

InterimReport_ChngWeePing_A2 085-201

by EEE CHNG WEE PING

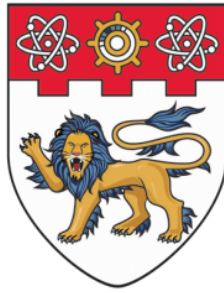
Submission date: 08-Nov-2020 08:13PM (UTC+0800)

Submission ID: 1439486166

File name: InterimReport_ChngWeePing.docx (1.22M)

Word count: 1078

Character count: 5672



**NANYANG
TECHNOLOGICAL
UNIVERSITY**
SINGAPORE

Final Year Project Interim Report

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Project Title: Smart Non-contact Thermometer

Project Number: A2085-201

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School of Electrical & Electronic Engineering

A final year project report presented to the Nanyang Technological
University

in partial fulfilment of the requirements of the degree of
Bachelor of Engineering

AY2020

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Chapter 1 Introduction

Background

The 21st century has shown that despite advances in science and medicine, the large population of the world are still susceptible to viral infectious diseases. Recent pandemics has proven that it is a huge challenge to monitor the health of the general populace.

Today, digital thermometers are the most popular type of thermometer due to its' reliance and affordability. However, digital thermometers do not usually record an individual's temperature to keep track of the individual's health.

The existence of a facial recognition scanner with a built-in temperature sensor likely exist at the time of writing, but the technology has raised some concerns about privacy and data security.

Objectives

This project focuses on implementing technology to monitor the health of individuals.

This project is envisioned to improve the efficiency of collecting and storing temperature readings of many individuals. Ideally, it would be used in hospitals to facilitate faster temperature readings of patients, or even in workplaces or schools where attendance-taking and temperature readings can be taken at the same time.

Project Scope

The heart of this project will be the [TTGO T-Display ESP32 Wifi and Bluetooth module by LilyGo](#), which has a powerful microcontroller board for commercially available modules to be integrated with; The module also has a OLED display to provide visual feedback to users, and has a built-in Wi-Fi and Bluetooth feature for wireless transmission of data.

A 2D/3D code scanner module, GM65, will read and record the identity of person through barcodes or QR codes; A compact but highly accurate temperature sensor, MLX90614, will take the readings of the body temperature.

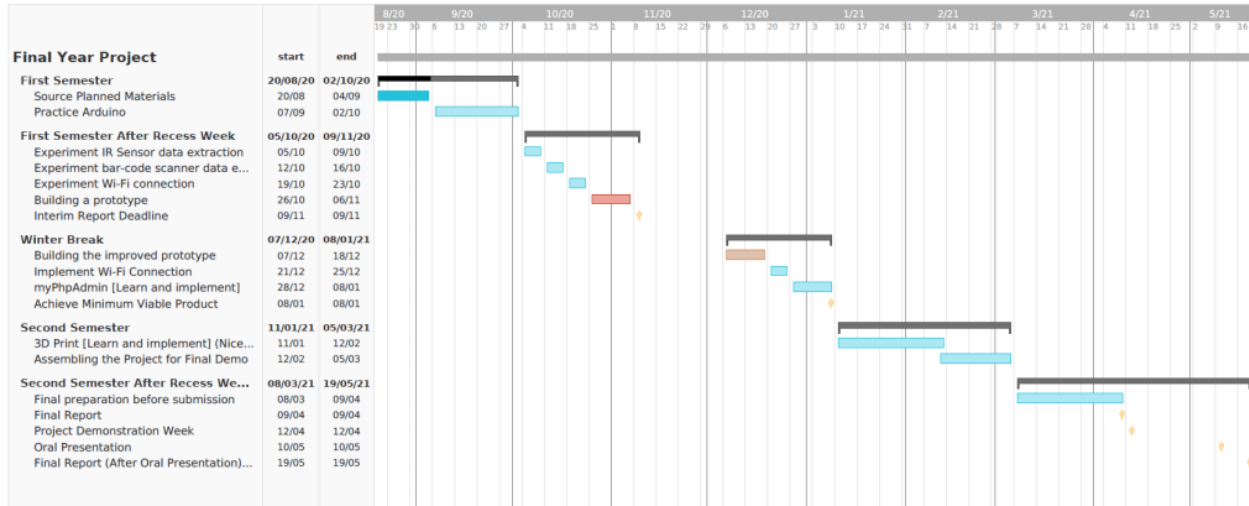
A database on a web server will be used to collect data. As of writing, the current plan is to use phpMyAdmin.

