POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

BLUETOOTH MASSAGE BELT

NAME	REGISTRATION NO
MUHAMMAD AMIRUL NAIM BIN KAMARUL NAZRI	**08DJK20F1014**

JABATAN KEJURUTERAAN ELEKTRIK

SESI 1 2022/2023

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This report submitted to the Electrical Engineering Department in fulfillment of the requirement for a Diploma in Electrical Engineering

JABATAN KEJURUTERAAN ELEKTRIK

SESI 1 2022/2023

CONFIRMATION OF THE PROJECT

The project report titled "Bluetooth Massage Belt" has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

Checked by:

Supervisor's name : PUAN NORANIZAH SARBANI

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 : **MUHAMMAD AMIRUL NAIM BIN KAMARUL NAZRI**

Registration Number : **08DJK20F1014**

Date : **02/12/2022**

DECLARATION OF ORIGINALITY AND OWNERSHIP

TITLE : BLUETOOTH MASSSAGE BELT

SESSION: SESI 1 2022/2023

1. I, **1. MUHAMMAD AMIRUL NAIM BIN KAMARUL NAZRI with Identification Card No. 08DJK20F1014**

   is a final year student of **Diploma in Electrical Engineering, Department of Electrical, Politeknik Sultan Salahuddin Abdul Aziz Shah**, which is located at **Persiaran Usahawan, Seksyen U1, 40150 Shah Alam, Selangor**. (Hereinafter referred to as 'the Polytechnic').

2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation /creations without taking or impersonating any intellectual property from the other parties.

3. I agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the **Diploma in Electrical Engineering** to me.

Made and in truth that is recognized by;

a) **MUHAMMAD AMIRUL NAIM BIN KAMARUL NAZRI**) .
(Identification card No: - 08DJK20F1014)) ....…….
) **AMIRUL NAIM**

In front of me, **PUAN NORANIZAH BINTI SARBANI** (Click here to enter text.)) .....……
As a project supervisor, on the date:) Click here to enter text.

ACKNOWLEDGEMENTS

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them. I am highly indebted to (Puan Noranizah Binti Sarbani) for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

I would like to express my gratitude towards my parents & member of (Electrical Department) for their kind co-operation and encouragement which help me in completion of this project. I would like to express my special gratitude and thanks to industry persons for giving me such attention and time.

My thanks and appreciations also go to my colleague in developing the project and people who have willingly helped me out with their abilities.

ABSTRACT

Vibrations are a massage technique used to stimulate soft tissues. The vibration technique can be an up and down movement or a vibrating and shaking motion. Lighter vibration techniques can help stimulate the parasympathetic system and help the muscles relax. Vibrations can be used pre event and to treat tight muscles. There are many benefits of vibrations. The benefits of vibrations are reduced stress, relieved tight muscles and improved blood circulation.

ABSTRAK

Getaran adalah teknik urutan yang digunakan untuk merangsang tisu lembut. Teknik getaran boleh menjadi pergerakan naik dan turun atau gerakan bergetar dan menggoncang. Teknik getaran yang lebih ringan boleh membantu merangsang sistem parasimpatetik dan membantu otot berehat. Getaran boleh digunakan sebelum acara dan untuk merawat otot yang tegang. Terdapat banyak faedah getaran. Faedah getaran adalah mengurangkan tekanan, melegakan otot yang tegang dan melancarkan peredaran darah.

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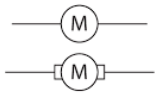
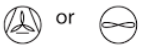
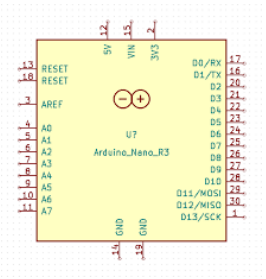
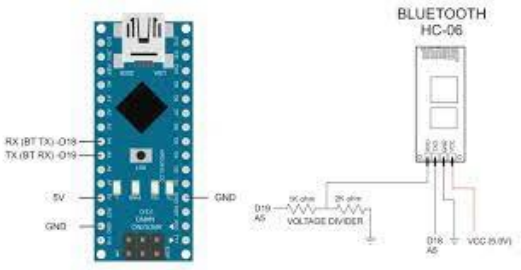
Electronic symbol for motor



