Step Counting Device

Describe

- This project focuses on developing a smart wearable device capable of counting the user's steps. It utilizes the STM32F411RE - Nucleo Board and a 3-axis gyro sensor for precise motion detection.
- Additionally, we have incorporated the MFRC522 IC, allowing user identification through pre-set ID_Cards. Once a user scans their card and the system successfully recognizes one of the pre-configured IDs, the device initiates step counting. Scanning the card again stops the counting process, all while displaying information on an OLED screen.

Features

1. **User ID Recognition**: Scan the ID card to be able to activate the step measurement function corresponding to the user.
2. **Step Counting**: Measure the user's steps.
3. **Real-time Clock Display**: Displays the time from the beginning of the pedometer to the end.
4. **User Name Display**: Display the user name corresponding to the ID card.

Hardware Components

Module	Functionality
STM32F411RE - Nucleo Board	The central processing unit
MPU6050 3-axis Gyro Sensor	Responsible for detecting user motion
Module MFRC522	Identify user ID
OLED Screen	Displays real-time clock information, user name and step counting
DS1307 (RTC)	Provide real-time clock information

Detailed Features

1. **User ID Recognition**

Number	Functionality	Note
1	Identification of the ID code on the ID card	Users can scan the ID card to start taking the step counting device

2. **Step Counting**

Number	Functionality	Note
1	Step count	The device relies on a 3-angle sensor to be able to detect the user's movement and thereby provide accurate step data.

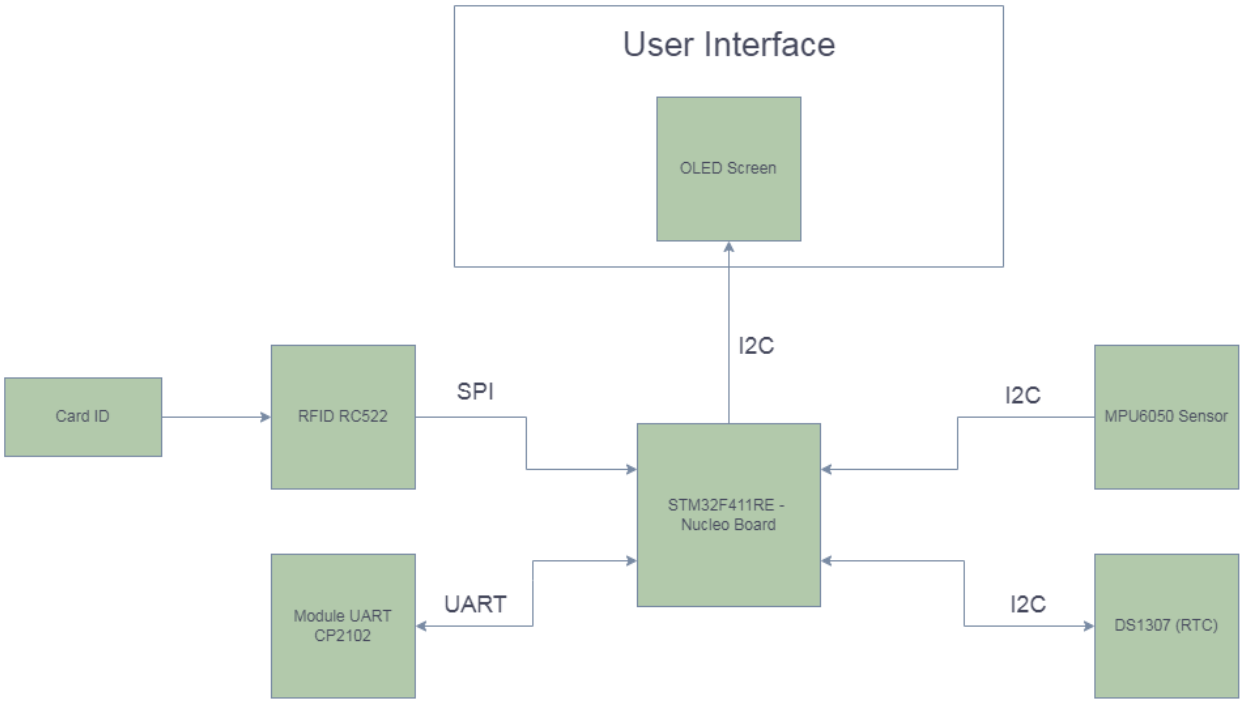
3. **Real-time Clock Display**

Number	Functionality	Note
1	Display time	Displays the hour from the start of the pedometer to the end

