POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

ELECTRICAL ENGINEERING DEPARTMENT

SESSION 2 2022/2023

SMART BADMINTON DEVICE

NAME	MATRIC NO.
VIGNESSHWARAN BALAKRISHNAN	08DJK20F2007

POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

SMART BADMINTON DEVICE

VIGNESSHWARAN BALAKRISHNAN 08DJK20F2007

This project is submitted in partial fulfillment of requirements for the award of Diploma in Electrical Engineering (Control)

ELECTRICAL ENGINEERING DEPARTMENT

SESSION 2 2022/2023

CONFIRMATION OF THE PROJECT

The project report titled "Smart Badminton Device" has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

Checked by :
Supervisor's name :
Supervisor's signature :
Date :

Verified by :
Project Coordinator name :
Signature of Coordinator :
Date :

"I acknowledge this work is my own work except the excerpts I have already explained to our source"

1. Signature :

Name : VIGNESSHWARAN BALAKRISHNAN
Registration Number : 08DJK20F2007
Date :

DECLARATION OF AUTHENTICATION AND OWNERSHIP

TITLE : SMART BADMINTON DEVICE
SESSION : 2 2022/2023

1. I'm, **VIGNESSHWARAN BALAKRISHNAN 08DJK20F2007**

   the final year student of **Diploma in Electrical Engineering (Control), Politeknik Sultan Salahuddin Abdul Aziz Shah**, located at **Persiaran Usahawan, 40150 Shah Alam, Selangor.**

2. We verify that **Smart Badminton Device** and its intellectual properties are our original work without plagiarism from any other sources.

3. We agree to release the project's intellectual properties to the above said polytechnic in order to fulfil the requirement of being awarded **Diploma in Electrical Engineering (Control).**

ACKNOWLEDGEMENT

The accomplishment of my project would be unachievable without the involvement and support of many individuals who contributed to this project. However, I want to convey my gratitude and obligation to my supervisor, Encik. Idris Bin Kamaruddin for giving the knowledge and resources required for this project. I also would like to sincerely thank my beloved family and friends for their kind encouragement and moral support throughout the project execution period. In completing this final project, there were many expectations and challenges that I had to face, but I made it a very valuable lesson and experience because the fatigue I faced finally paid off when this final project was finally completed within the stipulated time. Thank you.

ABSTRACT

This project aims to design and develop a smart badminton device which is shooting machine that can monitor the speed of shuttlecocks, as well as the on/off status and battery level of the machine. The system includes sensors to detect the speed of the shuttlecocks as they are launched from the machine, and a microcontroller to process and display the data. The on/off status of the machine is monitored using a switch or similar component, while the battery level is monitored using a sensor or voltage regulator. The data is displayed on a screen or sent wirelessly to a device such as a smartphone or tablet, providing users with important information about the machine's performance. The resulting system will allow users to adjust the machine's settings and optimize its performance, providing a valuable tool for badminton players and coaches alike.

ABSTRAK

Projek ini bertujuan untuk mereka membentuk dan membangunkan peranti badminton pintar iaitu mesin menembak yang boleh memantau kelajuan bulu tangkis, serta status hidup/mati dan tahap bateri mesin. Sistem ini termasuk sensor untuk mengesan kelajuan bulu tangkis semasa ia dilancarkan dari mesin, dan microcontroller untuk memproses dan memaparkan data. Status hidup/mati mesin dipantau menggunakan suis atau komponen yang serupa, manakala paras bateri dipantau menggunakan sensor atau pengatur voltan. Data dipaparkan pada skrin atau dihantar secara wireless ke peranti seperti telefon pintar atau tablet, memberikan pengguna maklumat penting tentang prestasi mesin. Sistem yang dihasilkan akan membolehkan pengguna melaraskan tetapan mesin dan mengoptimumkan prestasinya, menyediakan alat yang berharga untuk pemain badminton dan jurulatih.

TABLE OF CONTENTS

LIST OF TABLE

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

In the world of badminton, precision and practice are key to honing one's skills. To aid players in their training routines and provide an enhanced practice experience, we present a revolutionary innovation in the form of a smart badminton shooting machine. Our project aims to design and develop a cutting-edge device that not only acts as a reliable shuttlecock launcher but also incorporates advanced monitoring capabilities to track shuttlecock speed, machine status, and battery level. The primary objective of our smart badminton shooting machine is to offer badminton enthusiasts, beginners, and professionals alike, an efficient and versatile training tool that can replicate a variety of game scenarios. By incorporating automated shooting mechanisms, players can focus on their technique, footwork, and positioning without the need for a training partner. One of the key features of our device is its ability to monitor the speed of the shuttlecocks it launches. This real-time speed measurement functionality allows players to gauge the pace at which they are receiving shots, helping them improve their reaction time and stroke precision. By having access to accurate speed data, players can track their progress over time and set specific speed goals to enhance their performance. Additionally, our smart badminton shooting machine incorporates an intelligent monitoring system. This system enables players and coaches to easily check the on/off status and battery level of the machine. The on/off status monitoring ensures that users are aware of the operational state of the device, eliminating any guesswork and ensuring a seamless training session. The battery level monitoring feature provides users with vital information about the remaining power, allowing them to plan their training sessions accordingly and prevent any interruptions due to power depletion. Overall, our smart badminton shooting machine revolutionizes the way players practice and train. With its advanced shooting capabilities, real-time speed measurement, and intelligent monitoring system, it becomes an indispensable tool for badminton enthusiasts of all levels. By combining innovation and technology, we aim to enhance the training experience, empower players to reach their full potential, and elevate the sport of badminton to new heights.