Symbols from other standards







LIST OF ABBREVIATIONS

- IDE (Integrated Development Environment)
- PCB (Printed Circuit Board)
- DC (Direct Current)
- PWM (Pulse Width Modulation)

CHAPTER 1

INTRODUCTION

1.1 Introduction

A massage belt relates to a massage device, the massage belt is provided with massage balls, at least two massage balls are freely arranged in a soft bag body, the massage balls are in the free state in the bag body, elastic bands are respectively arranged at the two ends of the bag body, buckles which are mutually buckled are correspondingly arranged on the elastic bands, the massage balls can be arranged at the middle part of the bag body, the bag body is bound at the waist or a backrest of a chair, when sitting in the chair, the body lies on the backrest of the chair, the self-service massage of the waist can be carried out, the bag body can also be bound on other parts of the back, and the regulation of the massage balls is carried out; when sitting in the chair, the body lies on the backrest of the chair or lies on the bed, the self-service massage of the parts by the massage balls is carried out by relying on the body pressure, the massage balls can also be arranged at one end of the massage balls and the other end of the bag body is lifted by a hand, thereby beating acupuncture points of various parts of the body; the massage belt has the advantages of simple structure, low cost and convenient use, and is applicable to massage of the waist and the back and beating the acupuncture points of various part of the body.

1.2 Background Research

A massage belt is a unique tool used to help tighten and tone muscles. Applied directly to the desired area, this electric powered device stimulates the muscles. This causes the muscle to contract, the main component of any strengthening program. A muscle is made up of fibers surrounded by a thin sheath or covering

1.3 Problem Statement

-Stress level is increasing as compared to the past

- Controller that are controlled by physics are easily damaged

1.4 Research Objectives

The main objective of this project is for massage that can relieve stress and increasing relaxation

More specifically the principle objective of this research are:

1. To design a new product

2. To develop product with IoT features

1.5 Scope of Research

1. This project is focusing to all people
2. The emphasis is provide relaxation and reduce stress to users
3. The main controller is using arduino and bluetooth module which controlled using application in the devices

1.6 Project Significance

This device not only helps to develop muscles but also improves blood circulation. The high-frequency vibrating wave can efficiently target areas with excess fat. Two-way massaging belts can cover two body areas at once or allow two users to exercise at the same time.

1.7 Chapter Summary

Vibrations are a massage technique used to stimulate soft tissues. The vibration technique can be an up and down movement or a vibrating and shaking motion. Lighter vibration techniques can help stimulate the parasympathetic system and help the muscles relax. Vibrations can be used pre event and to treat tight muscles. There are many benefits of vibrations. The benefits of vibrations are reduced stress, relieved tight muscles and improved blood circulation.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

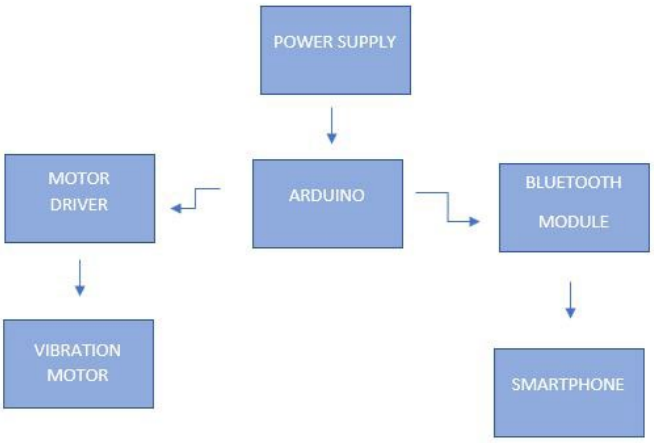
In the increasing stress on individuals nowadays, the manufacture of this massage belt is expected to help in reducing stress and can provide relaxation with the aid of vibration

2.2 Vibration Massage (Literature Review Topic 1)

Vibrations are a massage technique in which tissues are pressed and released in an up and down movement. A vibration massage creates a vibrating and shaking motion onto the muscles that can be performed in a soothing or stimulating way

2.3 Control System (Literature Review Topic 2)

Control System theory has played an important role because it helps to check the errors and to take the corrective action so that deviation from standards are minimized and stated goals of the organization are achieved in desired manner.



