



FINAL YEAR PROJECT REPORT

(EEE368)

THE INTELLIGENT SAJADAH

Prepared by:

MUHAMMAD HAFIZ BIN NORHAFIZAN

2021605408

Group:

CEEE1115C

Supervisor: Miss Fatimatul Anis Bakri

ABSTRACT

The *Intelligent Sejadah* serves as a solution to the common problem of forgetting the number of rakaat (prayer units) during prayers, while also fostering discipline among children in their prayer routine. This innovative device operates by accurately counting the rakaat and providing real-time feedback each time the prostration movement occurs. By considering each set of two prostrations as one rakaat, the device increments the rakaat count accordingly, ensuring accuracy and convenience for the user. Moreover, the rakaat count can be conveniently relayed to a mobile application via the NodeMcu ESP8266, enhancing accessibility and monitoring capabilities. The circuit components, meticulously selected and simulated using Tinkercad software, include an ultrasonic sensor (HC-SR04) for prostration detection, a 7-segment display for visual indication of the current rakaat count, and an I2C LCD to display the type of solat performed during prayer. Additionally, a pushbutton is incorporated to reset the counter if inadvertently activated before the start of the prayer session. The entire circuit is orchestrated by an Arduino Uno and ESP8266 NodeMCU controller, ensuring seamless integration and efficient control. Through diligent design and simulation using Proteus Software for PCB layout, the project has successfully realized its objectives, offering a reliable and user-friendly solution to enhance the prayer experience and instill discipline in individuals' prayer routines.

Table of Contents

CANDIDATE DECLARATION.....	III
SUPERVISOR APPROVAL	IV
ABSTRACT.....	V
CHAPTER 1.....	7
INTRODUCTION.....	7
1.1 BACKGROUND OF STUDY.....	7
1.2 PROBLEM STATEMENT.....	9
1.3 OBJECTIVES.....	11
1.4 SCOPE OF WORK.....	12
CHAPTER 2.....	13
2.1 INTRODUCTION.....	14
2.2 HCSR04 CONNECTION WITH ARDUINO UNO.....	17
2.3 HCSR04 CONNECTION WITH ESP8266 NODEMCU.....	18
CHAPTER 3.....	19
METHODOLOGY	19
3.1 PROJECT PROGRESS FLOWCHART.....	19
3.2 PROJECT PROCESS FLOWCHART.....	21
3.3 BLOCK DIAGRAM.....	24
3.4 SCHEMATIC DIAGRAM.....	25
3.5 CODE DESCRIPTION.....	26
3.6 BYLNK SETUP.....	34
3.7 PCB FABRICATION PROCESS.....	35
3.7.1 PCB CUTTING PROCESS.....	36
3.7.2 LAMINATING PROCESS.....	37

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

In this modern world, the population in Malaysia has been growth in a past a few year ago. Figure 1.1 shown the population of Malaysia from 2020 to 2022. It shows that population of the Malaysian increasing 0.2% every year which were 32.4M (2020), 32.6M (2021) and 32.7M (2022).

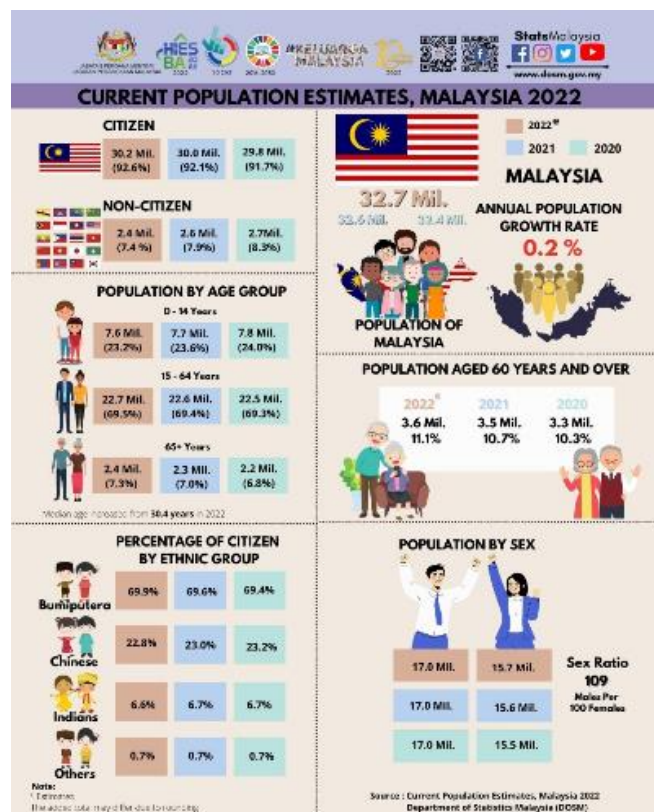


Figure 1.1 Percentage Population of Malaysian

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this study, the *Intelligent Sajadah* is a product designed to count rakaat (units) of prayer using sensors and processed by the Arduino Microcontroller and the ESP8266 NodeMCU module to control the rakaat counting application. The innovation in this *Sejadah* lies in its smart functionality, allowing users to view the number of rakaat performed during prayer sessions from their smartphones and smartwatch trackers, which serve as the output display for this product. This product aims to provide a solution to modern society's increasing reliance on technological advancements.

In this project, students were tasked with utilizing a microcontroller equipped with WiFi or Bluetooth capabilities. Therefore, the ESP8266 NodeMCU was chosen as the primary microcontroller due to its ability to connect to WiFi networks. However, due to the limited number of pins available on the ESP8266 NodeMCU, an Arduino UNO will also be incorporated into the project. Each microcontroller will be connected separately, allowing for efficient utilization of resources and ensuring the successful implementation of the project's functionalities. This collaborative approach enables the project to leverage the strengths of both microcontrollers while overcoming their individual limitations, ultimately enhancing the overall performance and functionality of the system.

To construct this project, two ultrasonic sensors (HC-SR04) will be required, with each sensor connected to both the ESP8266 and Arduino UNO microcontrollers. The distance measurement functionality of the ultrasonic sensor (HC-SR04) can be configured using code written in the Arduino IDE. In this project, the ultrasonic sensor (HC-SR04) will be programmed to trigger when an obstacle is detected at a distance of 15cm in front of it. This