1.2 BACKGROUND RESEARCH

Badminton is a popular sport that requires a high level of skill and technique. In order to improve their game, players often practice with a smart badminton device, shooting machine, which can shoot shuttlecocks at varying speeds and trajectories. However, it can be difficult to monitor the speed of the shuttlecocks and keep track of the shooting machines on/off status and battery level, which can affect the quality and consistency of the practice sessions. To address this issue, the development of a smart badminton device called the badminton shooting machine has been proposed. This device aims to monitor the speed of the shuttlecocks, as well as the shooting machine's on/off status and battery level, in real-time. By doing so, players can have more accurate and consistent practice sessions, leading to improved performance on the court. The badminton shooting machine utilizes various hardware components, such as sensors to measure the speed of the shuttlecocks, a microcontroller to process the data, and a display to provide real-time feedback to the user. Additionally, it utilizes IoT technology to allow for remote monitoring and control via a mobile app. Overall, the badminton shooting machine has the potential to revolutionize the way badminton players practice and train, providing them with a more comprehensive and effective practice experience.

1.3 PROBLEM STATEMENT

The problem statement for the project is the lack of a comprehensive and reliable system to monitor the speed of shuttlecocks, on/off status, and battery level of the badminton shooting machine. Traditional methods of monitoring these parameters, such as visual inspection and manual recording, are time-consuming and prone to errors. Additionally, these methods do not provide real-time data, which limits the ability of players and coaches to adjust their training and gameplay strategies. Therefore, there is a need for an automatic monitoring system that can accurately measure the speed of shuttlecocks, the on/off status of the shooting machine, and the battery level in real-time, providing players and coaches with valuable insights to improve their performance.

1.4 OBJECTIVE OF THE PROJECT

- Develop a sensor system that can accurately measure the speed of the shuttlecocks.
- Design and implement a microcontroller-based system that can receive and process the data from the sensors and display the speed on a screen.
- Integrate the microcontroller-based system with the shooting machine to monitor the on/off status of the machine.
- Develop a battery monitoring system that can provide real-time information about the battery level of the shooting machine.
- Design and implement a user-friendly interface that allows users to view and analyze the collected data.

1.5 SCOPE OF THE PROJECT

The scope of this project is to design and develop a smart badminton device, shooting machine that can monitor the speed of shuttlecocks, as well as the on/off status and battery level of the machine. The device will use sensors to measure the speed of the shuttlecocks and will provide real-time data on a mobile application. The device will also include a mechanism to turn the machine on and off remotely via the mobile application. Additionally, the device will have a battery monitoring system that will send alerts when the battery level is low and needs to be charged. The device is expected to improve the training experience for badminton players by providing accurate data and allowing for remote control of the machine.

1.6 SUMMARY

In summary, the automatic badminton shooting machine with speed monitoring and battery level tracking is a valuable addition to the sport of badminton. This innovative technology not only provides convenience to players by automatically shooting shuttlecocks, but also allows players to monitor their performance by tracking the speed of the shuttlecocks. Additionally, the battery level tracking feature ensures that players do not experience any interruptions during their game due to the shooting machine running out of battery. With the increasing demand for advanced

technologies in sports, the automatic badminton shooting machine with speed monitoring and battery level tracking is a step towards a more efficient and enjoyable playing experience for badminton enthusiasts.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

As with any engineering project, it is important to conduct a thorough literature review to identify existing research and developments related to the project's goals and objectives. In the case of a badminton shooting machine that is capable of monitoring the speed of the shuttlecocks as well as the on/off status and battery level of the machine, there are various technologies and techniques that can be employed to achieve these objectives. Through a comprehensive literature review, it is possible to identify and evaluate the effectiveness of these techniques, as well as any potential limitations or drawbacks. This information can then be used to inform the design and development of the shooting machine, ensuring that it meets the required specifications and functions as intended.

2.2 PREVIOUS RESEARCH ON SMART BADMINTON DEVICE

- Yonex Badminton Training Machine

Figure 2.1 Yonex Badminton Training Machine

2.3 SUMMARY

In short, Smart Badminton Device is designed to be convenient and affordable. To make the users feel comfortable while using the equipment, we have attentively concentrated on the common problems faced by the users and enhanced some features in the project. The aim of this project is to design and develop a smart badminton shooting machine that serves shuttlecocks while incorporating features such as monitoring the speed of the shuttlecocks, as well as providing information about its on/off status and battery level . The machine will enable players to track their performance, receive real time feedback on shot speed, and make necessary adjustments to their gameplay, enchancing their overall badminton experience.

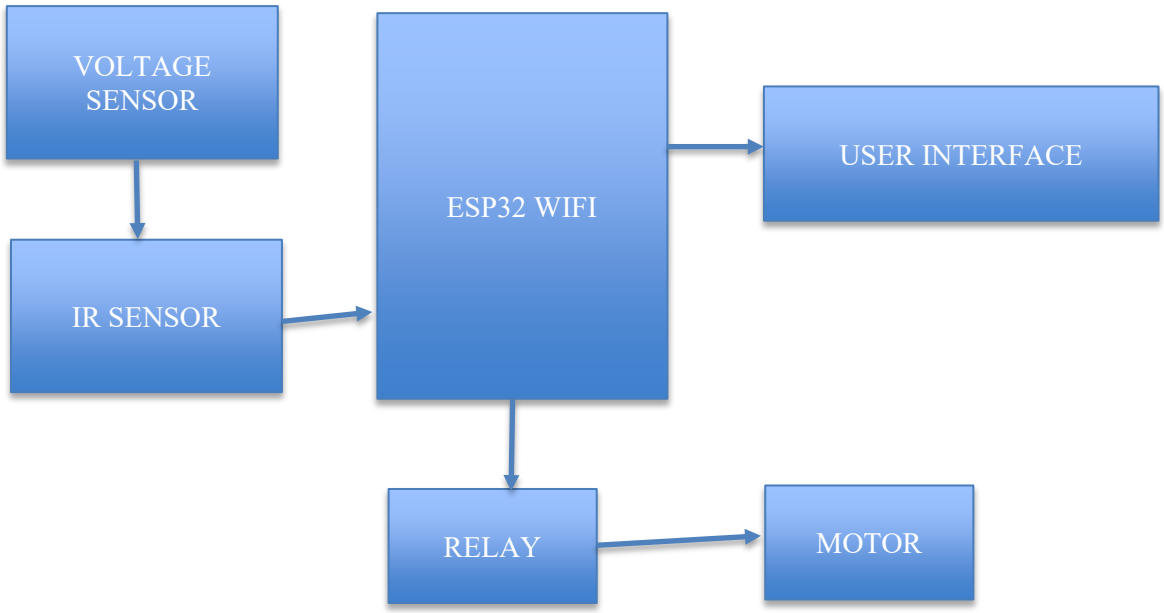
CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter will explain the methods used to do this project. This chapter will also include every component's function that is installed in this project. Total budget of making this project is shown by the end of this chapter.