BLOCK DIAGRAM

2.3.1 12V Vibration Motor

12v motors are a type of electric motor that operates based on 12 volts, which are a unit of electrical force, of energy that they convert into mechanical energy to be utilized in the powering of various machinery or equipment.

2.3.2 Bluetooth Module

Development of this project will using a Bluetooth protocol to connect the massage belt to the device such as smartphone,laptop,tablet and etc. It will make the user easy to controller the massage belt because they can controller it using their devices.

2.3.3 Arduino

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

2.4 Chapter Summary

This section focusing on two different section, the first is about vibration massage. The second section is discovered about the technical part including the selection the type of component.

CHAPTER 3

RESEARCH METHODOLOGY

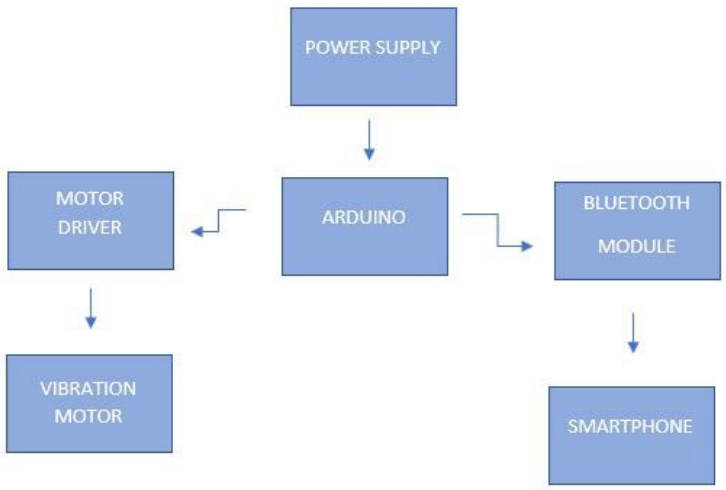
3.1 Introduction

In order to realize this project as a product that ready to use with safety characteristic, a very comprehensive plan is undertaking. A step by step procedure is done so that the project can be completed in time. This include collecting data of vibration massage, design the mechanical part, circuit design testing and verification.

3.2 Project Design and Overview.

As mentioned in the previous chapter, the design of the Arduino controller circuit is realised using Proteus Software and then converted to PCB circuit is very useful and easy to test, customise, and many more.

3.2.1 Block Diagram of the Project



BLOCK DIAGRAM

3.2.2 Flowchart of the Project 2

Figure 3. 1 shows the circuit diagram of the whole system.