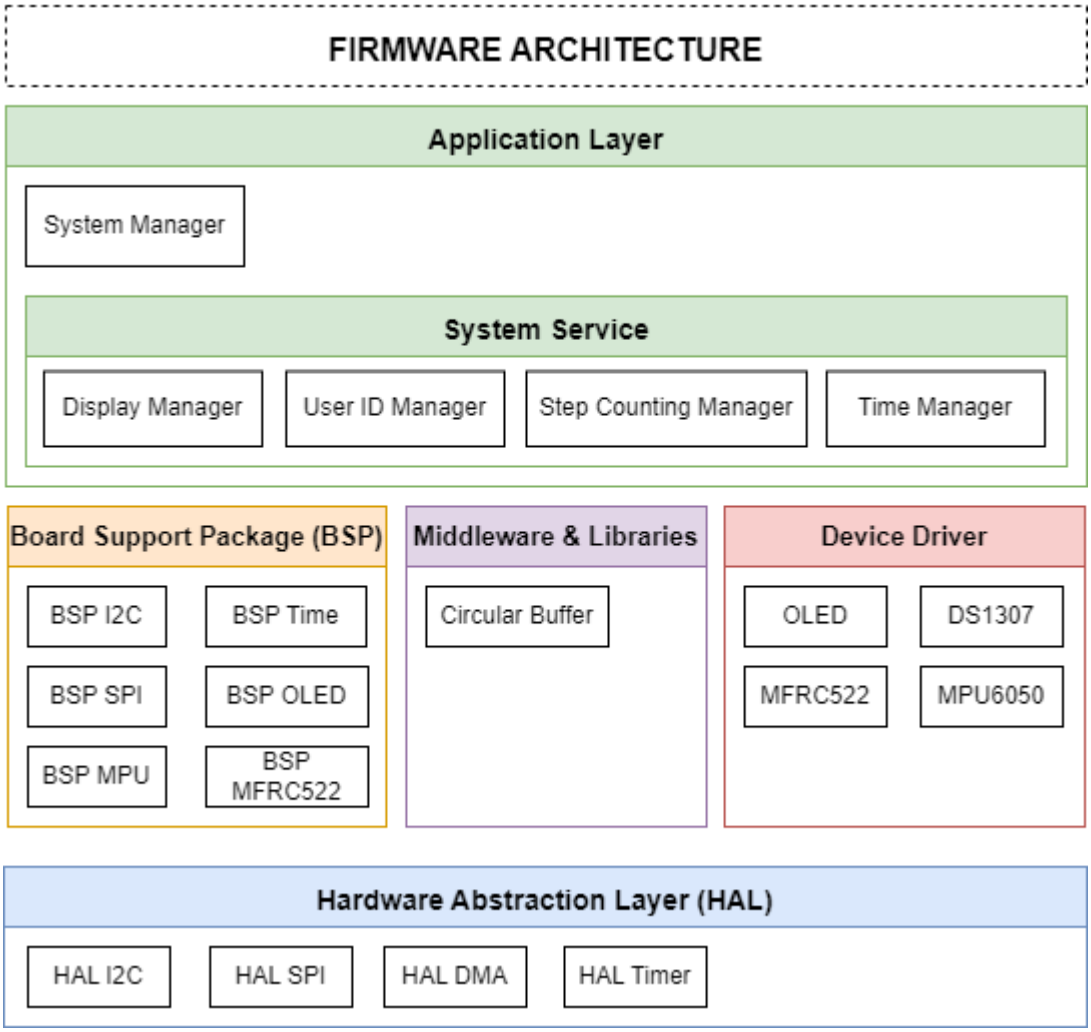
4. **User Name Display**

Number	Functionality	Note
1	Display user's name	Displays the user name corresponding to the scanned ID number

