Universitatea Politehnica Timișoara

Universitatea Ștefan cel Mare Suceava

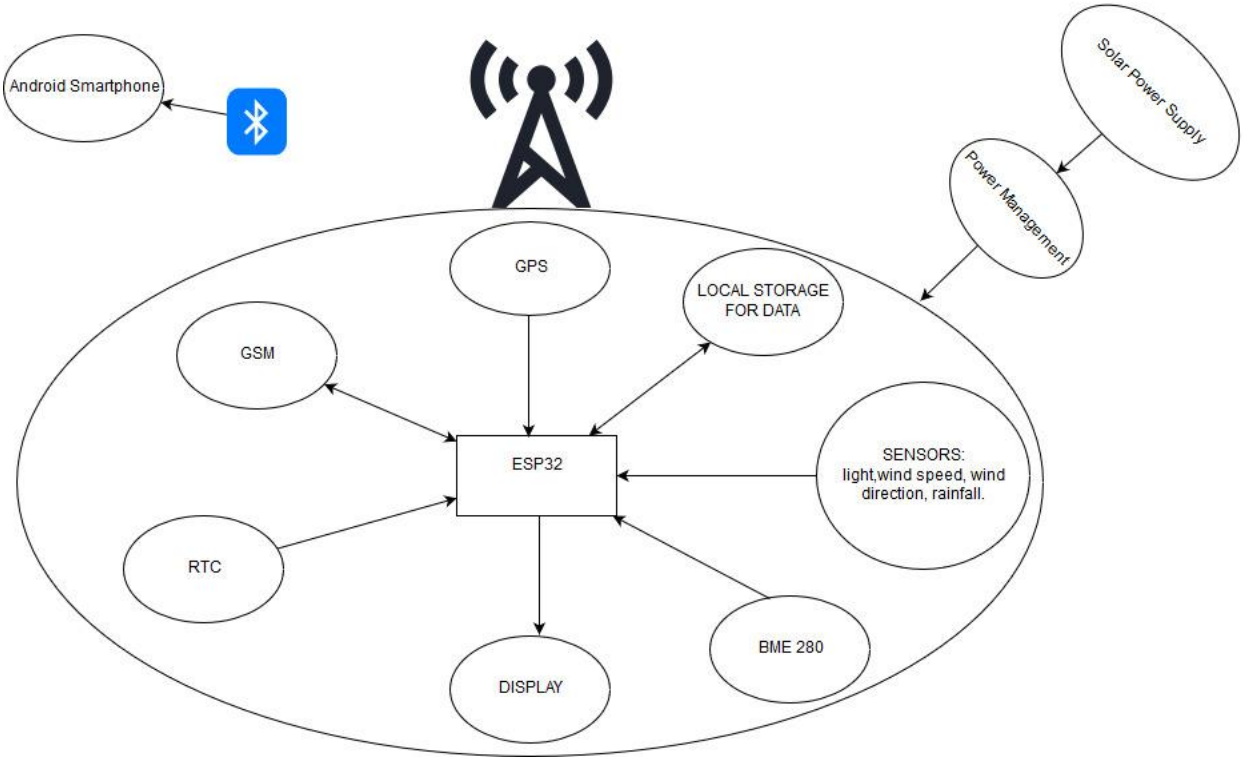
Hard and Soft 2018

Remote, No Moving Parts, Weather Station

Timisoara Team 2

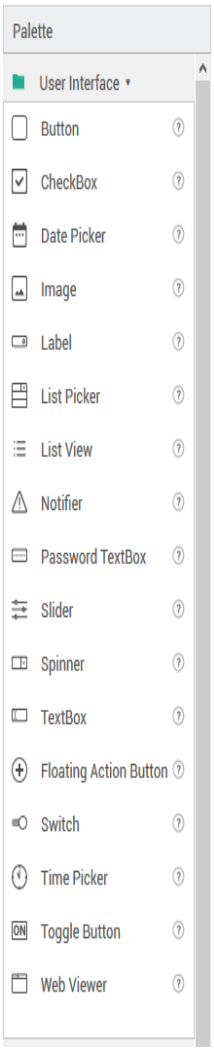
We built a remote weather station with no moving parts which can datalog various enviromental conditions. Weather station sends its data for display to an App on an Android smartphone by Bluetooth. We use ESP32 as a main subsystem which takes data like temperature, humidity and atmospheric pressure from BME280 on I2C . The values received from BME280 are processed and sent via Bluetooth to android application.