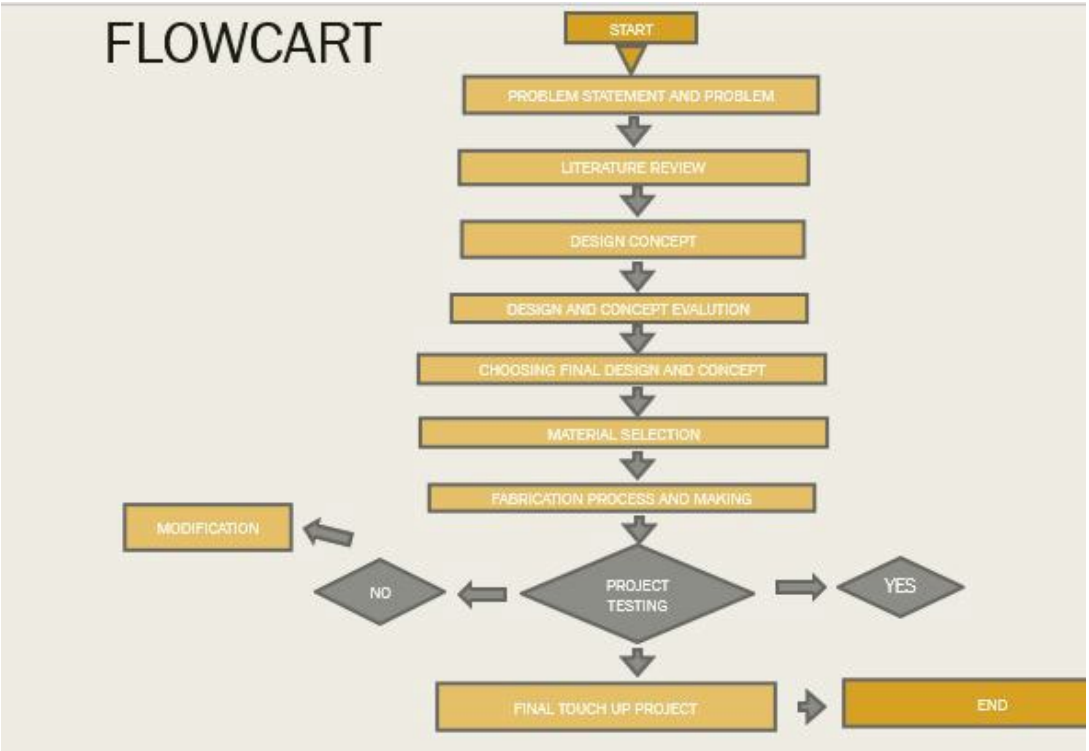


Figure 3. 1: Flow chart of operation of the system

3.2.3 Project Description

3.3 Project Hardware

As mention in previous chapter, the design controller is using arduino uno Then, the vibration motor will be running. The motor in the model is running according to Table 3.1

Table 3. 1 :Sequence of Vibration Motor Speed

Bluetooth Massage Belt	Speed (RPM)
0% Duty Cycle	0
25% Duty Cycle	2150
50% Duty Cycle	4300
75% Duty Cycle	6450
100% Duty Cycle	8600

3.3.1 Schematic Circuit

Figure 3. 2 shows the overall circuit diagram of this project

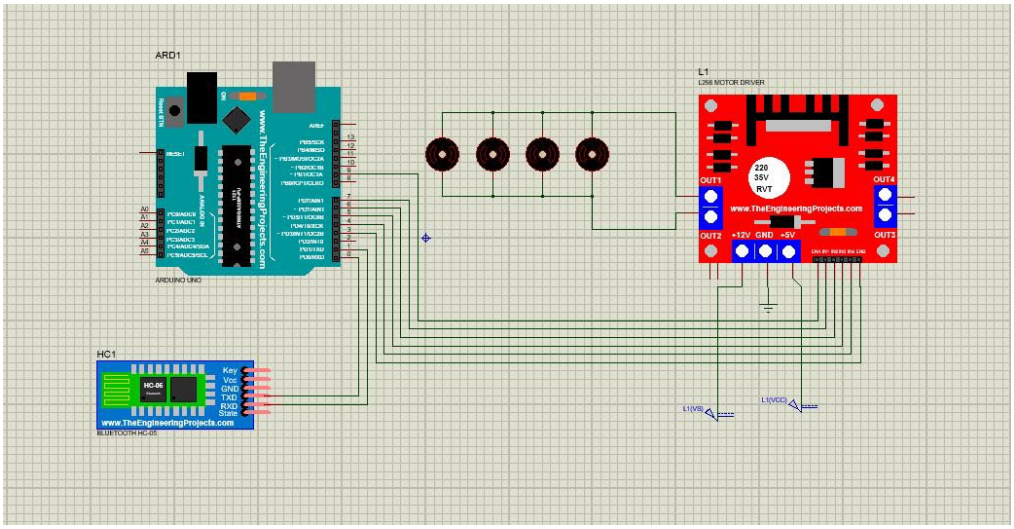


Figure 3. 2: Circuit Diagram

3.3.2 Description of Main Component

There are many electronic component out there that are being used but in the development of this project, we are using are specific components which is Arduino Uno, motor driver(L298N), 12V Vibration Motor, and Bluetooth Module(HC-06).

3.3.2.1 Component 1

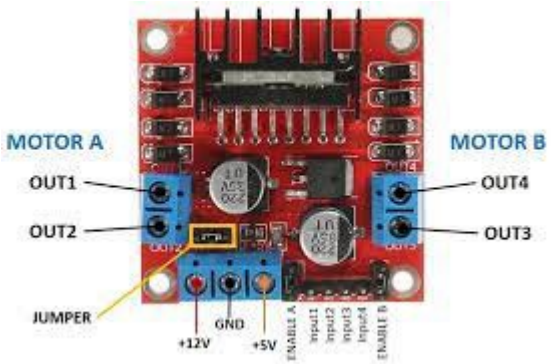
Arduino Uno :

In this project, we are using Arduino. Arduino is a single-board microcontroller. It is intended to make the application of interactive objects or environments more accessible. The hardware consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM.

