Physical Computing
Umbrella Reminder Outline

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1 Introduction

The device we want to create is a smart umbrella holder.
When stepping outside the door, the device recognises movements and, based on the weather forecast, it recommends to take an umbrella if needed.
This was the first idea we had about this device, after refining the idea we thought that the device could make much more. For example, it could remind you about usual things you take outside, like your lunch box, or it could be used to remind someone else about something.

1.1 Motivation Scenario

It happens often when going outside that one forgets something at home, and most of the time when we realise that, we are already quite far away. So it could be useful to have a device that will remind you to take the things you need at the very last moment when stepping outside the door.

1.2 Hardware and Software Components

To create the prototype we will need:

- Server side software to filter and store incoming data. (filter weather forecast information or store user's habits)
- Web application in order to insert user's habits.
- Arduino software to communicate with the server and interact with input and output devices.
- 1x Arduino due (ports of the uno will be not enough)
- 1x TFT display
  2.4" TFT Shield mit Touch / microSD - ILI9341 (Play-Zone)

- 3x Magnetic sensors + magnet
  `https://www.adafruit.com/products/158`
- 1x WiFi Shield
- 1x Bluetooth module with Central Role
  `http://redbearlab.com/blemini/#HCI`
  `https://store.redbear.cc/product/ble/ble-mini.html`
- 1x Piezo
- 1x Motion sensor
  `https://www.adafruit.com/products/189`
- 5x Buttons

2 Prototype Description

2.1 Potential architecture

We designed a first draft of what we think the final product more or less would look like .

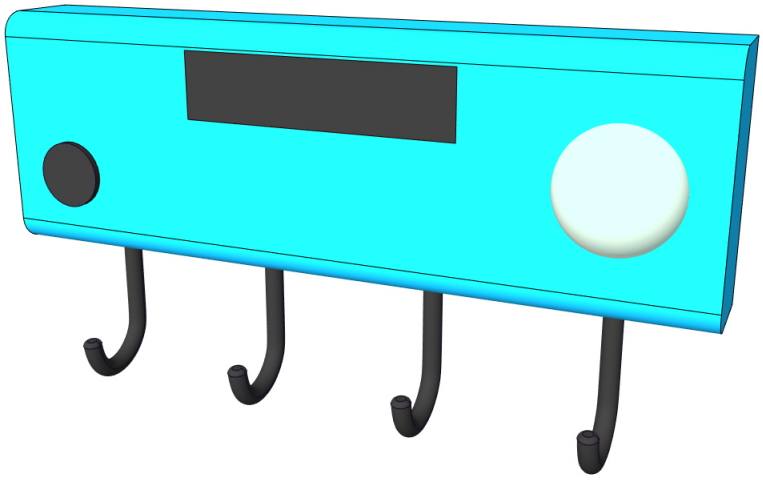

Figure 1:

2.2 Code to be Written

The code that we expect to write consists in two parts. The first part would be responsible for the control and interaction with the Arduino, while the second part would be residing on a smartphone as a mobile application that would be

used to intercat with the device, set it up and make it perform some actions. We are going to try and split the code based on the sensors we will need. Clearly there will be a logical part that uses and connects the components in a proper way.

Arduino part:

- I/O sensor:
  - Device discovery (done via Bluetooth)
  - To perform http request we are going to use a WiFi Shield. The requests are done to the server we will provide.
- Input sensors
  - Button will be placed to perform some simple actions on the device.
  - Motion sensor is used to see if someone is moving in front of it.
  - Magnetic sensors are used to recognise if there are umbrellas attached.
- Output actuators:
  - The piezo is used to perform a sound in order to gain the attention of the user.
  - A TFT display is used to show information or guide the user during the interaction process.

Web Application:

- Develop a user interface in order to register users and things to remind.