

WearLoc

A Wearable Indoor Localization Device

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RPLIDAR

360° omnidirectional laser scanner
Scan range 0.2 ~ 6m
Resolution: angular 1°, distance 2cm



Hokuyo URG-04LX

240° laser scanner
Scan range 0.02 ~ 4m
Resolution: angular 0.34°, distance 20mm



Raspberry Pi Model 2B

On the Raspberry Pi all the software components are running, including hector_slam. The resulting map is send via WLAN to a laptop to visualize it.



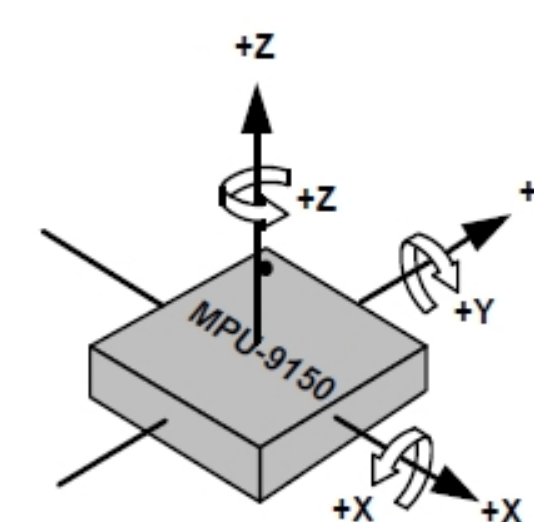
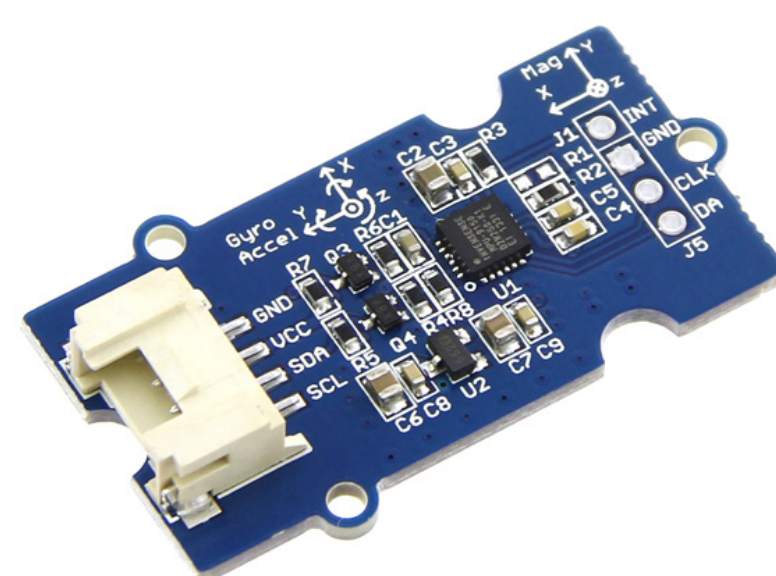
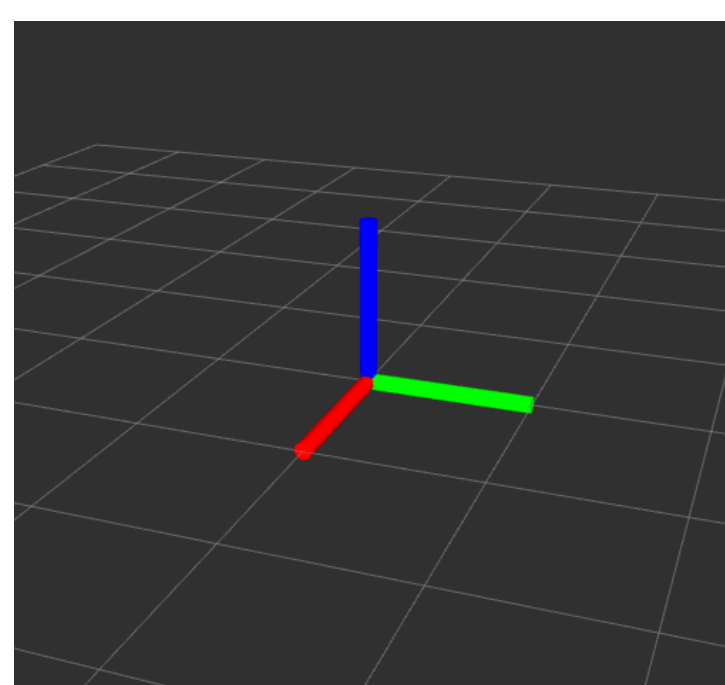
Intel Edison

We use the Edison to read out the scan and IMU data. Which is then send via WLAN to a laptop running hector_slam



Grove IMU 9DOF v2.0

The IMU is used to get the bearing of the laser scanner, so we can keep track of it's / the users rotation



Area of application

This device could be used in a search and rescue type situation.

In such a scenario the rescue team would be able to map out the area they have already visited.

Obstructed paths, due to possible debris, could possibly be marked as such.

This would enable new rescuers to find the best route to their intended destination.

Here, best could mean the quickest or the safest route, depending on the given environment.



Area of application

A possible area of application for such a device is cartography of caves.

It would enable a Speleologist to get the accurate data about the size of a cave.

An extension for this device could be a camera that also takes images of the surroundings during the slam process.

These images then could be projected on the resulting 3D map.

This would enable the Speleologist not only to see the dimensions of the cave at a given point but also the composition of the cave floor and walls, enabling virtual exploration of a cave.

Implementation Publicly Available at <https://github.com/JenniferNist/Wearloc>