# PROJECT Ⅲ 智能网球机器人

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**PART 01** 

硬件结构

**PART 02** 

软件架构

**PART 03** 

功能实现



### 硬件结构

上位机: Raspberry Pi 3B

下位机: Arduino Due

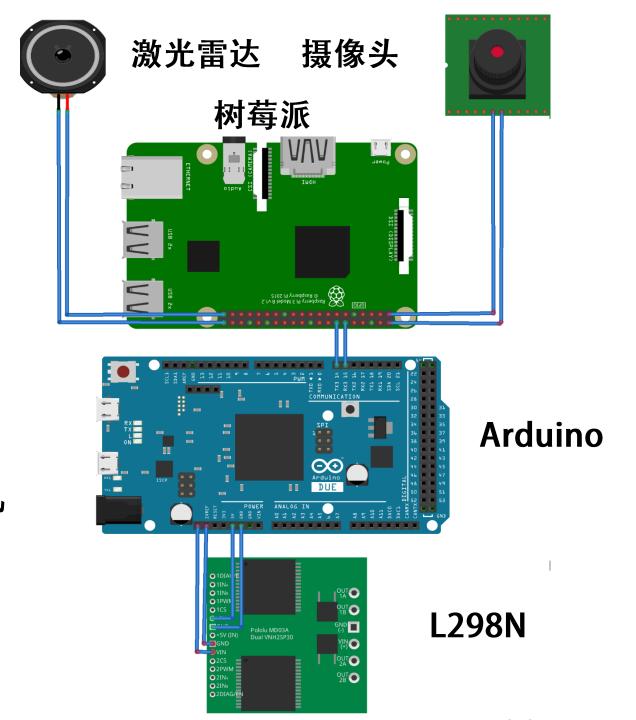
传感器:激光雷达RPLADAR A1

摄像头Raspberry Pi camera

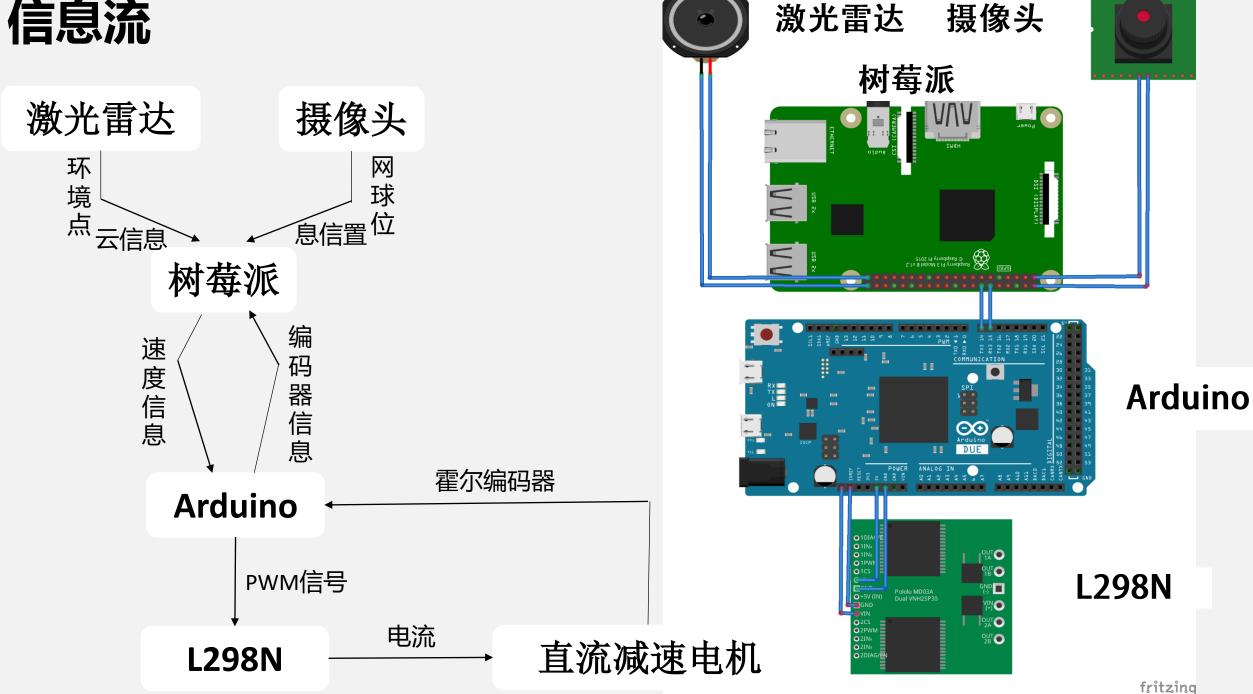
里程计 (电机编码器解码)