3.3.2.2 Component 2

Motor Driver(L298N) :

The L298N is a dual H-Bridge motor driver which allows speed and direction control of two DC motors at the same time. The module can drive DC motors that have voltages between 5 and 35V, with a peak current up to 2A.



3.3.2.3 Component 3

HC-06 :

The HC-06 is a class 2 slave Bluetooth module designed for transparent wireless serial communication. Once it is paired to a master Bluetooth device such as PC, smart phones and tablet, its operation becomes transparent to the

user. All data received through the serial input is immediately transmitted over the air.

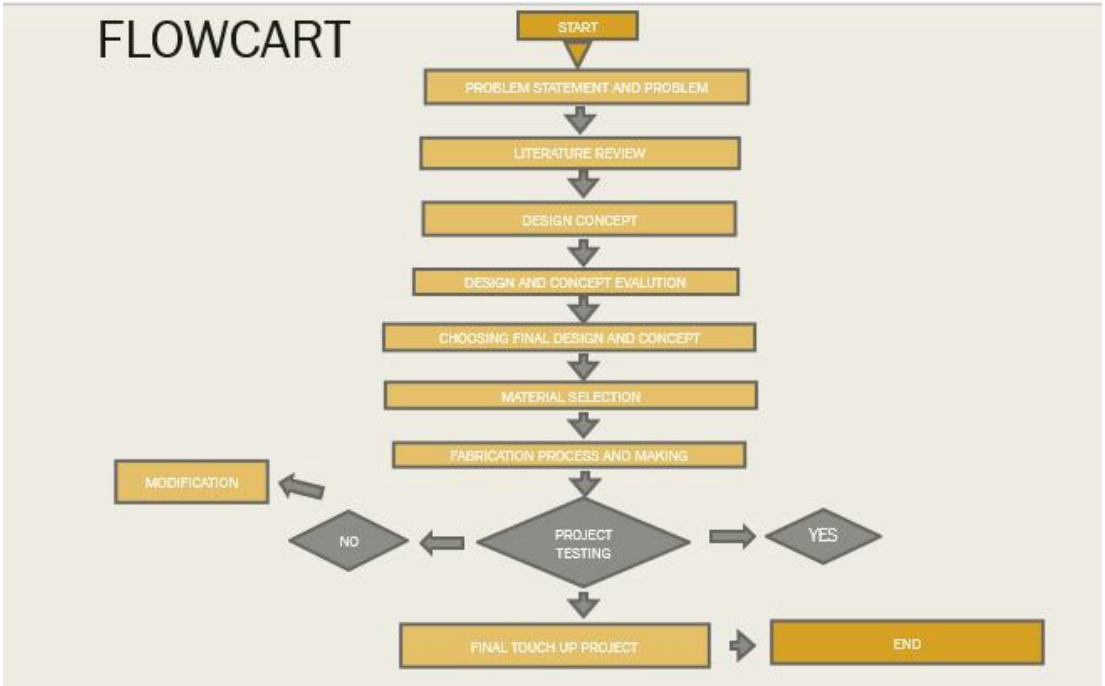
3.4 Project Software

In the development of this project, we are using MIT APP INVENTOR 2 for the controller software

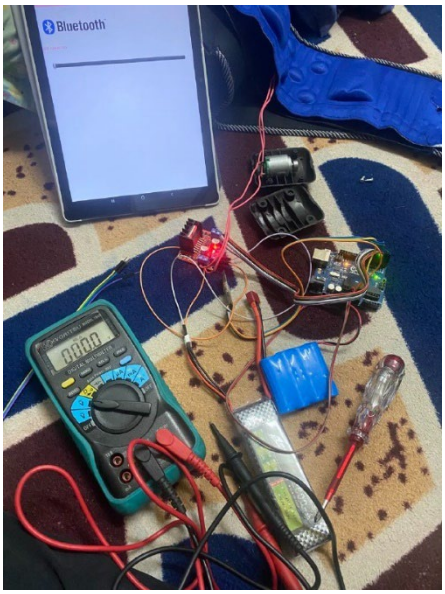
What is MIT App Inventor 2 and how it is used?

MIT App Inventor is an intuitive, visual programming environment that allows everyone even children to build fully functional apps for smartphones and tablets.

