

# Project Title Goes Here



**Prepared by:**

Name Surname

**Prepared for:**

EEE4113F

Department of Electrical Engineering

University of Cape Town

March 16, 2024

# Declaration

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the IEEE convention for citation and referencing. Each contribution to, and quotation in, this report from the work(s) of other people has been attributed, and has been cited and referenced.
3. This report is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as their own work or part thereof.



March 16, 2024

---

Name Surname

---

Date

# Acknowledgements

No man is an island entire of itself; every man is a piece of the continent,  
a part of the main.

—*John Donne*

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

# Abstract

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

# Contents

List of Figures	vi
Abbreviations	vii
<b>1 Introduction</b>	<b>1</b>
1.1 Background . . . . .	1
1.1.1 Problem Statment . . . . .	1
1.2 Objectives . . . . .	1
1.3 System Requirements . . . . .	1
1.4 Scope & Limitations . . . . .	1
1.5 Report Outline . . . . .	1
<b>2 Literature Review</b>	<b>2</b>
2.1 Data Transmission and User Interface . . . . .	2
<b>3 Conclusions</b>	<b>4</b>
<b>4 Recommendations</b>	<b>5</b>
<b>Bibliography</b>	<b>6</b>

# List of Figures

2.1 Overall Performance of each Protocol [1] . . . . . 2

# Abbreviations

# Chapter 1

## Introduction

Philosophers have hitherto only interpreted the world in various ways;  
the point is to change it.

—*Karl Marx*

### 1.1 Background

#### 1.1.1 Problem Statment

Sally, a researcher at the FitzPatrick Institute, needs a way to weigh the red-winged starlings without scaring them because interestingly they record their weight manually.

### 1.2 Objectives

### 1.3 System Requirements

### 1.4 Scope & Limitations

### 1.5 Report Outline



## Chapter 2

# Literature Review

### 2.1 Data Transmission and User Interface

The client requires the weight data to be retrieved remotely. We need to figure out two things: where do we want the data to be sent, and how do we want it to be sent. This section investigates different options for transmitting data from a microprocessor. In a comparative performance study by Eridani et al., three protocols were compared: Bluetooth, Wi-Fi direct, and ESP-NOW (‘a new protocol that allows multiple devices to communicate with each other without the use of Wi-Fi, with low power consumption’ [1]). 5 metrics were used in the tests: maximum range, transmission speed, latency, power usage, and signal resistance to obstructions [1]. A brief summary of the performance of each protocol is shown below in Figure 2.1.

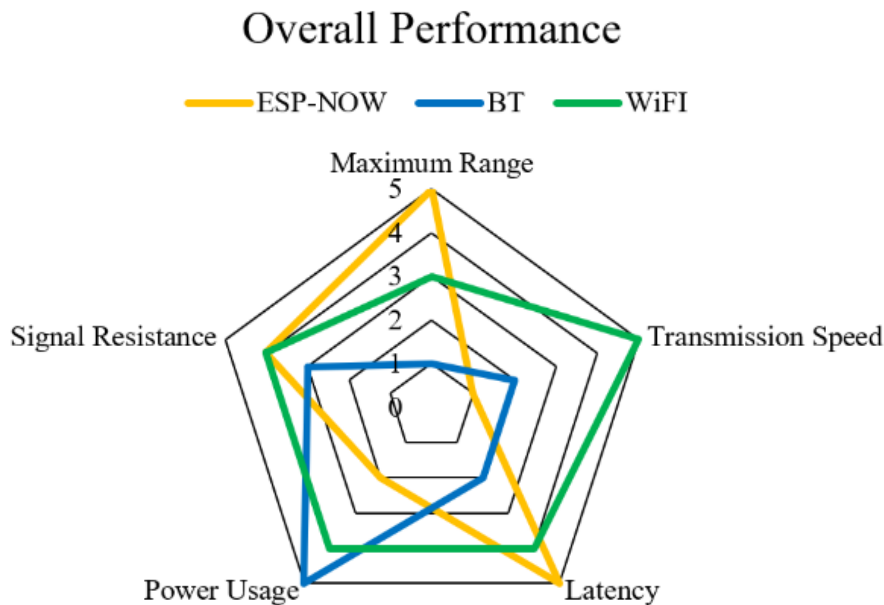


Figure 2.1: Overall Performance of each Protocol [1]

ESP-NOW performs best in range and latency; Bluetooth in power usage; and Wi-Fi in transmission speed. In our context, power usage would be most important. Bluetooth seems to provide sufficient range and speed.

The problem with this; however, is that connecting the system to the user’s phone requires effort and

perhaps expertise that the user may not have. In this case, connecting the system to the internet may be a better option (if internet connection is available, i.e. if eduroam is in range).

Budoyo and Andriana used the internet when designing a prototype of a digital scale to measure the weight of onions. [2]. They interfaced the microcontroller (an ATmega2560) to the internet using an ESP8266 Wi-Fi module. The weight data is sent to a website where it is stored in a database.

## Chapter 3

# Conclusions

The same rule holds for us now, of course: we choose our next world through what we learn in this one. Learn nothing, and the next world is the same as this one.

—*Richard Bach, Jonathan Livingston Seagull*

The purpose of this project was to...

This report began with...

The literature review was followed in Chapter...

The bulk of the work for this project followed next, in Chapter...

In Chapter...

Finally, Chapter... attempted to...

In summary, the project achieved the goals that were set out, by designing and demonstrating...

## Chapter 4

# Recommendations

It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced.

—*Abraham Lincoln*

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

# Bibliography

- [1] D. Eridani, A. F. Rochim, and F. N. Cesara, “Comparative performance study of esp-now, wi-fi, bluetooth protocols based on range, transmission speed, latency, energy usage and barrier resistance,” in *2021 international seminar on application for technology of information and communication (iSemantic)*. IEEE, 2021, pp. 322–328.
- [2] Y. Budoyo and A. D. Andriana, “The digital weight scale of iot system using load cell sensor in ud. pangrukti tani,” *Jurnal Ilmiah Komputer dan Informatika (KOMPUTA)*.