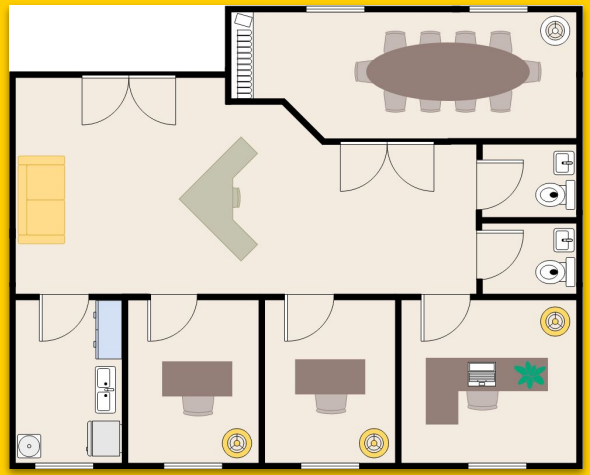


Indoor Positioning using NodeMCU

Jonas dos Santos

Objective

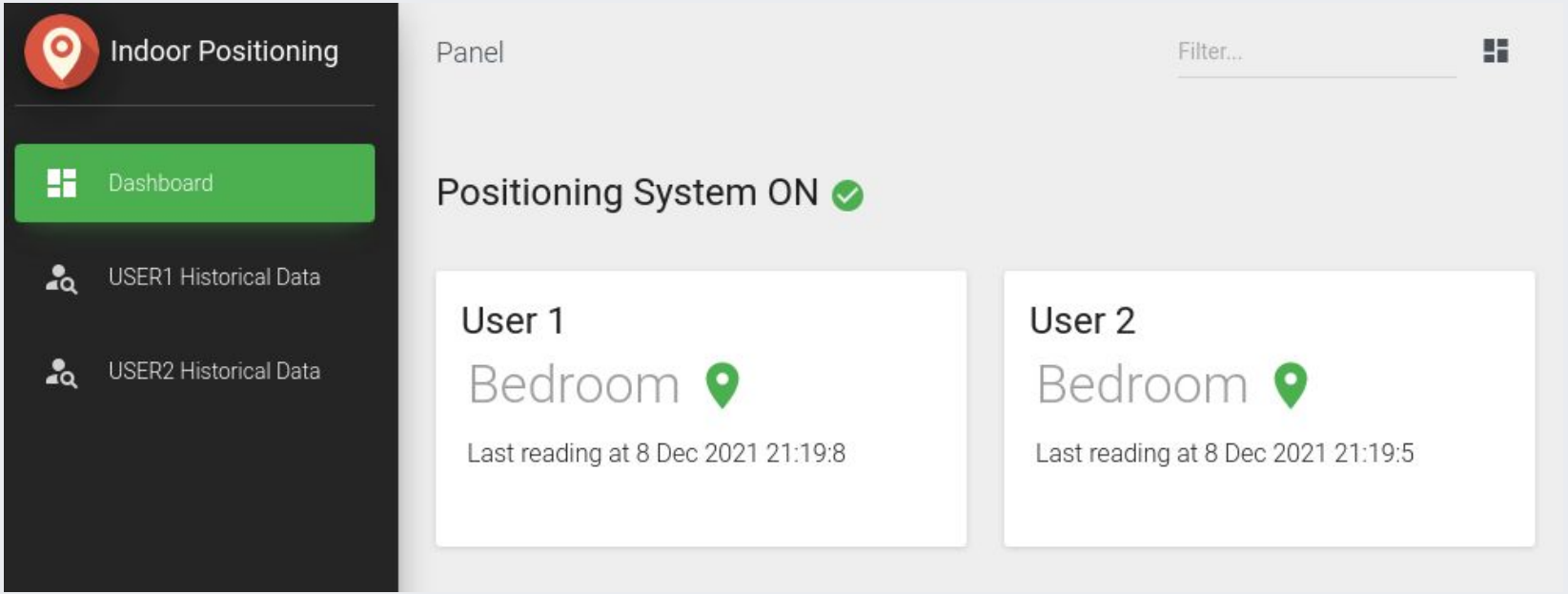
Create a system that is capable of tracking people **inside a building**