3.4.1 Flowchart of the System



3.5 Prototype Development



3.5.1 Software Design Layout

Figure 3. 1 shows the design of the software of Bluetooth Massage Belt

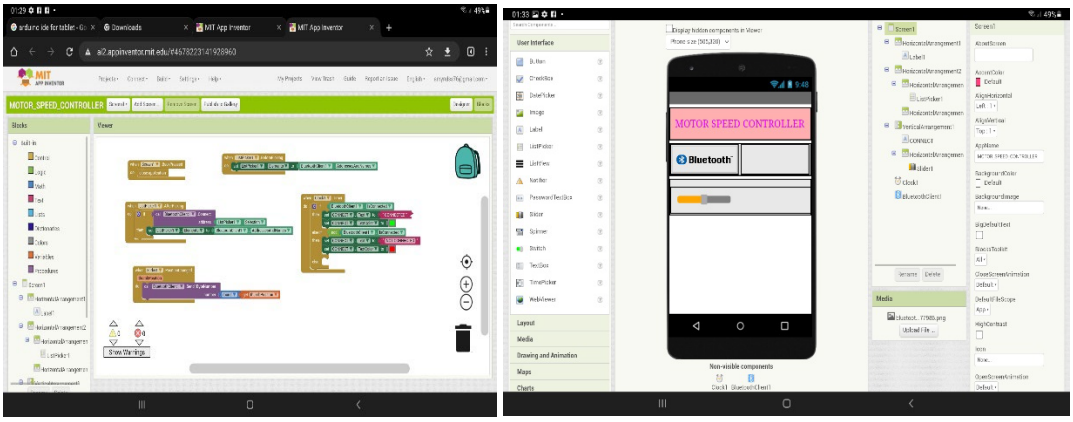


Figure 3. 3: View of the Software

3.6 Sustainability Element in The Design Concept

In this project's design is based on the user's comfort in wearing it. The use of soft materials also plays a significant role in user satisfaction

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

Using a massage belt can help tone muscles much in the same way as any strengthening program. Due to the adjustable straps, it can be used on just about any major muscle groups. It offers much of the same benefits of a regular exercise routine such as increasing things like circulation, waste removal and strength. It also increases the efficiency of the muscles which can in turn, help burn more calories.

In addition to the exercise benefits of a massage belt, these devices, set at a lower intensity, can offer relief from stress and overworked muscles by providing a gentle soothing massage to the area. Many massage belts also come with optional features such as heat. These aspects make the massage belt a great tool to prevent muscle soreness and fatigue after any strenuous workout routine.

4.2 Results, Analysis and Discussion

Electric vibrating belts, in addition to being a weight-loss or muscle-toning tool, are also a good choice for some people. These belts are ineffective in reducing belly fat or cellulite, but they may reduce thighs. They may even have the opposite effect, in fact. cellulite, also known as dimpling, is caused by the accumulation of fat and is treated with massages. However, the massages will not resolve the underlying causes of the problem. Many experts and researchers agree that such massages can work as a temporary fix for certain conditions, but they cannot cure them permanently.

Can Vibrations Help You Lose Weight?

The issue with vibration exercise equipment is that it does not increase heart rate in the same way that regular exercise equipment does, so you will not lose any calories. Many vibration machine manufacturers, on the other hand, advise using the machine while lifting weights, squats, lunges, and other activities.

Exercise Machine That Vibrates Your Way To Better Health

Vibrating machines have been shown to assist people in losing weight, improving muscle tone, and maintaining good blood flow. As a result of the machine's vibration, fatty tissues are broken down and toxins are released. If you use WBV, you will be able to improve your posture and balance as well. The American Council on Exercise recommends using the machine for only ten minutes at a time, gradually increasing the number of times you use it. If you want to burn calories, they recommend performing exercises that require a larger amount of muscle. As a result, if you want to do some low-impact exercises, the vibration

plate is an excellent choice. Begin with ten minutes of exercise and make sure you don't overdo it.

Does Vibration Plate Reduce Belly Fat?

It has also been demonstrated that vibrating platforms can be used to reduce belly fat in addition to reducing it. It appears that scientists and health experts are on the right track when it comes to vibration plate weight loss results so far.