All the components mentioned will form the basis for building this smart non-contact thermometer. Other components will be used to enhance the prototype.

Project Plan

The following Gantt chart shows the timeline of this project.

teamgantt
Created with Free Edition



Chapter 2 Work Accomplished

The project is ongoing, and the following has been accomplished.

GitHub Link

<https://github.com/DevilRulerEx/fyp-smart-thermometer>

OLED Display

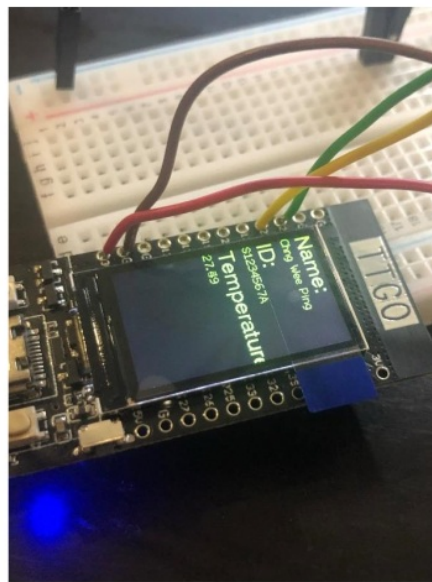


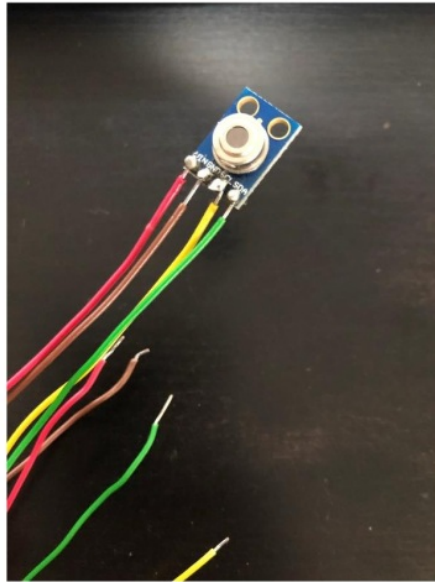
Figure 1 Working customized OLED display

I was able to code what I wished to be displayed on the OLED display of the ESP32 module. The OLED display is able to give me visual feedback of the temperature readings and the information from scanned barcodes/QR codes.

Being unfamiliar with ESP32 before the start of the project, and that Arduino is still more popular compared to ESP32, and also that there are various different specifications for the many models of ESP32 modules in the market – finding the proper documentation to work on my particular model is the most difficult part of this accomplishment.

After following a video guide that I found online, I was able to download the required library and work on customizing the display.

Temperature Sensor



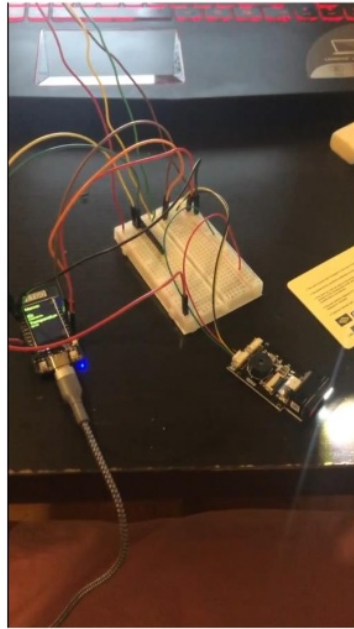
The temperature sensor, MLX90614, is successfully integrated with the ESP32. The OLED display shows the readings from the temperature sensor.

The difficult part for this accomplishment is the soldering, as the component is small, and I do not have much experience with soldering.

The following link is a video demonstration of this work:

<https://youtu.be/zn4DmDmXqzU>

Barcode Scanner



The barcode scanner, GM65, is successfully integrated with the ESP32 and the temperature sensor. The OLED display shows the readings from the barcode scanner.

