



GadgEon
Engineering Smartness



Smart Radiator Valve

European start-up wanted to build a smart radiator valve which can lower the cost of heating by up to 30% and saving the green house emissions.

Project Duration: 7 months

Technology Used: BLE 4.0 on Nordic NRF51xx, Central and peripheral role on same BLE chip, OLED

Challenge

- Implementing a BLE based custom mesh network to communicate between multiple Valves and Mobile App

Outcome

- Smart Valve that can be retrofitted in existing Valves and controlled from Mobile App
- Room based temperature configuration schedule which can be set from user's mobile App
- Temperature and mode control from mobile App as well as directly from Valve's knob
- Support for detection of open windows to optimize energy usage
- Automatic presence detection and setting to away mode when appropriate to reduce the energy consumption

WHAT DID GADGEON DO?	PLATFORMS/ TECHNOLOGIES USED
1) Software Architecture for complete system	<p>Requirements Gathering & Analysis, Uses cases, Architecture development, identification of functional components.</p> <p>Defined custom BLE profiles and services for implementing use cases</p>
2) Firmware	<p>Developed BLE firmware in Nordic nRF51822 using nRF SDK for implementing the custom services and use cases</p> <p>Implemented a BLE mesh like network of devices that controls radiator valves</p> <p>Integrated concurrent BLE Central and Peripheral roles in nRF51822 for implementing communication between valves in a home and communication with user's mobile App.</p> <p>Implemented synchronization of operation mode and temperature settings of all valves in a home via BLE mesh like network.</p> <p>Integrated algorithm for controlling Radiator motor and open window detection logic</p> <p>Implemented a smart user presence detection method using user's mobile.</p> <p>Drivers for rotary encoder, temperature and humidity sensor, OLED display and motor actuator</p>





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