**IT Project – Smart Mailbox**

**OVERVIEW**

As a team we discussed everyone’s project idea from assignment 1 as well the other possible project ideas. Collectively we decided to expand on an individual’s idea.

The project idea we are going to expand on is the Smart Mailbox Notifier.

The Smart Mailbox leverages your existing mailbox and home Wi-Fi internet in order to send you notifications whenever someone interacts with your mailbox by delivering letters and parcels.

An App installed on your smartphone will let you get notifications about any event happening on your mailbox. You will also be able to track mailbox trends (eg. Which day of the week has the highest triggers) and a custom speaker fitted next to the sensor will also let you play a custom audio file on mailbox trigger. This projects core system is a micro-controller with a Wi-Fi module, a speaker, as well as a smartphone app.

**MOTIVATION**

The demand for Home Automation has drastically increased in the past decade. According to Forbes, smart home device market is set to grow from $55 billion in 2016 to $174 billion by 2025. With the increasingly popular IoT (Internet of Things) devices becoming more and more mainstream and cheaper to buy, turning a lot of objects in your home such as your lights or your curtains smart has become the trend. The physical mailbox however does not have a lot of automation broadly available in the current market, we think there is a big potential to market an easy-to-install kit to monitor your mailbox wherever you are. Having the ability of monitoring your mailbox, in a world where mail is now a source for thieves trying to obtain information on property occupants, adds an additional layer of security.

**TOOLS AND TECHNOLOGIES**

This project would use multiple components, such as:

* A micro-controller such as an ESP32, that has integrated Wi-Fi and Bluetooth.
* A micro-controller was chosen for its robust design. Having the ability to work in temperatures of –40°C to +125°C is an ideal choice for the Australian harsh climate.
* A micro-controller is also a powerful small piece of kit with a dual-core CPU capable of 80, 160 or 240mHz along with 512KB SRAM on chip memory.
* Power consumption is an important aspect when it comes to designing a standalone device without a hard-wired power source. Using a micro-controller with ultra-low power consumption aids tremendously in length of battery life.
* Cost – microcontrollers can cost as little as a cup of coffee.
* Lastly, having built in Wi-fi and Bluetooth eliminates the need for any extra radio modules. This has the benefit of keeping the complete kit as small as possible.

- A light sensor combined with a motion sensor, a moisture sensor and a temperature sensor.

- Optional: A 3D Printer to create the case.

- Arduino IDE in order to program the micro controller

- A Smartphone app (Both deployed to Android/iOS) that will receive data about the sensor such as notifications and battery life. C# language and Xamarin.Forms would be my preferred choice of development tools as it can do cross-platform deployment.

-A database server to store the data from the sensor, and in return will let the smartphone app access it.

SKILLS REQUIRED

The required skills for this project are:

- A software developer proficient in C# and the Xamarin platform in order to produce the Android/iOS app.

This developer will also need to know how to set up and communicate to an external database on a server.

- A UX/Graphic designer to help with the interface/graphics of the app.

- A Digital marketing person to help promote the project.

- A micro-controller hobbyist or enthusiast that can set up the ESP32 with the sensors and program it.

(Optionally can draw a model for a case and print it out using a 3D Printer)

OUTCOME

By putting on the market a smart mailbox notifier kit, this would help a lot of people at the office receive live data regarding their mailbox without being at home, which would also help with mail theft. This smart mailbox market doesn't have a lot of offerings, and by bringing an affordable and easy to install solution for existing mailboxes, this could potentially become as popular as smart LED lights or even spark ideas for future iterations of this product.

DESCRIPTION

The Smart Mailbox Notifier's journey starts inside the mailbox, where it is mounted on the inner top part near the letter box.

Equipped with Light/Motion/Moisture/Temperature sensors, this mailbox notifier system will start capturing data as soon as you turn it on.

Even before the mailman is about to push in letters, you will know exactly at any time of the day how warm or humid your mailbox is, sending you incremental data every 15 minutes.

The Mailbox Notifier case will be rugged, weatherproof and waterproof, to ensure optimal functionality.

A decent rechargeable battery will provide the sensor for up to 3 weeks of operation, and charging will only take around 2 hours, which lets you enjoy minimal downtime and a piece of mind.

* Maybe the use of a solar could used instead of batteries.

An easy to use app will be downloaded on your smartphone of choice (Android or iOS), and the pairing process is very simple.

All you need to do is to initialize a Bluetooth connection to the device, which in return will let you enter your Home Wifi password to let it connect to the internet.

Once set up, push notifications will be automatically delivered to you anytime the mailbox is being triggered, or when a threshold of humidity and temperature is reached inside your mailbox.

A data warehouse in the cloud will keep all of your data for the week, and it will be able to tell you which time and day of the week was the most humid and warm, via accessible reports from the smartphone app.

The mailbox notifier system never rest, and will be monitoring your mailbox throughout the night, in case of thieves or little animals are trying to get in.