1 Demonstration

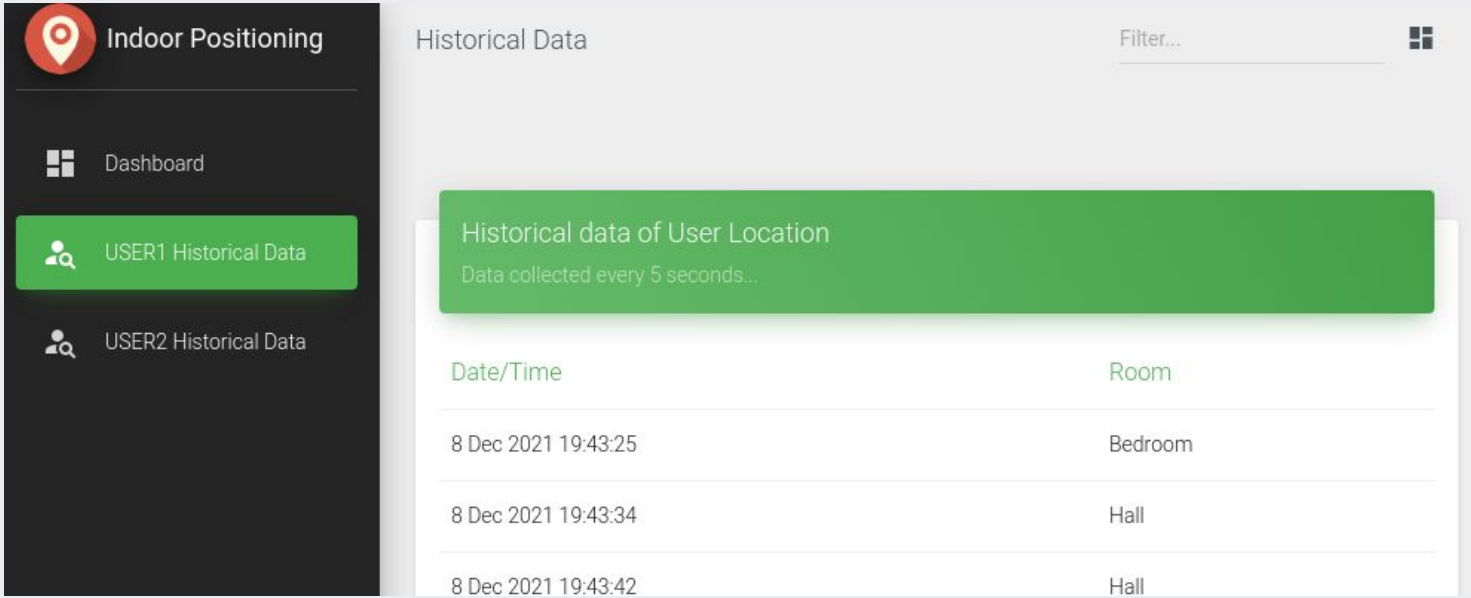
Web Application

- Can be found on the website https://indoor.jonascsantos.com

Web Application



Web Application

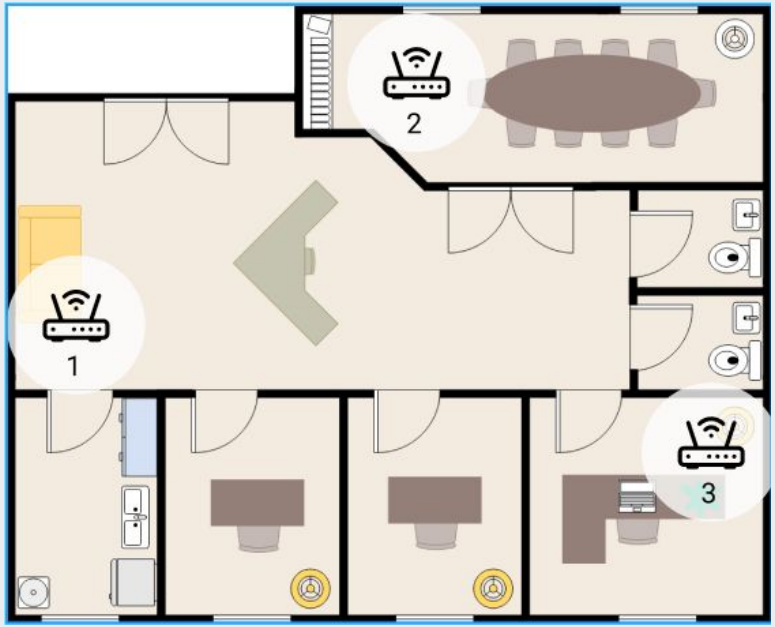


2 Specification

Specification

- For this project, I have decided to use WIFI.
- For this project, we will use a NodeMCU module, three or more WIFI networks nearby, and Machine learning.
- Web Application showing the location