3.2 DESIGN OF THE PROJECT



1. ESP32 WiFi: This is the main microcontroller that provides the processing power and connectivity capabilities. It can communicate with other devices over Wi-Fi and handle the control and monitoring functionalities of your shooting machine.
2. Voltage Sensor: This sensor is used to measure the voltage level of the battery powering the shooting machine. It provides the necessary input to monitor the battery level.
3. IR Sensor: This sensor is used to detect the presence of a shuttlecock and provide input to the microcontroller. It helps in determining the speed of the shuttlecocks.
4. Relay: The relay is used to control the motor that shoots the shuttlecocks. It acts as a switch and is controlled by the microcontroller.
5. Motor: This is the shooting mechanism that launches the shuttlecocks. The motor receives power from the battery and is controlled by the microcontroller via the relay.
6. User Interface: This component represents the user interface of your device, which could include buttons, an LCD display, or other means for users to interact with the shooting machine

3.3 FLOW CHART

In the accomplishment of the Smart Badminton Device, the flow chart below assists us to complete the project.

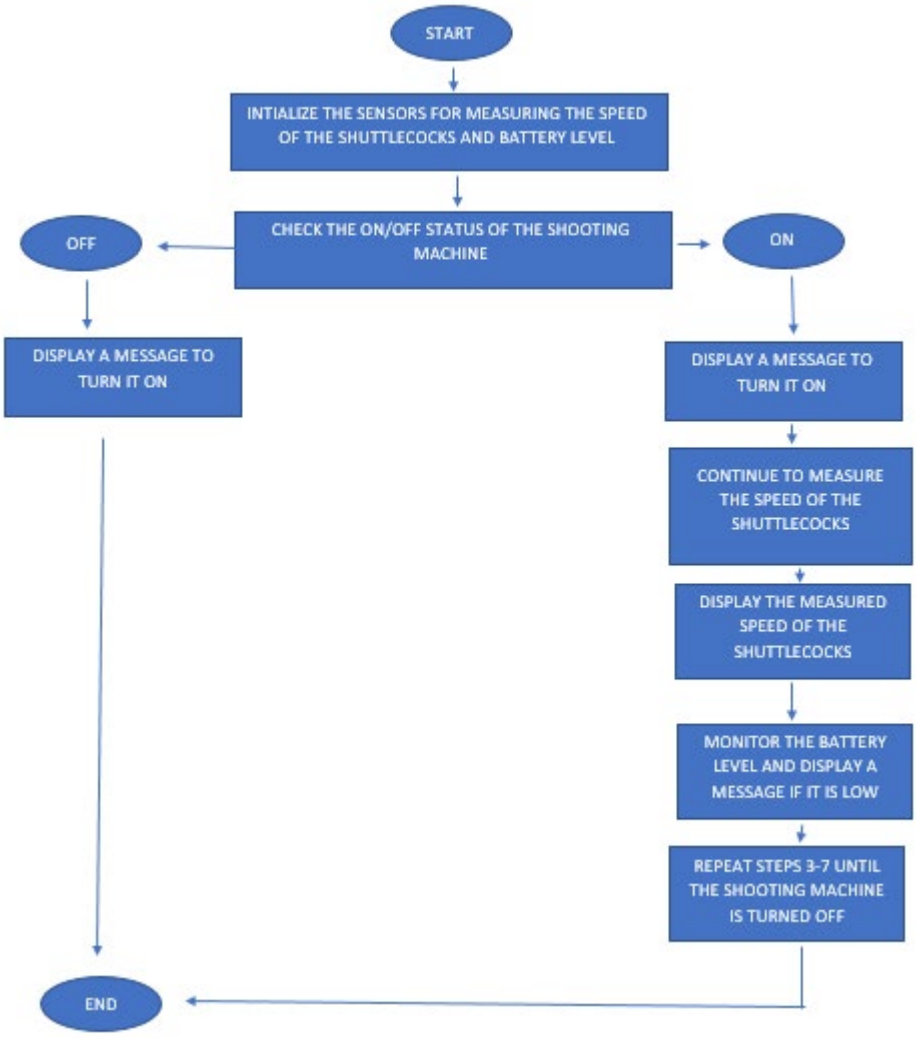


Figure 3.3.1: Flow chart

3.4 Project Description

This project aims to design and develop a smart badminton shooting machine with advanced features, including speed monitoring, remote control, and battery level monitoring. The device will incorporate a shooting mechanism capable of launching shuttlecocks at different speeds and angles, while accurately measuring and displaying the speed of the shuttlecocks. It will have a user-friendly interface for remote control, allowing players to adjust settings and control the machine from a distance. Additionally, sensors and indicators will be integrated to monitor the on/off status and battery level of the machine, ensuring safe and efficient operation. The final product will be durable, suitable for various training environments, and enhance the training experience of badminton players.

