Project proposal

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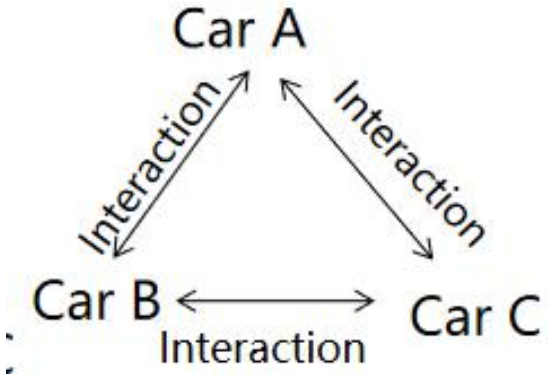
Multiple Interaction System

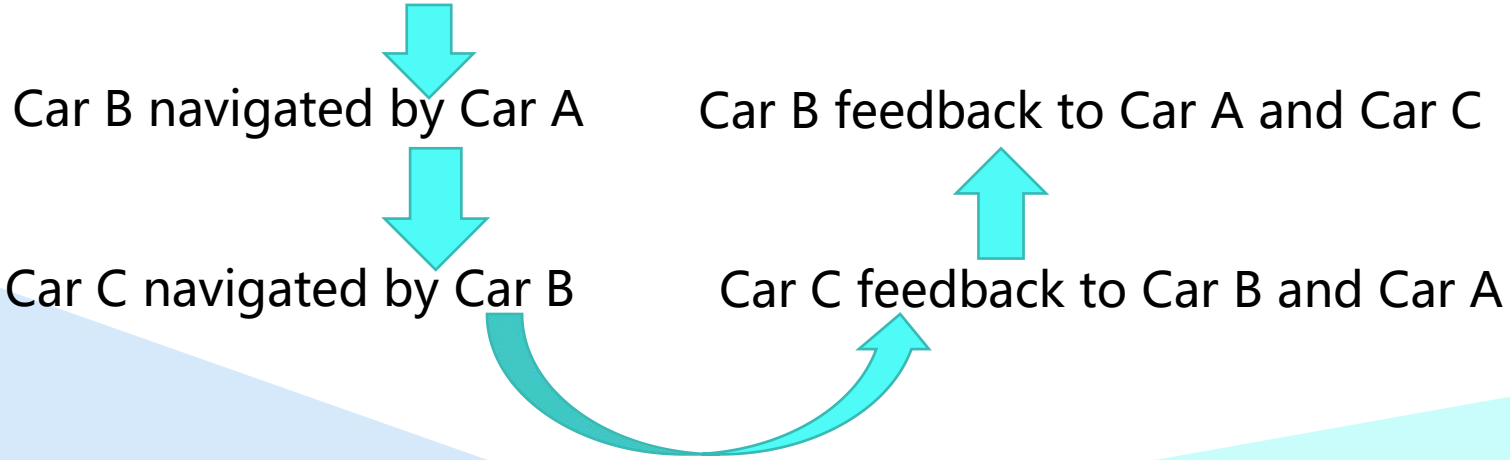
Multiple Interaction System

- **Components**: Three cars(Car A,Car B)
- **Core technology**:interaction between three cars
- Car A have sensors,Car B and Car C have **no sensor**

Build a multiple interaction system for **group control**



Car A self-drive and detect the environment

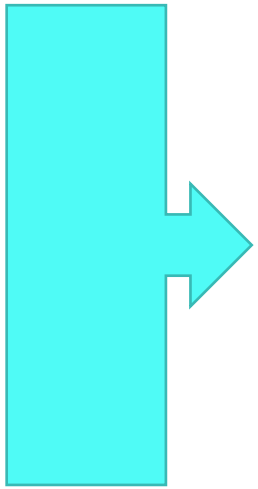


Three cars can maintain a certain formation and can interact with each other to complete group work

Multiple Interaction System

Communication protocol

- WiFi broadcast
- Bluetooth
- ZigBee
- UWB



wireless communication

Milestones,deliverables and success metrics

Milestone 1: Two cars interaction

Car A have sensors and can detect the environment and self-navigated,car B have **no sensors**. Car A guide car B by interacting with car B.

Milestone 2:Three cars interaction

Car A,car B,car C can guide each other and feed back each other's state.Three cars cooperate to complete a team work by interacting with each other.

Milestone 3:Multiple Interaction system

Build a information sharing system，group decision-making system and group collaboration system between mutiple cars.

Discussion of related work

- **According to literature review,the trend of multi machine interaction system is below:**

1.At present, there are few multi car communication systems, which are in the early stage of development

2.At present, the research of multi robot coverage is a popular topic in multi cars and wireless sensor networks. To solve this problem, the common method is to use virtual force distribution strategy

3.” Multi agent system” (MAS), a theory of multi-agent agent system in distributed artificial intelligence, has attracted the attention of researchers of multi robot cooperation theory. MAS based cooperative multi robot system is an important direction of the development of cooperative multi robot Science

4.Distributed control and group decision-making system is the core technology for multiple interaction system

Reference

—— "An important direction of the development of multi robot system cooperation and multi robot Science" *School of electronic information, Shanghai Jiaotong University, 2018*

—— "An intelligent interactive robot system and interaction method based on Cloud Computing" *Fleway intelligent robot technology (Shanghai) Co., Ltd 2018*

—— "A method, system and robot for generating interactive content of robot" *Shenzhen gouweicao Intelligent Technology Co., Ltd 2016*

—— " Working mechanism and key technology of multi-channel human-computer interaction perception feedback for service robot "*Shanghai University 2015*

—— " A remote interactive robot system and method "*South China University of technology, Suzhou Chenben Intelligent Technology Co., Ltd 2016*

—— " Research and implementation of multi-channel interactive system of space robot "*Huazhong University of science and technology 2016*

Technical approach

- 1.The **distributed control method** in cooperative multiple mobile car systems.
- 2. Behavior planning
- 3.Target tracking based on communication information
- 4.group decision-making system
- 5.Decomposition and assignment of group tasks

Timeline

Week4~Week5	**Construction of intelligent car**
Week6~Week7	**Inplement interaction between two cars**
Week8~Week9	**Inplement interatcion between three cars**
Week10	**Testing and demo**

Task Split

Zeyu Wang:
1.Build the intelligent car platform, communication interface between cars and Raspberry Pie programming.
2.Build the group decison-making system

Wanli Gao:
PCB design

Yifan Xu:
1.Distributed Control Algorithm
2.Communication Algorithm