Specification

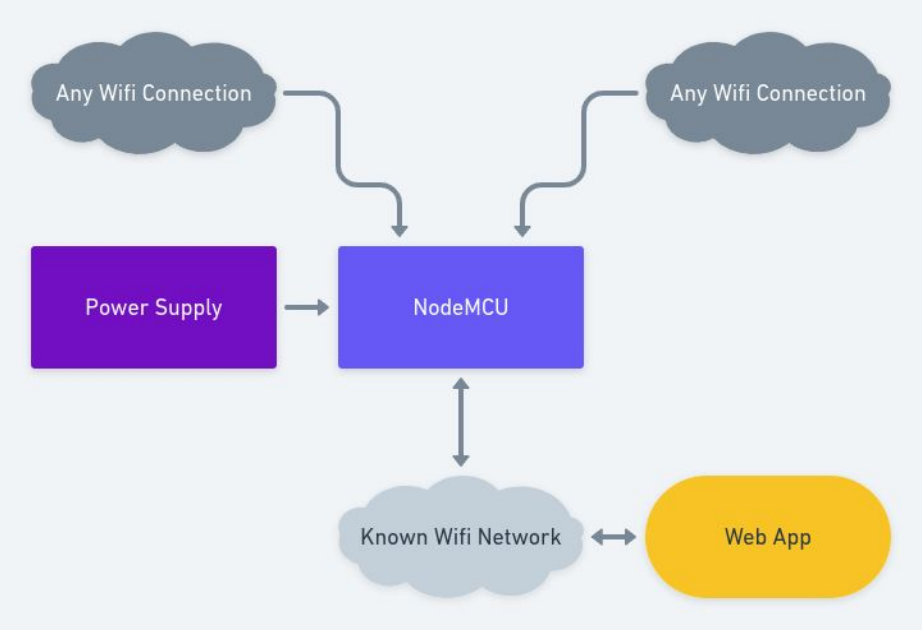


Specification

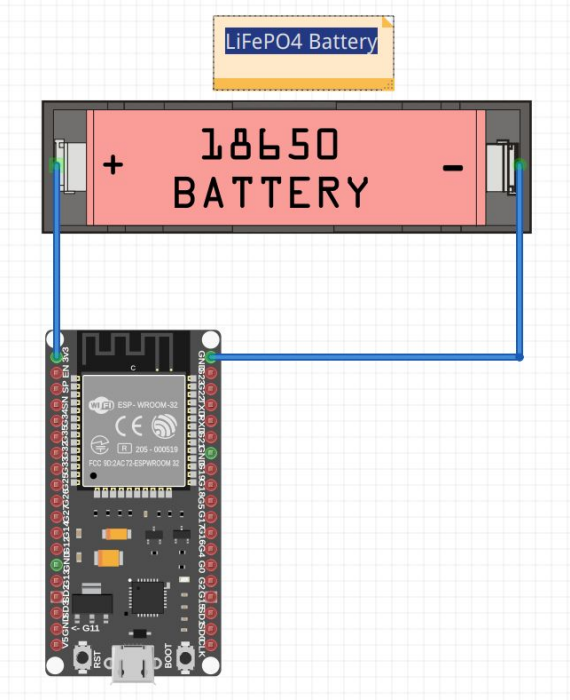
Location: Hall

3 Logical and physical system design

Logical system design



Physical system design



4 Cost

Cost

- 1x Ipari LFP 18650P 3.2V 1100mAh LiFePO4 Battery - 2300 Ft
- 1x NodeMCU ESP32 / NodeMCU32 (ESP32-WROOM-32D, CP2102, 38pin) - 4500 Ft

- The cost for this project will be around 6800 Ft

5 Description of parts

Description of parts

- Ipari LFP 18650P 3.2V 1100mAh LiFePO4 Battery

Description of parts

- NodeMCU ESP32 / NodeMCU32 (ESP32-WROOM-32D, CP2102, 38pin)

7

How it works?

How it works?