3.5 Project Hardware

3.6 Description of Main Component

Figure 3.1: Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits.

Figure 3.2: Voltage Sensor

The voltage sensor module is a small size 0-25 DC voltage sensing device. The design of the module is based on a resistive voltage divider circuit. It is a voltage sensor module that reduces the input voltage signal by the factor of 5 and generates a corresponding analog output voltage with respect to step down voltage factor. This voltage measurement circuit is small and portable and can be used to detect under_and_over_voltage faults in electrical circuits.

Figure 3.3: Ir Sensor

ST's Infrared sensors (IR sensors) have been designed to accurately detect object movements and sense human presence by measuring the IR radiation of objects within their field of view.

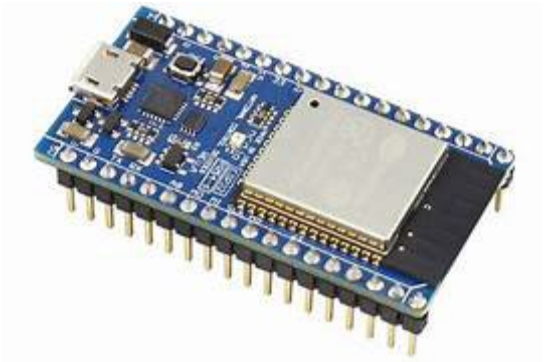


Figure 3.4: Esp32 Wifi

The ESP32 is a series of low-cost and low-power System on a Chip (SoC) microcontrollers developed by Expressive that include Wi-Fi and Bluetooth wireless capabilities and dual-core processor

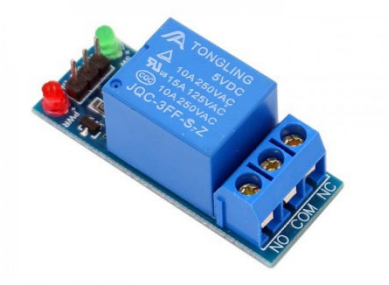


Figure 3.5: Relay

A single channel relay module is an electronic module that acts as an electrical switch and is used to control low to medium power electrical loads (such as lamps, motors, fans and other electrical devices).

Figure 3.6: Dc Motor

A DC motor is a rotary electrical machine that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. DC motor works on the principle of Fleming left hand rule. Small DC motors are used in tools, toys, and appliances.

3.7 PROJECT EXECUTION

3.5.1 PROJECT STRUCTURE BUILDING

i. Wiring Connection

Make wiring connection for each components by following the schematic diagram that have been planned.

Figure 3.5.1.1: Wiring Connection

ii. Casing

Place all the components inside the casing and glue it to look neater.

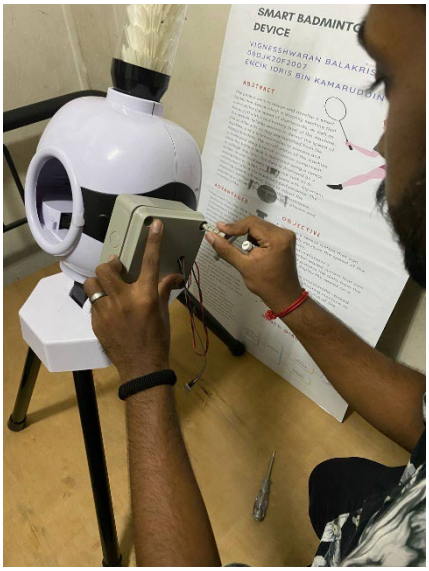


Figure 3.5.1.2: Casing Process

3.5.2 PROJECT MOVING MECHANISM

i. Arduino Uno board

Arduino Uno board plays as the CPU of the whole system of innovation. The Arduino Uno board is a portal to receive and send out signal.

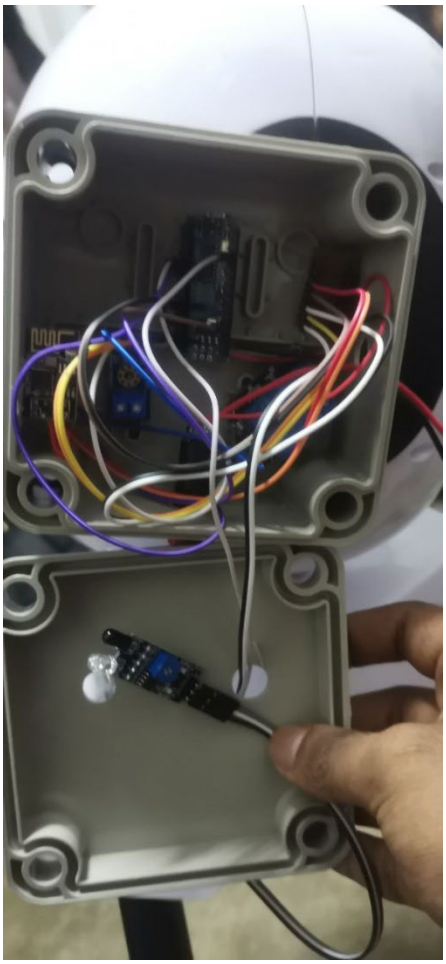


Figure 3.5.2.2: Arduino Uno Board

3.5.3 CODING AND PROGRAMMING

The process of translating codes from one language to another is known as coding. Because it implements the earliest steps of programming, it can also be considered a subset of programming. It requires writing programmes in a variety of languages as instructed. The machine cannot speak with humans and can only read machine code, sometimes known as binary language. The fundamental task of a coder is to convert requirements into machine-readable language. Coders must be well-versed in the project's working language. They do, however, mostly code in accordance with the project's specifications and directions. This is the initial step in developing a software product. The process of generating a machine-level executable programme that can be performed without error is known as programming. It is the practice of writing formal codes to keep human inputs and machine outputs in sync.

