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1. ToDo and Advice

1.1. ToDo

1.1.1. Indoor navigation

Indoor navigation was realized with the use of a lidar and ultrasonic sensors. Willy can map a space and plan routes within it. The following features and improvements are recommended:

- Fine-tune indoor navigation
- Indoor navigation localization registration; Remember where Willy was in a certain room so he explores new places first.
- The storage and loading of previously mapped spaces and recognizing Willy's current location for further navigation.
- Navigating in spaces with a large audience. Recognizing moving objects and making decisions based on this.

1.1.2. Outdoor navigation

The only thing that has been realized so far with regard to outdoor navigation is GPS and the compass. GPS coordinates can be received inside ROS when subscribed on the /GPS topic.

- Location based on GPS
- Visualize GPS location.

- Accessibility determination based on location
- Route determination based on GPS and location determination
- Indoor navigation localization registration to keep Willy within a certain area.

1.1.3. Social interaction

Social interaction has been investigated. As a group we have focused on offline functionality at the request of the client. Offline functionality has been investigated; [Research Social Interaction](#)

Offline wakeword recognition has been realized through the use of 'Snowboy'. Documentation about Snowboy can be found on: [Snowboy Documentation](#).

Implementation of Snowboy on Willy is described here: <https://artofrobotics.github.io/WillyWiki/Config/index.html>

1.2. Advice

First, it's important to try to understand Willy and get trusted with the robot. Reading of all the documentation and trying to understand it is a must. Use the documentation to drive Willy. Another essential part of understanding Willy is the understanding of the underlying framework. Understanding how ROS works makes understanding Willy much easier.

Willy is a large and complicated project. There are a lot of things that can go wrong. At the start of the project this can give a lot of frustration. When this happens it is essential to know Willy. Dealing with such situations can help understanding Willy even more.

Another advice is that it is essential to keep updating this wiki. That way continuation of the project keeps guaranteed.