1. Collect Wifi Strength data from each room.

```
"Hall", "Vodafone-C4C6": -51, "WARRIOR": -77, "I ragazzi della via Pal": -79,
"Hall", "Vodafone-C4C6": -49, "I ragazzi della via Pal": -77, "WARRIOR": -78,
"Hall", "Vodafone-C4C6": -45, "I ragazzi della via Pal": -81, "UPC-AP-9064333
"Hall", "Vodafone-C4C6": -46, "WARRIOR": -81, "Lifespace Apartments": -83, "P
"Hall", "Vodafone-C4C6": -50, "Lifespace Apartments": -82, "I ragazzi della v
"Hall", "Vodafone-C4C6": -47, "Lifespace Apartments": -81, "WARRIOR": -84, "I
"Hall", "Vodafone-C4C6": -44, "I ragazzi della via Pal": -78, "WARRIOR": -88,
"Hall", "Vodafone-C4C6": -49, "I ragazzi della via Pal": -79, "Lifespace Apar
"Hall", "Vodafone-C4C6": -52, "I ragazzi della via Pal": -75, "UPC-AP-9064333
```

How it works?

1. Collect Wifi Strength data from each room.

2. Generate a code that will convert SSID (Network name) to Array ID

3.

```
if (ssid.equals("UPC9212101"))
return 44;

if (ssid.equals("UPCBCE9E4A"))
return 45;

if (ssid.equals("Vodafone-4CC5"))
return 46;

if (ssid.equals("Vodafone-C4C6"))
return 47;

if (ssid.equals("WARRIOR"))
return 48;
```

How it works?

1. Collect Wifi Strength data from each room.

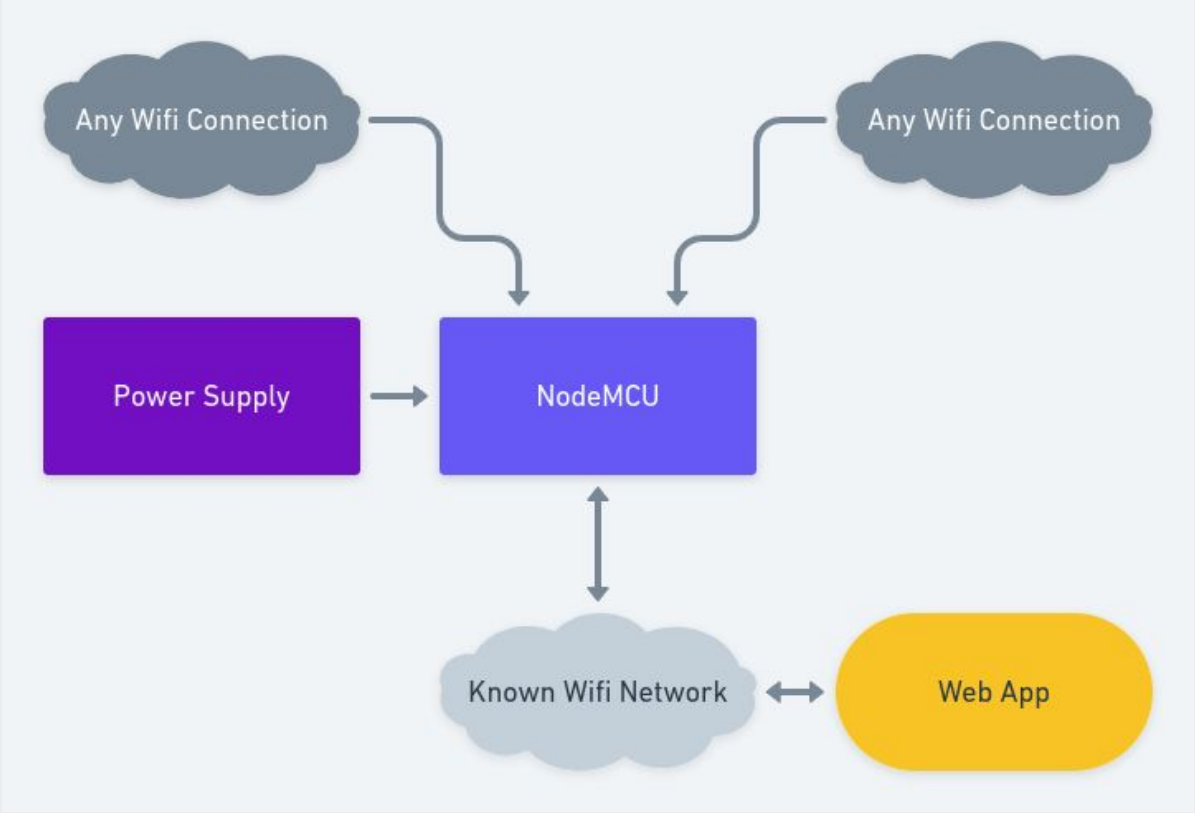
2. Generate a code that will convert SSID (Network name) to Array ID

