014.9 - 2018.6

B.S. in Automation

Overall GPA: 86.77/100

Rank: 10/180

★ RESERCH INTERESTS

Embodied Artificial Intelligence, Robotics, Control, SLAM, Reinforcement learning

📖 EXPERIENCE

Visual Target Navigation 03/2020 - now

Visual and Learning-based developing *Jinan, China*

- The platform of **AI Habitat** is used to achieve the visual target navigation, and I focus on the task of ObjectNav using the semantic 3D scene graph in multi-room scene.
- 3D scene graph is encoded by the Relational Graph Convolutional Networks as scene priors.
- The visual and prior features are concatenated to the deep reinforcement learning model, and finally we can achieve the semantic navigation such as "find the toilet".

3D Structured Semantic Scene Graph 08/2019 - 01/2020

DMAI, Inc. Reserch Intern *Guangzhou, China*

- A bottomup construction framework is designed for structured 3D scene graph generation, which efficiently describes the objects, relations and attributes of the 3D indoor environment with structured representation.
- The parse graph is calculated by the capture of semantic information and inference from scene priors.
- An improved probabilistic grammar model is used to represent the scene priors.
- The proposed framework significantly outperforms existing methods in terms of accuracy, and a demonstration is provided to verify the applicability in applying to high-level human-robot interaction tasks.

The Design of Control board 05/2019 - 08/2019

Embedded Engineer *Jinan, China*

- Design embedded control board circuit and shell
- Communication with server by CAN to control more than ten boards simultaneously
- Control strong electricity (220V AC) using weak current (5V DC)

Cloud-based Open Loop SLAM

09/2018 - 04/2019

SLAM Algorithm Engineer

Jinan, China

- Based on Cartographer, we focus on how to build map in gallery with sparse features using 2D laser.
- Apriltag is used as the position-known landmark to build the constraint and add it to global optimization.
- Websocket is used to achieve the cloud-based mapping, which the sensor data is captured by the mobile robot and calculation is run in the cloud server.

Competition Robot

10/2017 - 06/2018

Embedded System Engineer

Qingdao, China

- Construct and lead the team of robot in our college to finish the competition task that two robots should be designed to transmit the ball with a belt and throw the ball by the belt to target.
- Design the omnidirectional encoder wheel, and fuse IMU, ultrasonic sensor and laser to locate in the competition environment.
- The national first prize is got in Chinese University Robot Competition (ROBOCON), which is the best-known robotics contest in China, so I can exempt from Admission Exam to Shandong University.

📄 PUBLICATIONS

A Bottom-up Framework for Construction of Structured Semantic 3D Scene Graph (Video)

Banguo Yu, Chongyu Chen, Fengyu Zhou, Fang Wan, Wenmi Zhuang, and Yang Zhao

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020 (**Accepted**)

Visual Target Navigation in Unexplored Indoor Environments using 3D Scene Priors (Video)

Banguo Yu, Fengyu Zhou, Ke Chen, and Zhiyong Yang

IEEE International Conference on Robotics and Automation (ICRA), 2021 (**Submitted**)

🏆 AWARDS

2018 and 2019	2nd Prize	Shandong University Scholarship
2019.08	2nd Prize	The 14th China Graduate Electronics Design Contest
2018.06	1st Prize	The 17th China University Robot Competition (ROBOCON)
2018.06	1st Place	The 5th and 6th Shandong Provincial Robot Competition
2017.08	2nd Prize	National Undergraduate Electronocs Design Contest
2017.06	2nd Prize	Shandong Provincial Challenge Cup Technological Innovation Competition
2016.10	1st Place	The 5th Shandong Provincial University Robot Competition
2016.10	1st Place	The 2th Shandong SCM Application Design Competition
2016.08	2nd Prize	The 11th National Undergraduate Smart Car Contest

🔧 TECHNICAL SKILLS

Computer Languages	C/C++, python, Matlab, L ^A T _E X
Robotics	ROS, PID Control, SLAM, Navigation, Reinforcement Learning
Embedden System	STM32, K60, CAN, UART, IIC, SPI
Design	Altium Designer for Circuit Board, SolidWorks for Machinery