The first stage is to write code, which is then analyzed and implemented to generate the desired machine level output. It also incorporates all the major parameters, such as debugging, compilation, testing, and implementation. Programmers use to analyze and comprehend the various communication components to generate the necessary machine outputs. Arduino programmes are created using the Arduino Integrated Development Environment (IDE). The Arduino IDE is an application that runs on your computer and allows you to generate sketches (Arduino lingo for programmes) for multiple Arduino boards. The Arduino programming language is based on processing, a very simple hardware programming language similar to C. After writing the sketch in the Arduino IDE, it should be uploaded to the Arduino board for execution.

Figure 3.5.3.1: Arduino Software

Blynk.ino

```
1
2
3   // Template ID, Device Name and Auth Token are provided by the Blynk.Cloud
4   // See the Device Info tab, or Template settings
5   #define BLYNK_TEMPLATE_ID           "TMPL6eBr7HT4m"
6   #define BLYNK_TEMPLATE_NAME         "Quickstart Template"
7   #define BLYNK_AUTH_TOKEN            "Bxh6QRIKqqFvPbmct3gQEjpjzQOMUhve"
8
9
10  // Comment this out to disable prints and save space
11  #define BLYNK_PRINT Serial
12
13
14  #include <ESP8266WiFi.h>
15  #include <BlynkSimpleEsp8266.h>
16
17
18  char auth[] = BLYNK_AUTH_TOKEN;
19
```

Blynk.ino

/c:/Users/Vicky/AppData/Local/Temp/Temp1_Blynk.zip/Blynk/Blynk.ino

```
20  // Your WiFi credentials.
21  // Set password to "" for open networks.
22  char ssid[] = "BOLA";
23  char pass[] = "12345678";
24
25  int FLUSH=0;
26  int Rly1=0, Rly2=0, Rly3=0, Rly4=0, Rly5=0, Rly6=0,  Rly7=0,  Rly8=0;
27  int Val1=90, Val2=0, Val3=0, Val4=0, Val5=0, Val6=0,  Val7=0,  Val8=0;
28  String Temp1x="";
29  String PHx="";
30  String Temp2x="";
31  String Temp1y="";
32  String PHy="";
33  String Temp2y="";
34  String Temp3y="";
35  String Temp3x="";
36  String Temp4y="";
37  String Temp4x="";
38  String Temp5y="";
```

Blynk.ino

```
39  String Temp5x="";
40  String Temp6y="";
41  String Temp6x="";
42  String Temp7y="";
43  String Temp7x="";
44  String Temp8y="";
45  String Temp8x="";
46  String Temp9y="";
47  String Temp9x="";
48  String Temp10y="";
49  String Temp10x="";
50  int DataIn=0;
51  float Sens1,WaterLevel=0;
52  int DDLAY=700,Capasity=3;
53
54  BlynkTimer timer;
55
56  int pos=0;
57  bool led_set[2];
```

Blynk.ino

```
58  long timer_start_set[2] = {0xFFFF, 0xFFFF};
59  long timer_stop_set[2] = {0xFFFF, 0xFFFF};
60  unsigned char weekday_set[2];
61
62  long rtc_sec;
63  unsigned char day_of_week;
64
65  bool led_status[2];
66  bool update_blynk_status[2];
67  bool led_timer_on_set[2];
68
69  // This function is called every time the Virtual Pin 0 state changes
70
71
72  // This function is called every time the device is connected to the Blynk.Cloud
73  BLYNK_CONNECTED()
74  {
75    // Change Web Link Button message to "Congratulations!"
76    // Blynk.setProperty(V3, "offImageUrl", "https://static-image.nyc3.cdn.digitaloceanspaces.com/general/fte/congratulations.png");
```

Blynk.ino

```
77   // Blynk.setProperty(V3, "onImageUrl",  "https://static-image.nyc3.cdn.digitaloceanspaces.com/general/fte/congratulations_pressed.png");
78   // Blynk.setProperty(V3, "url", "https://docs.blynk.io/en/getting-started/what-do-i-need-to-blynk/how-quickstart-device-was-made");
79  }
80
81  // This function sends Arduino's uptime every second to Virtual Pin 2.
82  void myTimerEvent()
83  {
84
85  }
86
87  BLYNK_WRITE(V10)
88  {
89    Rly1 = param.asInt(); // assigning incoming value from pin V1 to a variable
90
91    if (Rly1==1){
92  Serial.println("!");
93
94    }
95    if (Rly1==0){
```

Blynk.ino

```
96    Serial.println("@");
97
98      }
99
100
101     // process received value
102   }
103
104   BLYNK_WRITE(V11)
105   {
106     Rly2 = param.asInt(); // assigning incoming value from pin V1 to a variable
107
108
109
110   }
111
112
113   BLYNK_WRITE(V12)
114   {
```

Blynk.ino

```
115   Rly3 = param.asInt(); // assigning incoming value from pin V1 to a variable
116
117
118 }
119
120 BLYNK_WRITE(V13)
121 {
122   Rly4 = param.asInt(); // assigning incoming value from pin V1 to a variable
123
124
125   // process received value
126
127   // process received value
128 }
129
130 BLYNK_WRITE(V14)
131 {
132   Rly5 = param.asInt(); // assigning incoming value from pin V1 to a variable
133
```