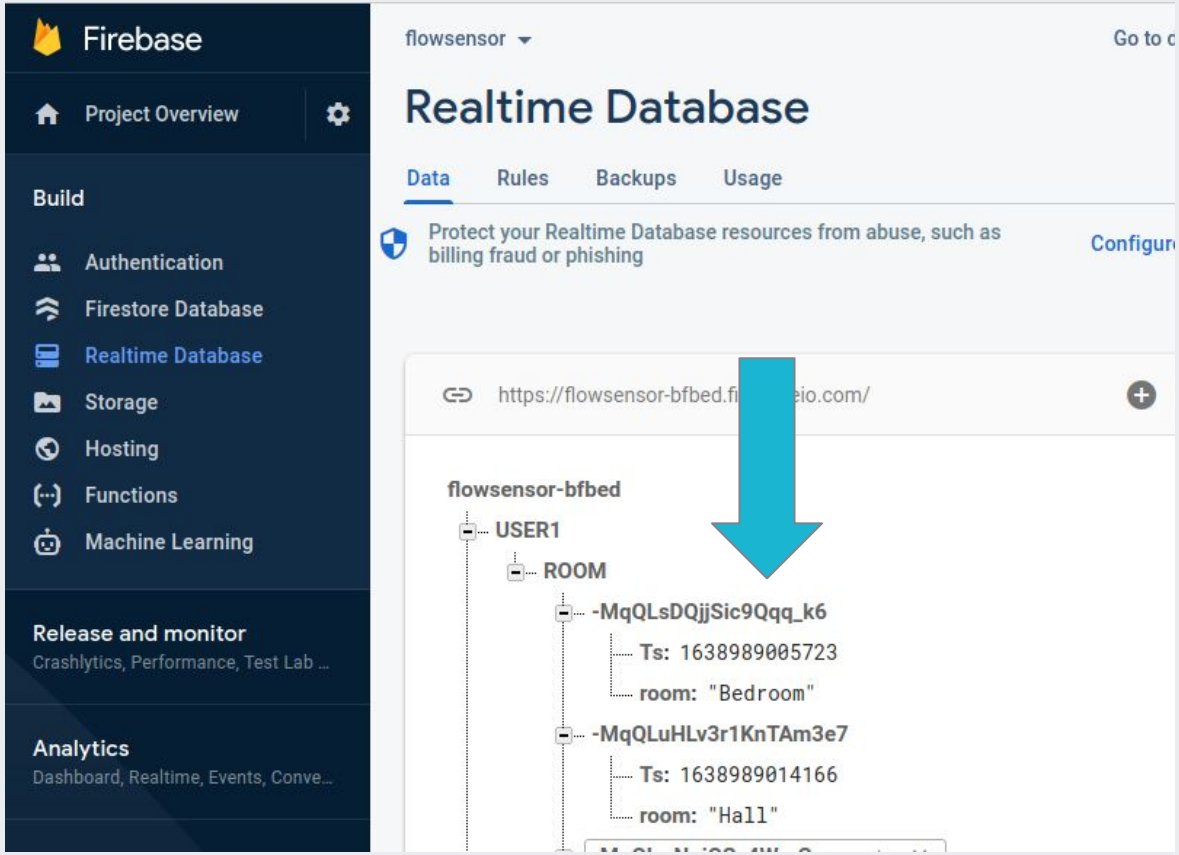
3. Generate a Classifier: Will output the location based on the input wifi strengths

