

Cleaning and Mapping Robotics Project

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Outline

Introduction

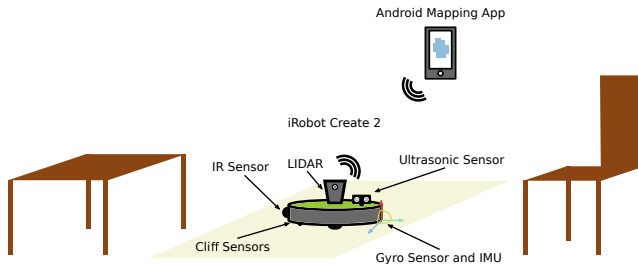


Figure: Diagram representing the working principle of the cleaning and mapping robot

- Created basic layout of the Android app for displaying the 2D room map in Android Studio
- Researched RPiLidar S1 360° Laser Scanner

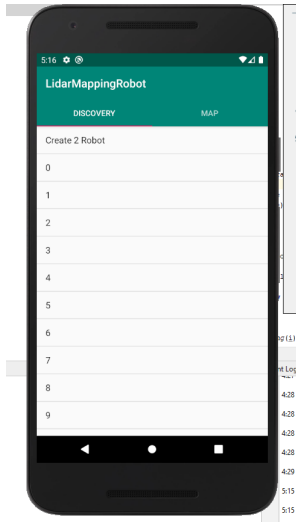


Figure: Screenshot of app with Discovery and Map tabs

Progress

Further app details

- `TabLayout` View used for displaying tabs horizontally
- `Fragment` class used for both the discovery and map tabs
- To display items in a list, `ListView` is used for displaying a vertically-scrollable collection of views
- `ArrayAdapter` used for displaying Strings from an `ArrayList` in the `ListView`
- `AdapterView.setOnItemClickListener()` to register a callback when an item in the adapter view has been clicked

Progress

Lidar



Figure: RPILidar S1 360° TOF Laser Scanner, source:
<https://www.sparkfun.com/products/15872>

- Takes samples at a rate up to 9200 samples per second
- 40 meter range
- Built-in motor that rotates at 10 Hz (600 rpm)
- Data is transferred over serial connection 256000 bps
- Can be connected to a single board computer (Beaglebone Blue)
- Separate power interfaces for the scanner and motor (5V VCC)

Plans

- Build custom adapter class for displaying network data of the discovered robot
- Write a server in Python for the Beaglebone to accept connections from mobile devices
- In the `DiscoveryFragment` class add code to automatically start discovering robots with TCP/IP client code
- Add a spinner in the UI while the app is waiting for robot connections

References I



Android Developer Docs

<https://developer.android.com/>



RPLidar S1 360 Datasheet

<https://www.robotshop.com/media/files/content/r/rpk/pdf/rplidar-s1-360-laser-scanner-40-m-datasheet.pdf>