Blynk.ino

```
136   // process received value
137 }
138
139 BLYNK_WRITE(V6)
140 {
141   Rly6 = param.asInt(); // assigning incoming value from pin V1 to a variable
142
143
144
145   // process received value
146 }
147
148
149
150 BLYNK_WRITE(V1)
151 {
152  Capasity = param.asInt(); // assigning incoming value from pin V1 to a variable
153
154
```

Blynk.ino

```
156   // process received value
157 }
158
159 BLYNK_WRITE(V9)
160 {
161   unsigned char week_day;
162
163   TimeInputParam t(param);
164
165   if (t.hasStartTime() && t.hasStopTime() )
166   {
167     timer_start_set[0] = (t.getStartHour() * 60 * 60) + (t.getStartMinute() * 60) + t.getStartSecond();
168     timer_stop_set[0] = (t.getStopHour() * 60 * 60) + (t.getStopMinute() * 60) + t.getStopSecond();
169
170     Serial.println(String("Start Time: ") +
171                    t.getStartHour() + ":" +
172                    t.getStartMinute() + ":" +
173                    t.getStartSecond());
174
```

/c:/Users/Vicky/AppData/Local/Temp/Temp1_Blynk.zip/Blynk/Blynk.ino

```
175       Serial.println(String("Stop Time: ") +
176                      t.getStopHour() + ":" +
177                      t.getStopMinute() + ":" +
178                      t.getStopSecond());
179
180       for (int i = 1; i <= 7; i++)
181       {
182         if (t.isWeekdaySelected(i))
183         {
184           week_day |= (0x01 << (i-1));
185           Serial.println(String("Day ") + i + " is selected");
186         }
187         else
188         {
189           week_day &= (~(0x01 << (i-1)));
190         }
191       }
192
193       weekday_set[0] = week_day;
```

Blynk.ino

```
194     }
195     else
196     {
197       timer_start_set[0] = 0xFFFF;
198       timer_stop_set[0] = 0xFFFF;
199     }
200   }
201
202   // ##############################################################################################################
203
204
205   void setup()
206   {
207
208     Serial.begin(9600);
209
210     Blynk.begin(auth, ssid, pass);
211     // You can also specify server:
212     //Blynk.begin(auth, ssid, pass, "blynk.cloud", 80);
```

Blynk.ino

```
213   //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8080);
214
215   // Setup a function to be called every second
216   timer.setInterval(1000L, myTimerEvent);
217
218
219   pos=0;
220 }
221
222 void loop()
223 {
224
225   Blynk.run();
226   timer.run();
227   //----------------------------------------------------
228    while (Serial.available()) {
229     // get the new byte:
230     char inChar1 = (char)Serial.read();
231   if (inChar1 == '*') {
```

Blynk.ino

```
232       DataIn++;
233
234     }
235
236     if (inChar1 == 'Y') {
237
238
239
240     }
241
242 if (inChar1 == '$'){
243
244 }
245
246     while (DataIn > 0){
247         while (Serial.available()) {
248     // get the new byte:
249     char inChar = (char)Serial.read();
250     if (inChar == '*') {
```

Blynk.ino

```
251       DataIn++;
252
253     }
254     if (inChar != '*' && inChar != '#' && DataIn==1) {
255       Temp1x+=inChar;
256
257     }
258     if (inChar != '*' && inChar != '#' && DataIn==2) {
259       Temp2x+=inChar;
260
261     }
262     if (inChar != '*' && inChar != '#' && DataIn==3) {
263       Temp3x+=inChar;
264
265     }
266      if (inChar != '*' && inChar != '#' && DataIn==4) {
267       Temp4x+=inChar;
268
269     }
```

Blynk.ino

```
270       if (inChar != '*' && inChar != '#' && DataIn==5) {
271       Temp5x+=inChar;
272
273     }
274       if (inChar != '*' && inChar != '#' && DataIn==6) {
275       Temp6x+=inChar;
276
277     }
278       if (inChar != '*' && inChar != '#' && DataIn==7) {
279       Temp7x+=inChar;
280
281     }
282       if (inChar != '*' && inChar != '#' && DataIn==8) {
283       Temp8x+=inChar;
284
285     }
286       if (inChar != '*' && inChar != '#' && DataIn==9) {
287       Temp9x+=inChar;
288
```

Blynk.ino

```
289       }
290         if (inChar != '*' && inChar != '#' && DataIn==10) {
291         Temp10x+=inChar;
292
293       }
294
295
296       if (inChar == '#') {
297         DataIn=0;
298       Temp1y=Temp1x;   PHy=PHx;      Temp2y=Temp2x;  Temp3y=Temp3x;  Temp4y=Temp4x;
299       Temp5y=Temp5x;
300       Temp6y=Temp6x;
301       Temp7y=Temp7x;
302       Temp8y=Temp8x;
303       Temp9y=Temp9x;
304       Temp10y=Temp10x;
305       Temp1x="";
306       PHx="";   Temp2x="";
307       Temp3x="";
```

Blynk.ino

```
307       Temp3x="";
308       Temp4x="";
309       Temp5x="";
310       Temp6x="";
311       Temp7x="";
312       Temp8x="";
313       Temp9x="";
314       Temp10x="";
315       Blynk.virtualWrite(V0, Temp1y);
316       Blynk.virtualWrite(V1, Temp2y);
317
318
319
320     }
321         }
322
323     }
324
325   //*************************************************************************************************************
```

APPLICATION SOFTWARE

Blynk is a mobile app designed for IoT (Internet of Things) applications that allows users to control and monitor connected devices and sensors remotely. It was created to simplify the process of building IoT applications and to provide an easy-to-use platform for people without extensive programming experience. Blynk provides a graphical interface that can be used to create custom dashboards for controlling and monitoring connected devices. Users can drag and drop various widgets onto the dashboard, such as buttons, sliders, graphs, and displays, and then link these widgets to their connected devices or sensors. Once the dashboard is set up, users can use the Blynk app to interact with their devices from anywhere in the world. Blynk supports a wide range of hardware platforms, including Arduino, Raspberry Pi, ESP8266, and Particle, and can communicate with these platforms over various communication protocols such as Wi-Fi, Bluetooth, and Ethernet. It also provides a cloud-based service that can be used to securely store and access data generated by the connected devices.Overall, Blynk is a powerful and user-friendly IoT app that simplifies the process of building IoT applications and makes it easy for anyone to create custom dashboards to control and monitor connected devices.