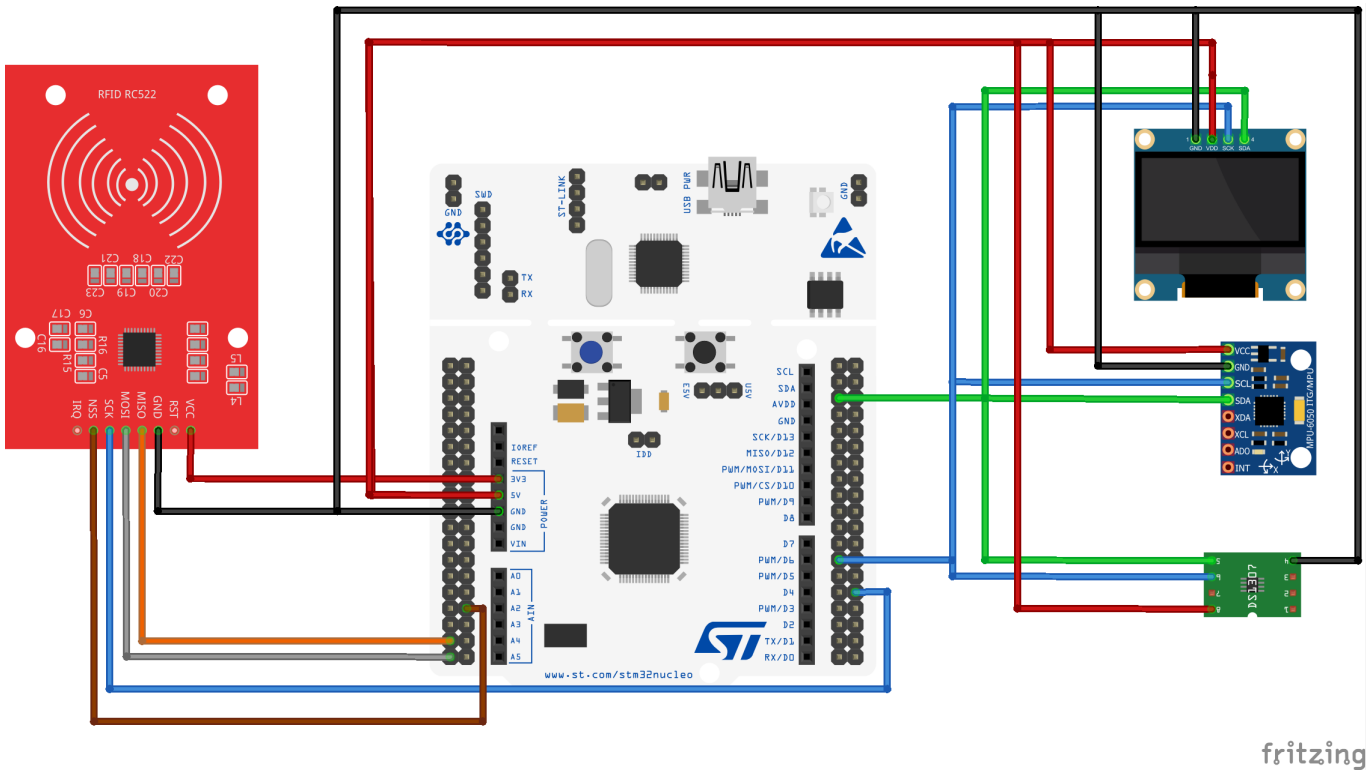
Block Diagram



Firmware Architecture



Schematic



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