Get Fit With A Vibration Plate

You can use a vibration plate to add a little cardio to your routine or to get you started on your weight loss plan. Many people believe that it is just as effective as running on a treadmill or cycling on a bike. Furthermore, because the device is so portable, you can bring it with you wherever you go.

If you're feeling sluggish or want to add muscle to your frame, you can use a vibration plate to get started. A vibration plate is a great choice for those who are looking for an effective and convenient exercise method.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Massage is the control of wistful tissues inside the body. Massage methods are generally applied with hands, fingers, elbows, knees, lower arms, feet, or an apparatus. The point of the massage is regularly for the treatment of body pressure or torment.

5.2 Conclusion

Consequently the venture moves toward the significance of the vibration treatment for muscle and nerve unwinding and in this manner shows the significance of vibration module inside the massage belt. Vibration treatment may have a few advantages for treating certain conditions, similar to muscle shortcoming, muscle irritation, or Parkinson's infection. it ought to try and be useful for more seasoned individuals who can't practice normally. Subsequently, massage therapy helped to achieve physical and mental strength and mental preparedness. This helps to own a healthy growth of mindfulness and active stimulation of the mind. Additional testing has shown a straight away increase and expedited recovery periods for muscle performance

5.3 Suggestion for Future Work

More improvements can be made based on this project, such as creating a waterproof cover to increase the durability of this product. Furthermore, the battery capacity can be increased to make this product run last longer.

-

CHAPTER 6

PROJECT MANAGEMENT AND COSTING

6.1 Introduction

Project management is critical to ensuring that the project is completed successfully. Of course, the creation of this new project or new innovation costs money. As a result, financial management is critical to ensuring that all of the project's requirements can be purchased. Savings can also be realised when the project is completed in groups. Each member of the group can contribute a little bit to ensure that each component can be purchased at a lower cost.

6.2 Gant Chart and Activities of the Project

6.3 Cost and Budgeting

This project involves the cost of purchasing components and materials throughout its implementation. components involving cost are hardware Arduino Uno, Bluetooth module, controller, vibration motor, elastic band and rechargeable battery,. All of these components are purchased through online purchase methods to make it easier as well as save on costs.

The overall gross budget estimate in the implementation of this project is RM 277.26 and other expenses is at RM 100.00 as shown in Table 1 According to this budget cost, this project is can be considered as a less costly project compared to other projects that can cost over a thousand ringgit. The cost of the project is also in line with one of the key features of a good project developer that is low cost but have a high quality project.

Table 1: List of Components and Materials

No.	Component and materials	The unit price	Quantity	Total
1	Arduino UNO set	RM 47.90		RM 47.90
2	Vibration Motor	RM 20.00	4	RM 80.00
3	Elastic Band	RM 24.99	1	RM 24.99
4	Rechargeable Battery	RM 85.37	1	RM 85.37
5	Controller	RM 27.50	1	RM 27.50
6	Bluetooth Module	RM 13.90	1	RM 13.90
			Total :	**RM 277.26**
	List of other costing			
1	Transportation			
2	Postage			
3	Craft Work			
4	Internet			
5	Application			
			Total :	**RM 100.00**
			Overall total	**RM 377.26**

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APPENDICES

APPENDIX A- DATA SHEET

APPENDIX B- PROGRAMMING

```
const int IN1 = 7;
const int IN2 = 6;
const int IN3 = 5;
const int IN4 = 4;

const int ENA = 9;
const int ENB = 3;


void setup() {



  Serial.begin(9600);

  pinMode (IN1, OUTPUT);
  pinMode (IN2, OUTPUT);
  pinMode (IN3, OUTPUT);
  pinMode (IN4, OUTPUT);
  pinMode (ENA, OUTPUT);
  pinMode (ENB, OUTPUT);
  // put your setup code here, to run once:

}

void loop()

{
  if(Serial.available()>0)
{
  byte pwm = Serial.read();
  analogWrite(ENA, pwm);
  analogWrite(ENB, pwm);

  digitalWrite(IN1, HIGH);
  digitalWrite(IN2, LOW);
  digitalWrite(IN3, HIGH);
  digitalWrite(IN4, LOW);
  delay(50);
}

  // put your main code here, to run repeatedly:
```

APPENDIX C- PROJECT MANUAL/PRODUCT CATALOGUE