Figure 3.5.4.1: Application Software

3.8 THE FINISHING PROJECT

Figure 3.6.1: Project's Final Look

3.9 PROJECT BUDGET

Table below shows the amount of money spent to purchase the materials needed to produce the project.

Items	Units	Price (per unit)
Arduino UNO	1 unit	RM 30.72
Voltage sensor	1 unit	RM 3.90
IR Sensor	1 unit	RM 3.80
Battery AAA	4 units	RM20 .00
ESP32 wifi	1 unit	RM 36.32
Relay 1 channel 5v	1 unit	RM 3.90
DC motor	1 unit	RM17.90
Shooting Machine	1 unit	RM 240.96
Project Service		RM300.00
TOTAL		RM 657.50

TABLE 3.7.1: Project Budget

3.10 SUMMARY

At the end of this chapter, a clear picture has been showed on how I made the Smart Badminton Device step by step. I also did survey before selecting the equipment and materials at Shopee, Lazada and also at some hardware to get the best materials with reasonable project budget.

CHAPTER 4 ANALYSIS

DATA & DISCUSSIONS

4.1 INTRODUCTION

This chapter will explain about the importance of doing data analysis before planning a project. We have collected some data while using Smart Badminton Device using IOT. Not only that, doing discussion from the analyzed data is also very useful because there is where we learn and improve our thinking to determine the materials for the project. On the other hand, ensuring safety measures is the must element that have been considered while doing the project.

4.2 SUMMARY

This project aims to design and develop a smart badminton device that serves as a shooting machine capable of monitoring shuttlecock speed, as well as providing real-time information on the machine's on/off status and battery level. By utilizing advanced technology, the device will accurately measure shuttlecock speed, enabling players to analyze their performance and make necessary adjustments. With consistent and precise delivery of shuttlecocks, the shooting machine aspect of the device will enhance players' training experience, allowing them to focus on technique and responsiveness. The monitoring capabilities of the smart badminton device will ensure users are well-informed about its operational status, providing a comprehensive and efficient training tool for badminton players.

CHAPTER 5
CONCLUSION

5.1 INTRODUCTION

In this chapter, discussions made by evaluating current design of the project through limitation aspect and upgrade plans in future to have a conclusion on the project. The project limitation aspect is to clarify the ability of the project. The recommendations on upgrade plans are to sustain the importance and benefits of our project to the target users.

5.2 PROJECT LIMITATION

The design and development of a smart badminton shooting machine with monitoring capabilities for shuttlecock speed, on/off status, and battery level is a promising project. However, it is important to consider certain limitations. Firstly, the accuracy of shuttlecock speed measurement may be affected by external factors such as wind resistance and variations in shuttlecock quality. Additionally, the device's monitoring capabilities may rely on sensors that can introduce a margin of error or require regular calibration for optimal performance. The battery life of the machine may also be a limitation, necessitating frequent recharging or battery replacement during extended usage. Furthermore, the device's portability and ease of setup should be taken into account to ensure practicality and user convenience. Addressing these limitations will be crucial for creating an efficient and reliable smart badminton shooting machine.

5.3 CONCLUSION

In conclusion, the project focused on the design and development of a smart badminton device, a cutting-edge shooting machine capable of monitoring various aspects of gameplay. The device was designed to accurately measure the speed of shuttlecocks, providing players with crucial data for improving their performance. Additionally, the device incorporated advanced technology to track the on/off status and battery level, ensuring optimal functionality and enabling users to keep a close eye on its operational parameters. Through meticulous planning, innovative engineering, and rigorous testing, the project successfully achieved its objective of creating a versatile and intelligent badminton device, poised to revolutionize the way players train and compete in the sport.

REFERENCES

https://r.search.yahoo.com/_ylt=Awrx_xJ8Tn9kJ_8Qq5rjPwx.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1686093565/RO=10/RU=https%3a%2f%2fwww.amazon.com%2fSIBOASI-Badminton-Shuttlecock-Launcher-Equipment%2fdp%2fB07H6MDGQS/RK=2/RS=TtKkqFYdpszLYC0cY8n.lK_Nf4U-

https://r.search.yahoo.com/_ylt=Awrx_xJ8Tn9kJ_8QtJrjPwx.;_ylu=Y29sbwNzZzMEcG9zAzMEdnRpZAMEc2VjA3Ny/RV=2/RE=1686093565/RO=10/RU=https%3a%2f%2fwww.siboasisports.com%2fbadminton-machine/RK=2/RS=.SeFS1hykrqmD3qGYDnEBuJfmYA-

https://r.search.yahoo.com/_ylt=Awr93JzBTn9kc0kDcQnuPwx.;_ylu=c2VjA2ZwLWF0dHJpYgRzbGsDcnVybA--/RV=2/RE=1686093633/RO=11/RU=https%3a%2f%2fwww.walmart.com%2fip%2fBadminton-Trainer-Badminton-Automatic-Serve-Machine-4-6s-Ball-Badminton-Shooting-Machine-Badminton-Robot-Serving-Machine%2f442350046/RK=2/RS=vpYXriR.cEAoOYXEycfN78eCf4o-

