ASSESMENT REPORT ON

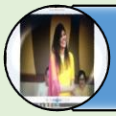
Team ID & Title: 19W1026

Tangle free earphone with smart start/stop music system

Submitted

as part of **CSE3999-Technical Answers for Real World Problems**

by



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Chapter 1
IMPORTANCE OF IDEA & PROBLEM STATEMENT

IMPORTANCE OF IDEA:

Headphones and Earphones are the staple of nearly everyone on the world. Be that because it might, after we place them away, they're going to generally tangle. The moving of headphones will create the wires in them break and this diminishes the lifetime of the headphones – each of the speakers quit operating or they quit working all at once and most disheartened state of affairs they tear. It should be one thing that isn't in-constructed. It tends to be placed on any combine of headphones. The headphones can have diminished or no tangling. The item ought to be shabby and straightforward to utilize. Active clamour dropping solely improves this talent. Alongside the untangleable wires we tend to are adding to the headphones, we tend to arrange on together with sensors aboard a touch printed circuit to the headphones with the goal that we are able to create a notice/caution framework. it's been seen that various people stroll out and regarding with headphones on, even in VIT. This propensity is exceptionally unsafe because it will prompt mishaps wherever the walker doesn't hear the vehicle sounding and move out of the way we can utilize any form of flag to alarm the consumer sort of a crystal rectifier or a sound message, etc. Mistreatment these inserted sensors, the electro-acoustic transducer and relating hardware will decide if the unit is during a client's ear, that advises management elements to show control hungry clamour dropping tasks on or off.

PROBLEM STATEMENT

Tangling of earphones is a common problem faced by all and this diminishes the lifetime of the headphones. Easy pausing of music directly by touching the earphones for safety reasons is another area we will be working on.

Keywords:

Earphones, untangling, noise cancelling, Arduino , cheap, more efficient, touch sensor, Bluetooth, power saving, auto play, auto pause, mobile application, music, intelligent earphones

CHAPTER 2

OBJECTIVES

In the lightweight of such a problem, we tend to expect to create AN item, which can have the incidental to usefulness:

1 It must be one thing that isn't in-constructed. It tends to be placed on any try of headphones.

2 The headphones can have minimized or no tangling

3 The item ought to be modest and easy to utilize. This item will be sold-out to any or all purchasers therefore everyone will a pair of headphones that tangle less and create the consumer involvement with headphones a greatly improved and fewer tight to utilize.

4 Another serious issue with all headphones is that after we all of a fulminant meet someone, we tend to merely take one earpiece off, and answer their inquiries or have a discussion and proceed onward. Be that because it might, we tend to might not delay the music creating the music continue taking part in – consequently making it badly designed as we are waste our phone battery by unremitting playback and what is more the music continues playing that makes North American nation free our stream. On these lines, most headphones don't have the component wherever on the off likelihood that we tend to take away the headphones, the music ought to stop – just like the Apple Air units. on these lines, we tend to set up on adding this element to the headphones therefore we are able to management the music while not very expecting to do and call our telephones and creating discussion to music a standardized progress.

5 The item ought to be modest and easy to utilize.

CHAPTER 3
LITERATURE REVIEW

3.1. National Status

An innovative and intelligent earphone with auto pause facility [1]
Department of Computer Science and Engineering, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, Amrita University, India |Department of Electrical and Electronics Engineering, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, Amrita University, India,2017
A framework that quits playing when the buds are taken off, and consequently proceeds with when it is set back. This is by all accounts basic however it isn't so. This will change the entire experience of getting a charge out of media, making another achievement in the stimulation world. This framework will bring another age of media players that not just enables us to tune in to our most loved music at whatever point we need yet in addition enables programmed access without opening our telephones once in a while for the equivalent.

Smart earphone: Controlling tasks by earphone in smart phone by gesture of the user [2] Ankur Jain, Prabhakar Tiwari, Amit Agrawal,2015

Relocation of the UI stage from an enormous computer to a complicated movable has altogether inspired its use by reworking it into a real wearable helpful innovation (Kim et at, 2012). thus essentially there are sensors within the speaker of the electro-acoustic transducer on varied mix of yield returning through sensors (ls1 on, rs1 on, ls2 on and rs1 off and plenty additional mix) attend the microcontroller, microcontroller turn out a specific flag for varied info condition, the yield of microcontroller attend the mobile phone Associate in Nursingd an application is there for distinguish the flag and on it flag assignment are going to be performed by the cell phone. thus far creators have done dynamical the track, dynamical the degree and respite and play of music there are plenty additional combine which will be created by the detector and on those data an endeavour may be performed by the host gizmo and what is more a discourse acknowledgment highlight can be another to the gadget.

