Embedded systems 2

Cosy Cafeteria: Masterplan

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1 Concept

To improve the experience of the students in the cafeteria, an embedded system will be developed to gather a variety of data. This data will then be display to the students through an online medium such as a website. The main focus will be to gather information about the amount off people that are in the cafeteria. There are two main goals. The first goal is to display the estimated waiting time to get a meal to the students. Secondly the amount of available seats will be tracked and displayed to the students. Next to this some additional information will be gathered. The temperature, air-quality and sound level will be monitored to give the student a general idea about the conditions in the cafeteria. This way the student can gauge if the cafeteria is suitable to study in at a certain moment. 2

2 Specifications

2.1 Functional specifications

- Monitor the available seats
- Monitor the queue to get a meal
- Display the data to the students
- Energy provision for 1 semester (4-5 months)
- Wireless coverage over the entire campus
- Measure new data every 10 minutes
- Send the data to the online medium every hour
- If the data changes with a large amount (needs to be specified) update the online medium sooner

2.2 Other technical specifications

- Enclosure: 10 x 10 cm
- Easy deployment: the node must be easy to attach and detach from the sealing
- Must be easy to recharge (Wireless or via USB)
- Light weight: 300 g (so it wont detach from the sealing)

2.3 Non-technical specifications

- Cost: €??
- The data should be easy accessible to the students

2.4 Situation sketch

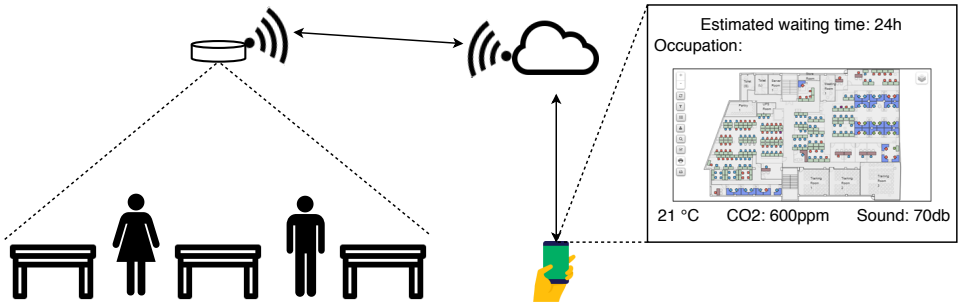

Figure 1: Situation sketch

3 System architecture

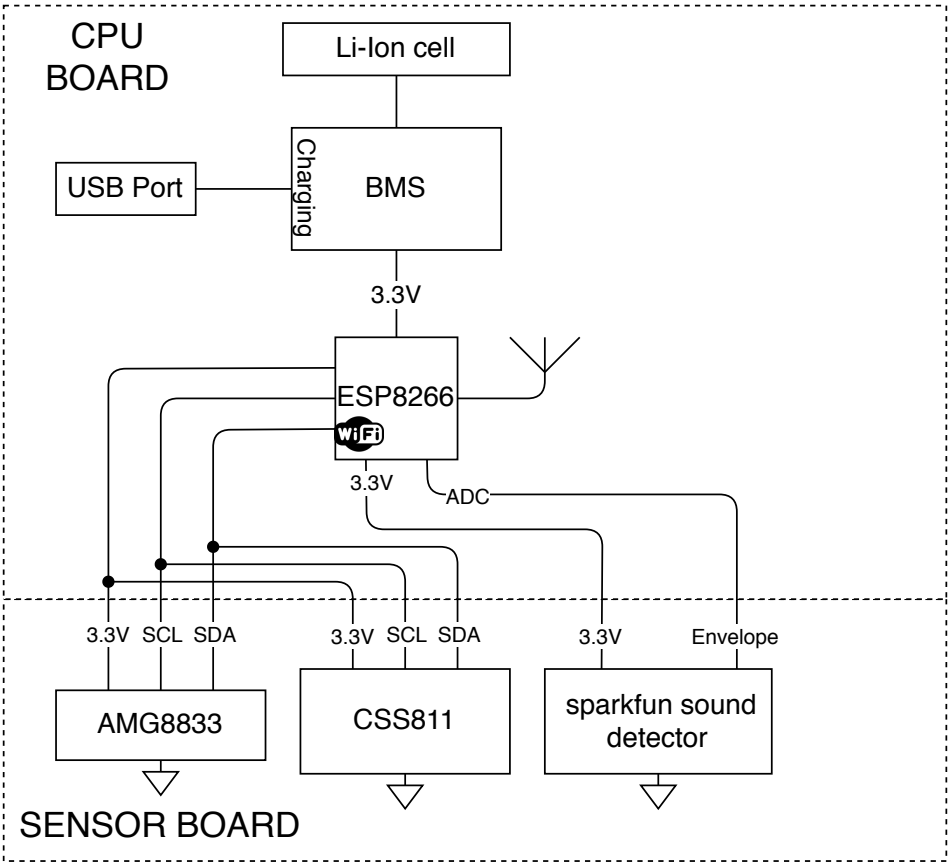

Figure 2: System architecture

4 Responsibilities

4.1 Technical:

- Power system (Battery, under and overcharge protection, voltage converters,...): Tobias
- Communication system: Thomas and Tobias
- PCB integration: Arthur
- Sensors: Robin
- Software integration: Thomas

- Online dashboard to display data: Arthur
- Enclosure: Robin

4.2 Non-technical:

- Time manager: Robin
- Project manager: Thomas
- Documentation/Report: Tobias
- Presentation: Arthur

5 Milestones

5.1 Battery and power management

- 2/03: Component selection
- 5/03: First draw schematic
- 6/03: Order components
- 12/03: First PCB design
- 13/03: Order PCB
- 20/03-1/04: Testing first prototype
- 3/04-10/04: Problems from first version solved and order new PCB

5.2 Communication

- 20/03: Succesfully connect to school enterprise WiFi
- 3/03: Receive data in Python
- 17/04: Reduce WiFi consumption

5.3 Sensors

- 2/03: Component selection
- 5/03: First draw schematic
- 6/03: Order components
- 12/03: First PCB design

- 13/03: Order PCB
- 20/03-1/04: Testing first prototype
- 3/04-10/04: Problems from first version solved and order new PCB

5.4 Case

- 27/03: initial design
- 14/04: final design and start 3d printing

5.5 Software

- 13/03: Investigate low power modes of ESP8266
- 27/03: Implement different states for software
- 10/04: Integrate sensors
- 24/04: Low power readout from the sensors

5.6 Online dashboard

- 6/03: Configure Raspberry pi as server
- 13/03: initial database + receive first data
- 20/03: initial version of dashboard
- 10/04: finished version of dashboard

5.7 PCB integration

- 5/03: First draw schematic
- 6/03: order components
- 12/03: First PCB design
- 20/03-1/04: Testing first prototype
- 3/04-10/04: Problems from first version solved and order new PCB