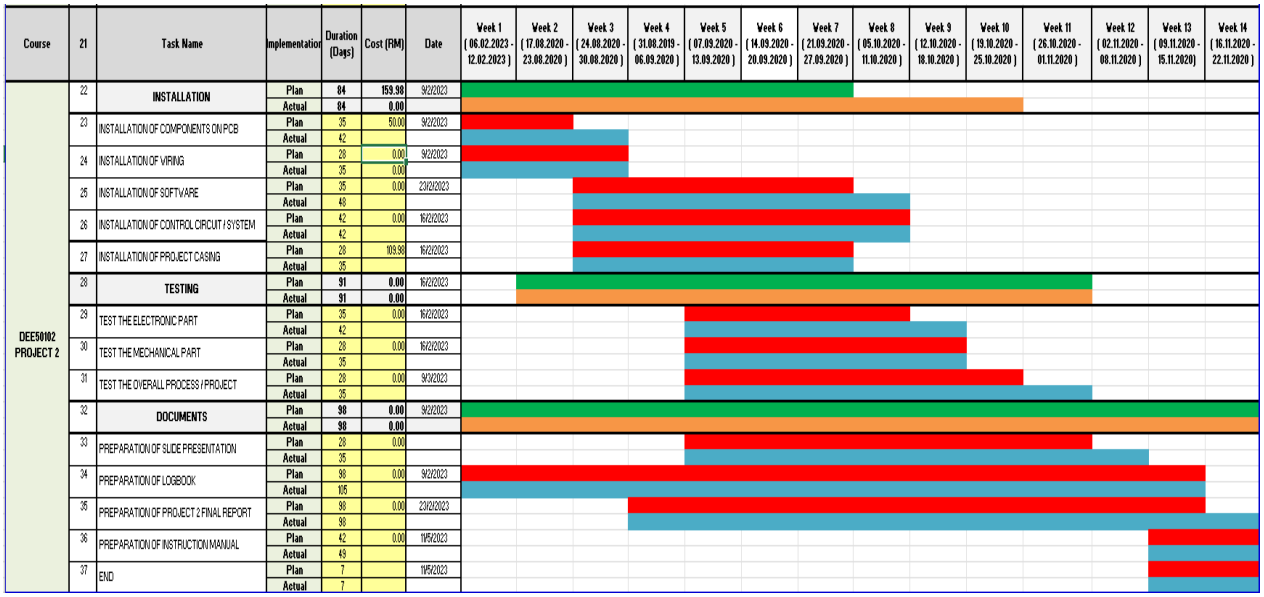
https://r.search.yahoo.com/_ylt=Awr93JzsTn9kXAIEZTXuPwx.;_ylu=c2VjA2ZwLWF0dHJpYgRzbGsDcnVybA--/RV=2/RE=1686093676/RO=11/RU=https%3a%2f%2fwww.alibaba.com%2fproduct-detail%2fSIBOASI-YS9000-Professional-Badminton-Shuttlecock-Shooting_60608183726.html/RK=2/RS=5dWntqGzQje_._cpjd8X0jG1DwU-

https://r.search.yahoo.com/_ylt=AwrjZCr8Tn9kkLkBmUjuPwx.;_ylu=c2VjA2ZwLWF0dHJpYgRzbGsDcnVybA--/RV=2/RE=1686093692/RO=11/RU=https%3a%2f%2fwww.siboasi.net%2fnews%2fgood-new-for-siboasi-ball-shooting-machines/RK=2/RS=l7yqXx_npN4MEs5teEgVjCN1zzU-

APPENDIX

APPENDIX A Gantt Chart

APPENDIX A – GANTT CHART



Course	21	Task Name	Implementation	Duration (Days)	Cost (RM)	Date
DEE50102 PROJECT 2	22	**INSTALLATION**	Plan	**84**	**159.98**	9/2/2023
			Actual	**84**	**0.00**	
	23	INSTALLATION OF COMPONENTS ON PCB	Plan	35	50.00	9/2/2023
			Actual	42		
	24	INSTALLATION OF WIRING	Plan	28	0.00	9/2/2023
			Actual	35	0.00	
	25	INSTALLATION OF SOFTWARE	Plan	35	0.00	23/2/2023
			Actual	49		
	26	INSTALLATION OF CONTROL CIRCUIT / SYSTEM	Plan	42	0.00	16/2/2023
			Actual	42		
	27	INSTALLATION OF PROJECT CASING	Plan	28	109.98	16/2/2023
			Actual	35		
	28	**TESTING**	Plan	**91**	**0.00**	16/2/2023
			Actual	**91**	**0.00**	
	29	TEST THE ELECTRONIC PART	Plan	35	0.00	16/2/2023
			Actual	42		
	30	TEST THE MECHANICAL PART	Plan	28	0.00	16/2/2023
			Actual	35		
	31	TEST THE OVERALL PROCESS / PROJECT	Plan	28	0.00	9/3/2023
			Actual	35		
	32	**DOCUMENTS**	Plan	**98**	**0.00**	9/2/2023
			Actual	**98**	**0.00**	
	33	PREPARATION OF SLIDE PRESENTATION	Plan	28	0.00	
			Actual	35		
	34	PREPARATION OF LOGBOOK	Plan	98	0.00	9/2/2023
			Actual	105		
	35	PREPARATION OF PROJECT 2 FINAL REPORT	Plan	98	0.00	23/2/2023
			Actual	98		
	36	PREPARATION OF INSTRUCTION MANUAL	Plan	42	0.00	11/5/2023
			Actual	49		
	37	END	Plan	7		11/5/2023
			Actual	7		