Smart Experience Sampling

User Manual

Mick Thelosen,

492994

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Contents

Hardware

Components

Figure 1 Clicker Tray Assembly

Clicker

The clicker consists of:

- Battery
- PCB
- Pogo Pins
- Keyboard Switch

These parts are mounted to a tray which slides into the housing and is screwed in from the bottom of the housing.

Beacon

The beacon consists of:

- Battery holder
- 2x 18650 batteries
- PCB

Server

The server consists of:

- Raspberry Pi 5
- Power Supply
- STM32WB07 & DWS1000
- Screen to display the QOTD.

The STM32WB07 & DWS1000 are development boards for the chips that handle the UWB and Bluetooth communication that are connected to the server (RPI) over USB and act as a receiver for the incoming data sent by the clickers.

PCB

Both the clickers and the beacons use the same PCB. The PCB handles the battery charging and the inputs of the switch. The PCB is designed using KiCAD. The files for this will be able to be found in the GitHub repository.

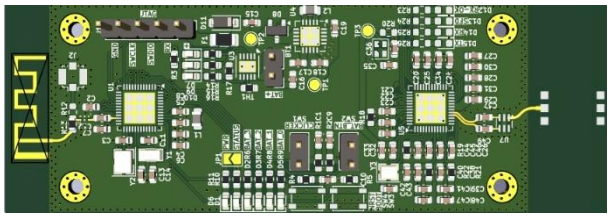

Figure 2 PCB.

Software

The code that runs on the components can all be found on the GitHub repository. The code is developed using the STM32CubeIDE and is written in C.

Setup

Prerequisites:

- A map and the dimensions of the environment.
- STM32CubeIDE
- ST-Link

Assemble the beacons and clickers.

If a beacon is new and has never been used before a channel on which the beacon will communicate needs to be specified. Every beacon has to have a specific channel between (1-39). Channel 0 is reserved for the server. To do this open Beacon_Software in CubeIDE and navigate to the main.c.

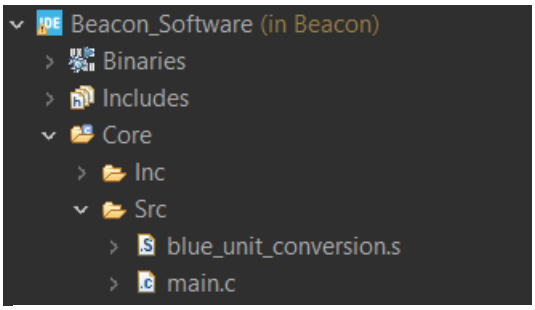

Figure 4 Beacon_Software main.c

This is where the BEACON_CHANNEL is defined at the top of the file change the beacon channel. Then upload the new code using the upload button  .

```
/* Beacon Channel (1-39) 0 is reserved */
#define BEACON_CHANNEL          (1)
```

Figure 3 Beacon_Channel Definition

To set up a Clicker no manual software changes have to be made.

The Development boards that act as the receiver for the incoming Clicks need to be connected to the RPI over USB and run the Server_Software. No changes have to be made to this code. The messages are transferred to the RPI using Serial at a baud rate of 115200.

Placing Beacons

Beacons should be placed withing 25 meters from each other to get the best measurements. When placing beacons keep track of where you are placing them and put this into the beacon map application. Using the beacon visualizer application, you can check if at least 3 beacons overlap everywhere in the environment.

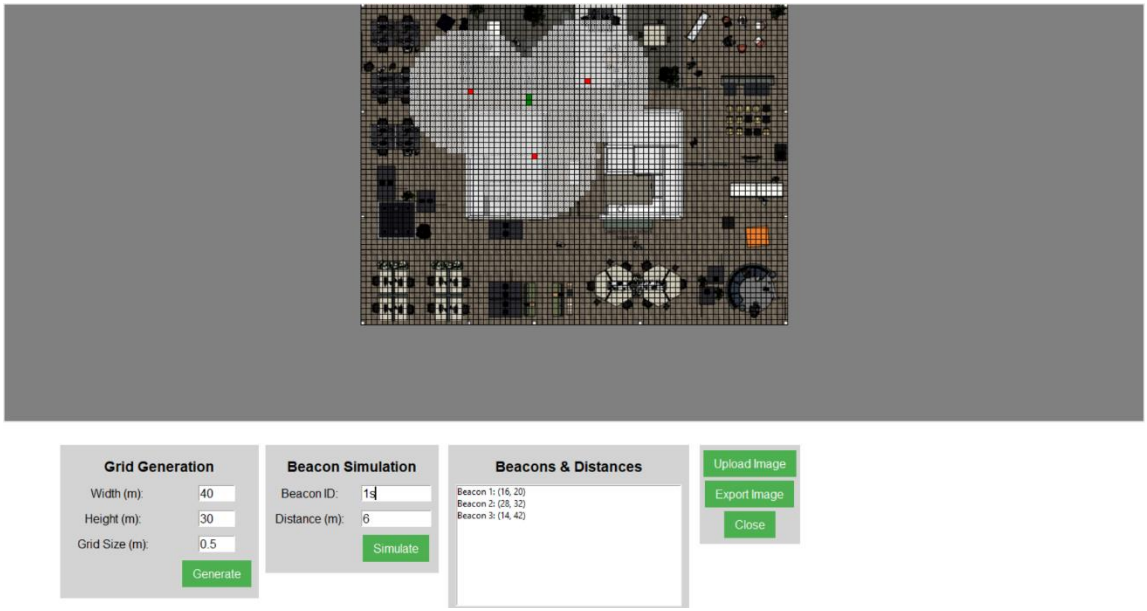

Figure 5 Beacon Visualizer

Figures