

Dissertation Title

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Abstract

This is the abstract of your dissertation.

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Chapter 1

Introduction

1.1 Background

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Chapter 2

Literature Review

2.1 Previous Studies

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Chapter 3

Methodology

3.1 Experimental Setup

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3.2 Notes

Why use ESP-IDF over Arduino IDE in this project? [1][2]

As we are using a ESP32 microcontroller to build our swarm, which left us with two options to program it: Arduino IDE or ESP-IDF. The reasons we chose the latter are because, first, it is the official development framework for the ESP32 microcontrollers, this means that ESP-IDF is native to ESP32 whereas Arduino is an API wrap around ESP-IDF. Making ESP-IDF more stable and enabling more advanced features, specially for communication data links such as Bluetooth, Wifi and LORA. Secondly, it is more powerful and flexible than

Arduino IDE, because it allows the use of FreeRTOS which allows multi core development support (our M5 Stack has two cores) and is a pre-requisite for running microROS in the ESP32 microcontroller (at the time of writing this microROS does not support Arduino), hence making it more suitable for complex projects like this one. Thirdly, it is more efficient in terms of memory and speed (as it enables parallel processing) which is important for a project that requires real-time communication between multiple devices in a swarm. Finally, it is more professional and an industry standard, it allows dependency tracking, Over the Air (OTA) updates, unit testing, enhanced debugging and comprehensive documentation around it, which means it is more likely to be supported in the future and software is less likely to become deprecated over time.

Bibliography

- [1] ESP-BOARDS. *ESP-IDF (IoT Development Framework) vs Arduino Core in 2023*. URL: <https://www.espboards.dev/blog/esp-idf-vs-arduino-core/> (visited on 06/03/2024).
- [2] Expressif Expressif. *FreeRTOS Overview - ESP32 - — ESP-IDF Programming Guide latest documentation*. URL: <https://docs.espressif.com/projects/esp-idf/en/latest/esp32/api-reference/system/freertos.html> (visited on 03/04/2024).