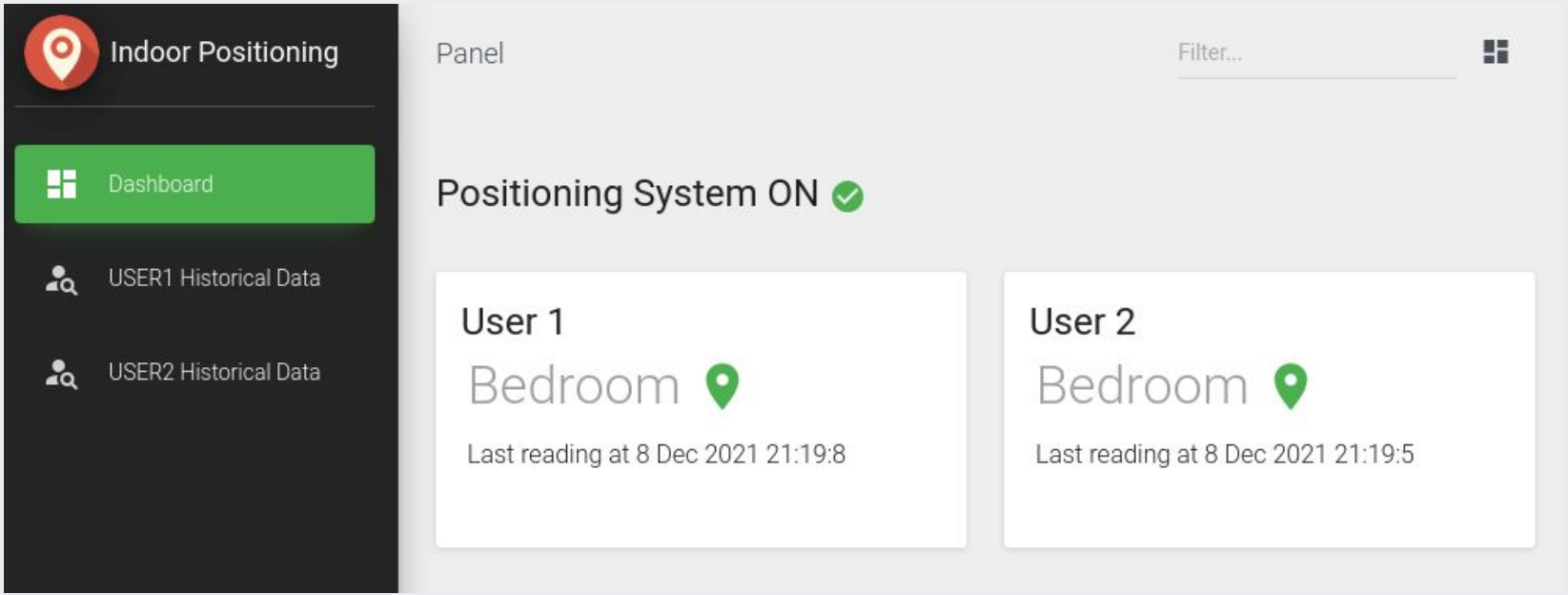
```
class DecisionTree {
    public:
        int predict(float *x) {
            if (x[62] <= -73.0) {
                if (x[65] <= -63.5) {
                    if (x[32] <= -43.5) {
                        return 0;
                    }

                    else {
                        return 1;
                    }
                }

                else {
                    return 0;
                }
            }
```


Any Wifi Connection
Any Wifi Connection
Power Supply
NodeMCU
Known Wifi Network
Web App


Firebase
Project Overview
Build
Authentication
Firestore Database
Realtime Database
Storage
Hosting
Functions
Machine Learning
Release and monitor
Crashlytics, Performance, Test Lab ...
Analytics
Dashboard, Realtime, Events, Conve...
flowsensor
Go to c
Realtime Database
Data
Rules
Backups
Usage
Protect your Realtime Database resources from abuse, such as billing fraud or phishing
Configur
https://flowsensor-bfbed.fi eio.com/
flowsensor-bfbed
USER1
ROOM
-MqQLsDQjjSic9Qqq_k6
Ts: 1638989005723
room: "Bedroom"
-MqQLuHLv3r1KnTAm3e7
Ts: 1638989014166
room: "Hall"


Indoor Positioning
Dashboard
USER1 Historical Data
USER2 Historical Data
Panel
Filter...
Positioning System ON
User 1
Bedroom
Last reading at 8 Dec 2021 21:19:8
User 2
Bedroom
Last reading at 8 Dec 2021 21:19:5

Thank you!

Any questions?

You can find me at:

- info@jonascsantos.com