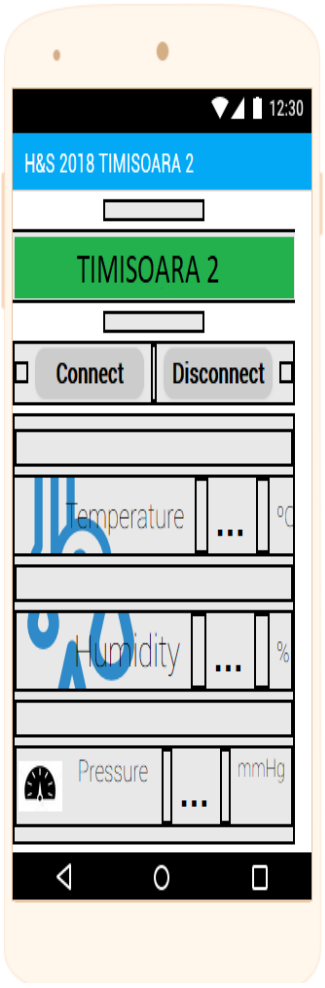
Security is a key aspect of our design, the hardware connections between the ESP32 and sensors are inherently secure from an unwanted third party, the Bluetooth communication with the mobile smartphone application is crypted, the module will only pair with a particular MAC address and just to be sure we will add an ID to the frames sent via Bluetooth and every message with a wrong ID will be discarded.