执行器: 电机驱动: L298N

控制左右轮电机、舵机、皮带电机



## 信息流

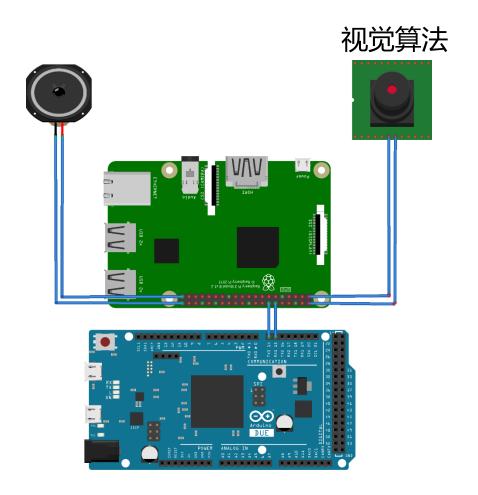




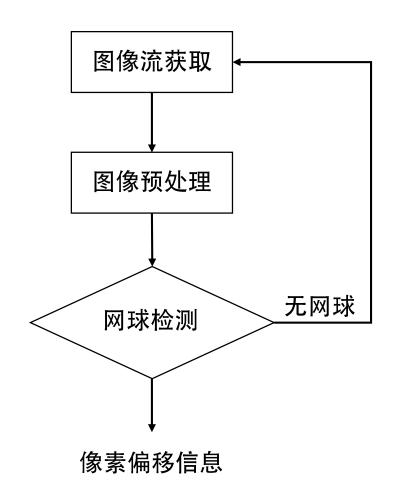
#### 软件架构

- 视觉算法
- Ros
- App

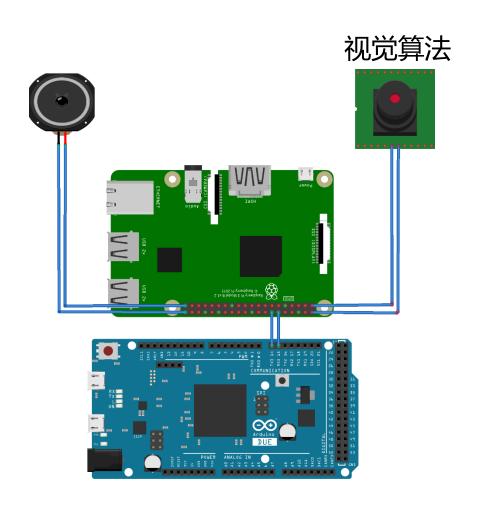
## 视觉算法



#### 算法流程



### 视觉算法



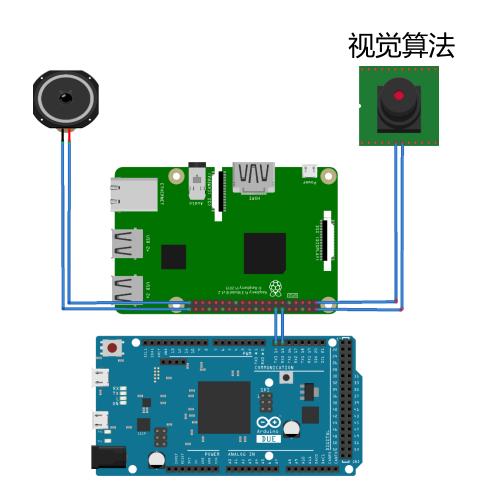