The first difficulty comes in integrating the UART connection between the barcode scanner and the ESP32 module. There are no specified TX/RX pins in the official pins diagram of my ESP32 module, so a lot of time was spent on researching how to circumvent this. It turns out that certain pins of the ESP32 module can be reconfigured as TX/PX pins.

The second difficulty finding documentations for the barcode scanner module to work with my ESP32 module. There are not many projects that I can referenced from. Studying UART connections and how the scanner works also takes up a lot of my time and effort.

The following link is a video demonstration of this work:

https://youtu.be/xLP9exNH_u0

PhpMyAdmin

XAMPP is implemented to set up as a database for recording readings in the future.

As of writing, I have learnt a lot about the usage of phpMyAdmin through my other modules.

Chapter 3 Future Work

The table below shows the work that are still required.

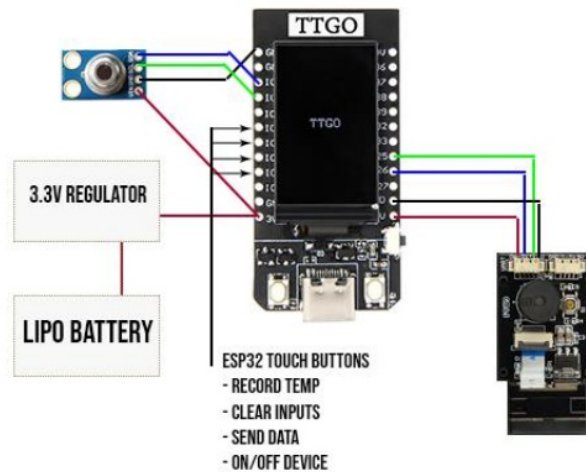
Component/Part	Work required
Wi-Fi implementation	<ul style="list-style-type: none">• Connect with local Wi-Fi to check the functionality
Php and phpMyAdmin	<ul style="list-style-type: none">• Once Wi-Fi is implemented, write the php codes to send the data readings to the database
Form Factor (Prototyping)	<ul style="list-style-type: none">• Experiment with the final user interface of the project.• Ensure a reading is good before uploading via Wi-Fi, implement some actions to retake temperature or identity code• Come up with a overall design of the project prototype.
Additional	<ul style="list-style-type: none">• Learn 3D printing to make a customized casing.

Prototyping

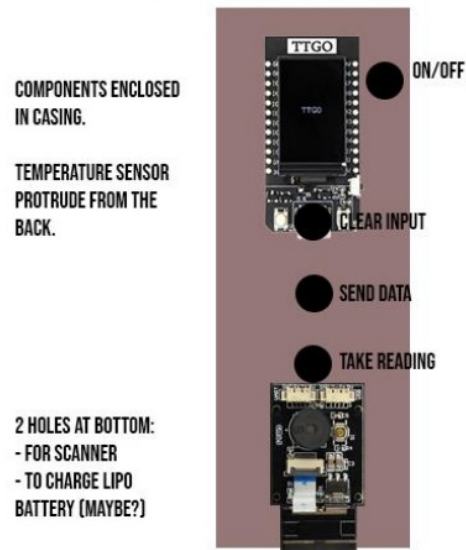
With most of minimum viable functionality being achieved before the writing of this report, the bulk of the rest of my work will lie in the prototyping of my project.

Below is a rough sketch of a design that I have in mind for my prototype.

SKETCH OF CIRCUIT DIAGRAM



SKETCH OF LAYOUT (FRONT)



Chapter 4 Conclusion

At the start of the project, I have a huge sense of uncertainty on whether I could actually get different components that are modular and sourced from different areas to actually work together for my project.

As of writing, I am glad to alleviate most of uncertainties with the status of my current progress, so I would say I have made good progress for this project.

The progress of the final year project is mostly still in line with the initial project plan. The design should also be constantly re-evaluated while preparing to fabricate the final product.

The winter break is planned to be used efficiently to complete the first prototype. A lot of buffer time is planned to resolve unforeseen situations while keeping up with the project plan's schedule.

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