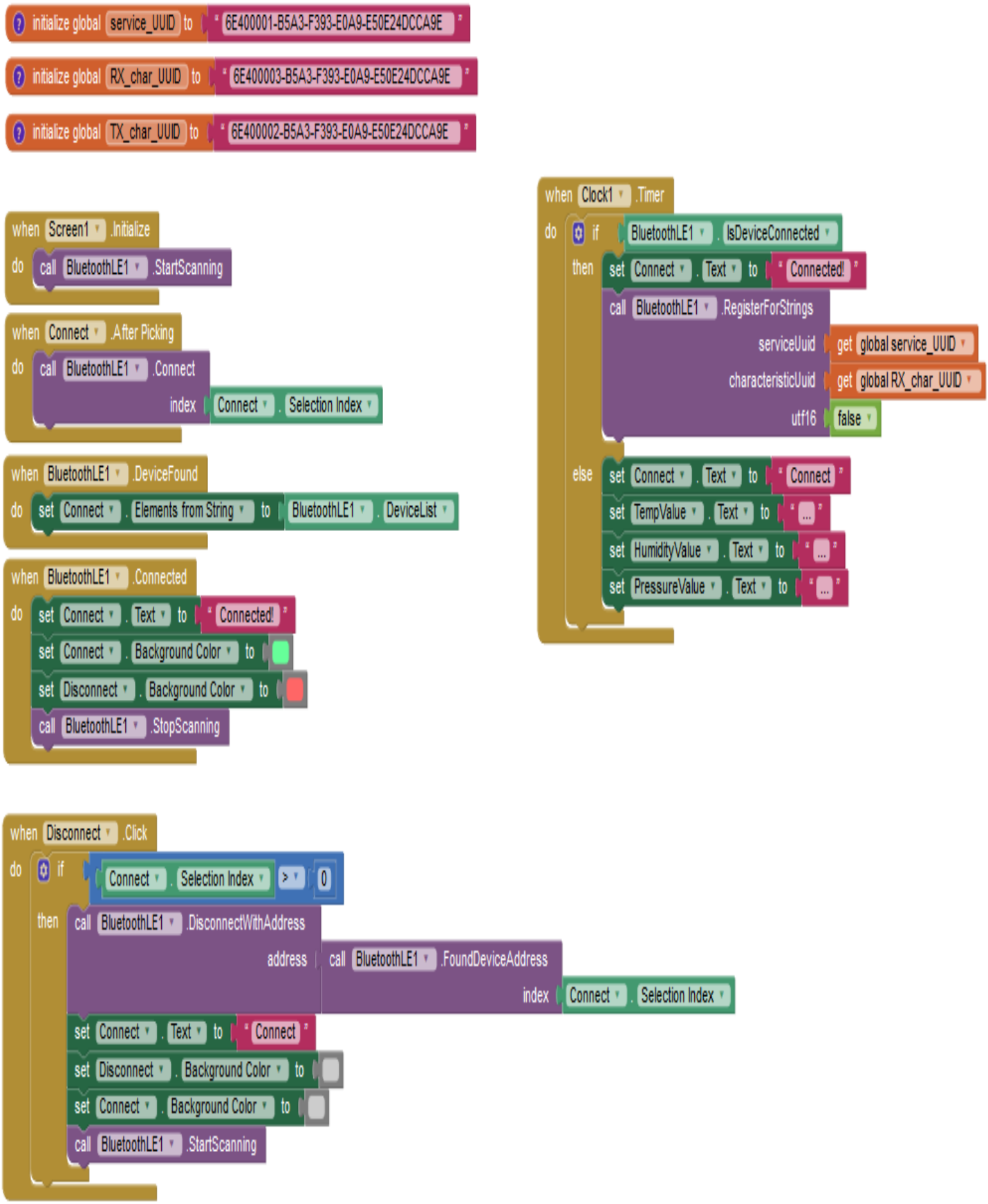


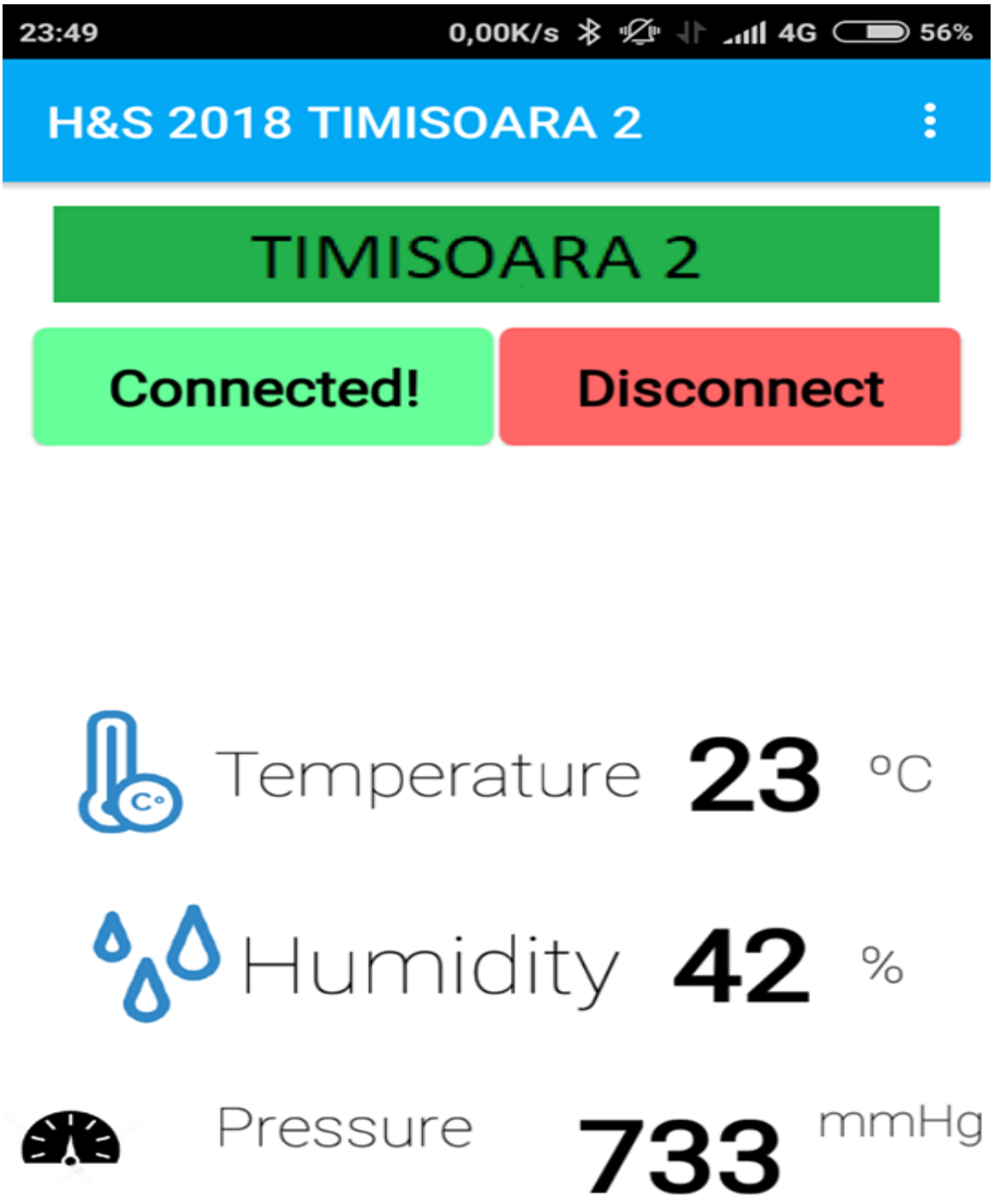
Android Application

Our android application was created in Thunkable and search for BLE devices and connect to the selected BLE device from the displayed list. Application also displays data received from the BME 280 sensor like temperature , humidity and atmospheric pressure.






initialize global service_UUID to " 6E400001-B5A3-F393-E0A9-E50E24DCCA9E "
initialize global RX_char_UUID to " 6E400003-B5A3-F393-E0A9-E50E24DCCA9E "
initialize global TX_char_UUID to " 6E400002-B5A3-F393-E0A9-E50E24DCCA9E "
when Screen1 .Initialize
do call BluetoothLE1 .StartScanning
when Connect .After Picking
do call BluetoothLE1 .Connect
index Connect . Selection Index
when BluetoothLE1 .DeviceFound
do set Connect . Elements from String to BluetoothLE1 . DeviceList
when BluetoothLE1 .Connected
do set Connect . Text to " Connected! "
set Connect . Background Color to
set Disconnect . Background Color to
call BluetoothLE1 .StopScanning
when Clock1 .Timer
do if BluetoothLE1 . IsDeviceConnected
then set Connect . Text to " Connected! "
call BluetoothLE1 .RegisterForStrings
serviceUuid get global service_UUID
characteristicUuid get global RX_char_UUID
utf16 false
else set Connect . Text to " Connect "
set TempValue . Text to " ... "
set HumidityValue . Text to " ... "
set PressureValue . Text to " ... "
when Disconnect .Click
do if Connect . Selection Index > 0
then call BluetoothLE1 .DisconnectWithAddress
address call BluetoothLE1 .FoundDeviceAddress
index Connect . Selection Index
set Connect . Text to " Connect "
set Disconnect . Background Color to
set Connect . Background Color to
call BluetoothLE1 .StartScanning


23:49
0,00K/s
4G
56%
H&S 2018 TIMISOARA 2
TIMISOARA 2
Connected!
Disconnect
Temperature
23
°C
Humidity
42
%
Pressure
733
mmHg

Versioning our work

We use Git to keep our work safe and for tracking changes in our files and coordinating work on those files between us . As a Git application we use GItKraken. We create a repository in GitHub and every member of the team clone this repository and use GitKraken to push their changes.