问题:树莓派计算速率太慢

1.更小分辨率的图片

2.图片预处理过程简化

3.检测网球算法简化

## 视觉算法





### ROS SLAM (实时定位与地图构建)

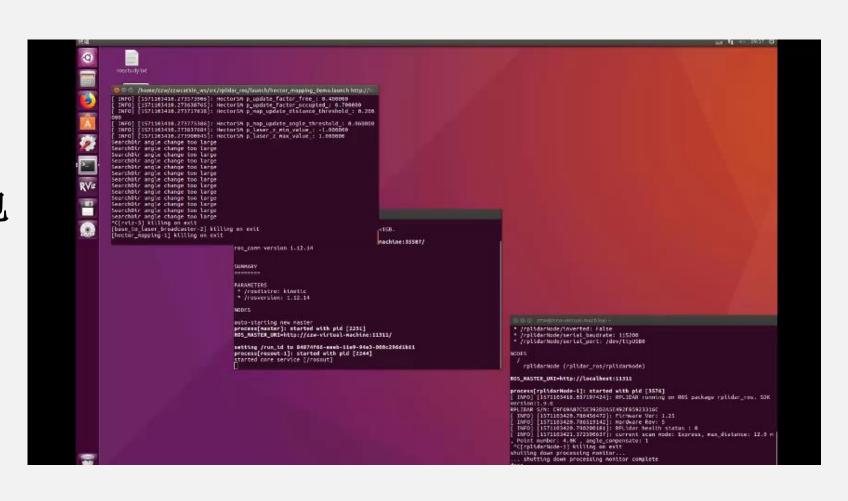
#### 主要步骤:

- 1.调用雷达软件包 (发布点云信息到 laser\_scan节点)
- 2.调用hector\_slam软件包 (订阅laser\_scan节点 利用点云信息建图并在 rviz中图形显示)

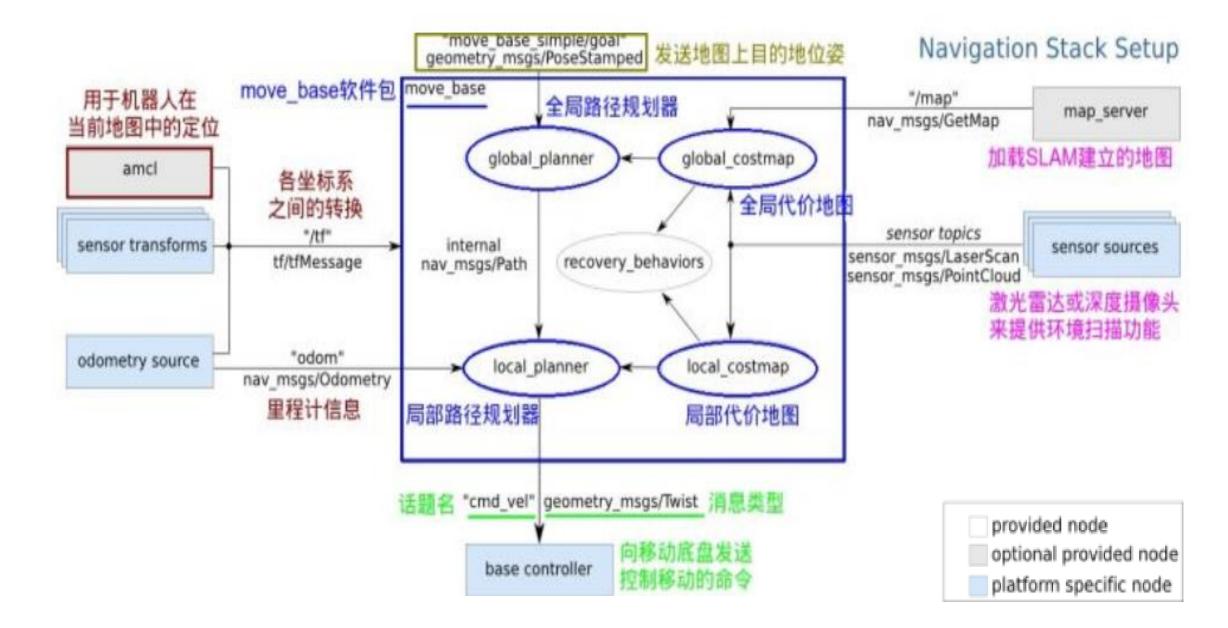
#### 命令行:

\$roscore

\$roslaunch rplidar\_ros hector\_mapping\_demo.launch \$roslaunch rplidar\_ros rplidar.launch



## ROS Navigation (避障导航 部分功能未完成)



## APP演示





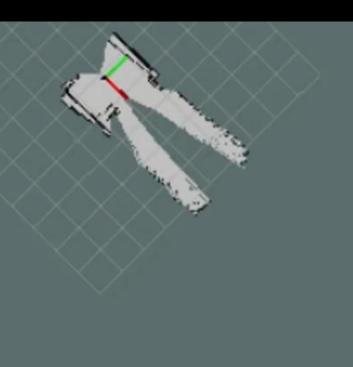
## APP演示







## 地图构建





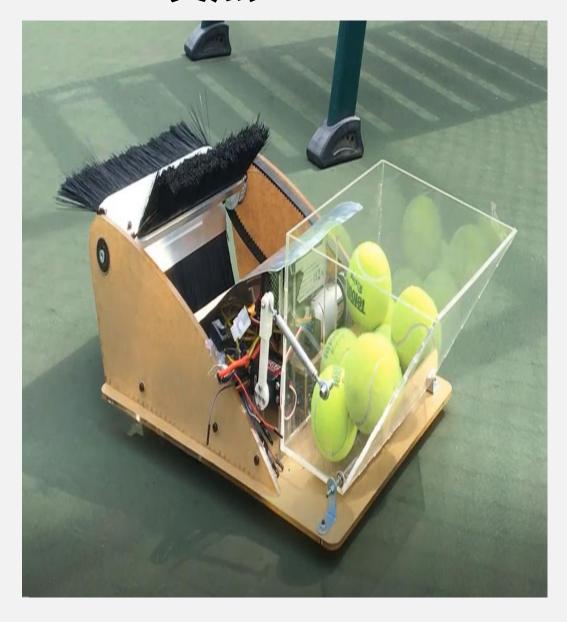
网球识别+避障导航

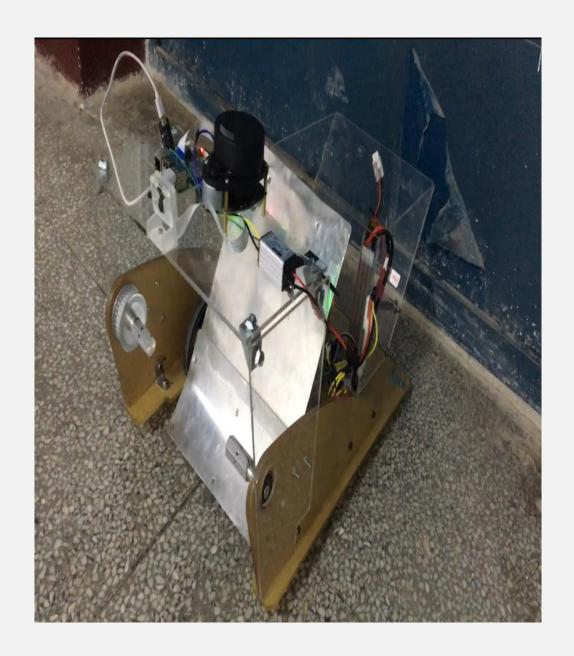
# 功能展示



## 失败经验

## L298N发热





## L298N发热



