Option B: Weather Client - Progress Report

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*Abstract*—This is the first progress report for the Term Project for CS370-801 for our group 8B. The project objectives and justifications are introduced. Description of the Hardware, Software Environment, Project Design, and Software development. (*Abstract*)

Keywords—component, formatting, style, styling, insert (key words)

# Introduction

The project objective is to develop and evaluate a system built using a single-board computer. The hardware requirement specifications are a single board computer, a sensor device, and communicating with at least one other computer. The single-board computer must have both Wi-Fi and OS boot capability.

Our project will measure, monitor, and report environmental factors, such as temperature, air pressure, humidity, and air quality over the Internet to a client machine. This progress report describes the current status of the project and our intent to evaluate quantitative information about the project. At the end of the project, we will submit a final report and a demonstration of the application we have produced.

# Progress

## Obtaining the Hardware

Due to our remote team location, our team chose to obtain hardware separately rather than having a shared device to develop with. Although working individually, we have the same hardware board and sensor. We chose the Raspberry Pi 3 B+ model computer board [8] and the Adafruit BME680 sensor board [1].

## Software Environment

Identify applicable funding agency here. If none, delete this text box.

We are developing individually using Visual Studio Code IDE, and our code is maintained in a repository on GitHub (<https://github.com/CS-370-801-Fall24-Term-Project/Fall2024TermProject.git>). We are developing directly on the board, through ssh protocol from our development machines.

## Project Design

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Our design has two components, primary and secondary. The primary component of the design is to have a website using a Node.js React client-side with a Java Spring-boot server-side. The server-side code will have direct communication to the sensor using I2C communication to the Adafruit BME680 sensor board. The Java interface to the sensor will use Pi4J to gain access to the GPIO headers on the Raspberry Pi and use I2C communication pins to communicate directly with the sensor board. A client will use the React UI to make a REST API request to the server side that will communicate directly with the sensor and obtain live data, returning it to the client and displaying it to the user.

The secondary design component is an application or service running in the background, separate from the primary component website client-server environment, that polls the sensor periodically and saves data to a database. This allows the client side to make requests to the server for historical data. For historical data client requests, the server side will directly access the same database that the background service will be inserting records into.

## Software Development

Identify applicable funding agency here. If none, delete this text box.

We created the base code for our website using NPX create-react-app template. The server-side base code was created using the Spring Initializer [2]. We added a basic API endpoint using the Spring Framework to demonstrate the technology [3][4]. We created the project for the Adafruit BME680 interface using Pi4J library for communicating using the I2C communication protocol through the computer’s onboard GPIO header pins [7]. This project will be packaged as a JAR and referenced as a dependency in the server-side backend.

# Development

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## Qualitative Analysis 1

Describe the first qualitative analysis here.

## Qualitative Analysis 2

Describe the second qualitative analysis here.

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##### Acknowledgment *(Heading 5)*

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

##### References

1. Adafruit, “Adafruit\_BME680,” Github repository, <https://github.com/adafruit/Adafruit_BME680>
2. Broadcom, “Spring Initializer,” 2005-2024. [Online] Available: <https://start.spring.io/>
3. Broadcom, “Spring Quickstart Guide,” [Online] Available: <https://spring.io/quickstart>
4. Code With Arjun, "Spring Boot Using VSCode," Youtube, youtube video, Aug 7, 2021, [Online] Available: <https://www.youtube.com/watch?v=dq1z9t03mXI>
5. Maven, [Online] Available: https://maven.apache.org/download.cgi
6. Paraschiv, Eugen, "Spring RequestMapping," Baeldung, May 11 2024, [Online] Available: https://www.baeldung.com/spring-requestmapping
7. Pi4J, “Pi4J,” [Online] Available: <https://www.pi4j.com/>
8. Raspberry Pi, “Raspberry Pi 3 Model B+,” [Online] Available: https://www.raspberrypi.com/products/raspberry-pi-3-model-b-plus/
9. ---------------------------------------------------
10. J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
11. I. S. Jacobs and C. P. Bean, “Fine particles, thin films and exchange anisotropy,” in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.
12. K. Elissa, “Title of paper if known,” unpublished.
13. R. Nicole, “Title of paper with only first word capitalized,” J. Name Stand. Abbrev., in press.
14. Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, “Electron spectroscopy studies on magneto-optical media and plastic substrate interface,” IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].
15. M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.
16. K. Eves and J. Valasek, “Adaptive control for singularly perturbed systems examples,” Code Ocean, Aug. 2023. [Online]. Available: <https://codeocean.com/capsule/4989235/tree>
17. D. P. Kingma and M. Welling, “Auto-encoding variational Bayes,” 2013, arXiv:1312.6114. [Online]. Available: <https://arxiv.org/abs/1312.6114>
18. S. Liu, “Wi-Fi Energy Detection Testbed (12MTC),” 2023, gitHub repository. [Online]. Available: https://github.com/liustone99/Wi-Fi-Energy-Detection-Testbed-12MTC
19. “Treatment episode data set: discharges (TEDS-D): concatenated, 2006 to 2009.” U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies, August, 2013, DOI:10.3886/ICPSR30122.v2

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