3.2. International Status

Qi Yu, Shenzhen (CN),2010: associate electronic gismo incorporates a principle body and a BLUE TOOTH electro-acoustic transducer that may be clearly joined to the elemental body. The electro-acoustic transducer incorporates a console equipped for generating signs to regulate the electronic gismo in lightweight of consumer input. the elemental body incorporates a distinctive unit, a handling unit, and a touch-delicate screen. The recognizing unit generates a flag once the electro-acoustic transducer is appended to the elemental body. The handling unit controls to point out knowledge while not specific data or with explicit data on the touch-touchy screen once acceptive the flag from the recognizing unit.

Takehisa Sato, Hamamatsu, Japan ,1992: it's during this manner an object of the current creation to administer a programmed enjoying mechanical assembly which might amendment the tone and beat at an offered temporal arrangement to fluctuate the image of music and evacuate the dullness of the music. To accomplish this text, as indicated by the current invention, a programmed enjoying mechanical assembly to play a show contains capability implies for golf shot away tone knowledge together with note data and data for adjusting an image of music; and management implies for in turn poring over out the tone data from the capacity implies and exposing the browse tone data to a tone-ON procedure to on these lines play the exhibition whereas dynamic the image of music obsessed with the music picture modifying data. As per the current innovation, knowledge for dynamic the music image is place away before time as demo info within the capability implies yet note information, and melodic tones are made, alluding to the present music-picture adjusting knowledge. It's on these lines possible to play modified shows while not dullness.

Apple Inc., Cupertino, CA (US),2014: This identifies with electronic gadgets and, all the additional particularly, to electronic gadgets with furbelow, for instance, headphones. Extras, for instance, headphones are frequently utilised with media players, cell phones, and alternative electronic gadgets. some furbelow has receivers that are utilised to form some portion of a commotion retraction circuit. At the purpose once commotion dropping functions are dynamic, the result of encompassing clamour on sound reproduce will be diminished. Amplifiers will likewise be utilised to implement Voice mouthpiece clamour cancellation. There will be challenges connected with commotion dropping headphones. for example, a consumer WHO is utilizing headphones to tune up to sound whereas commotion scratch-off hardware within the ear telephones is dynamic might periodically have to evacuate the ear telephones. whereas doing in and of itself, the consumer is going to be unable to physically kill commotion scratch-off highlights. Effectively running commotion wiping out activities in an additional once a consumer isn't utilizing the adornment builds management utilization and diminishes the battery lifetime of the embellishment. it'd thus be enticing to own the capability to administer improved manners by that to regulate task of associate electronic gismo coupled to an embellishment, for instance, clamour dropping ear telephones.

CHAPTER 4

REQUIREMENTS

Hardware Requirements

List of Hardware Components:

1. Arduino Nano
2. Bluetooth module (HC-05 preferably, if not then HC-06)
3. 220ohm resistors x 5 - Rs. 10
4. LEDs - 2 blue, 2 red - Rs. 10
5. Jumper Wires: 7M-M, 5M-F, 3F-F - Rs. 30
6. TTP-223 Touch Sensor

List of Software Components:

1. Android Studio – Since we are focussing on only Android for now

Description of Hardware Component:

(1). Arduino Nano

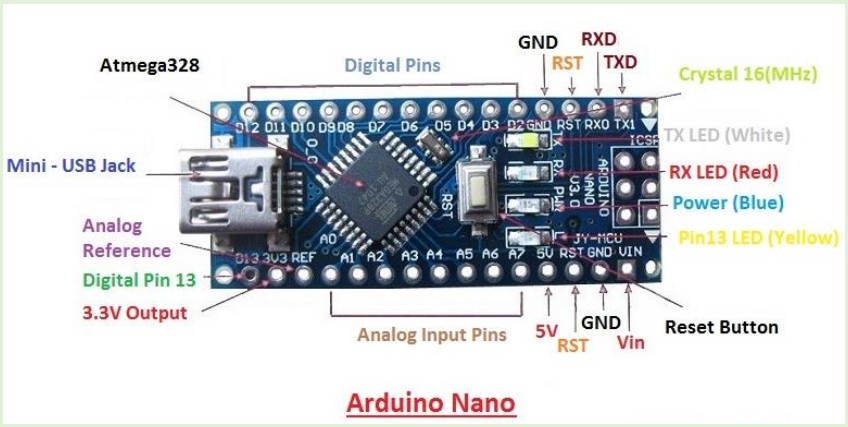


Fig. 1: Arduino Nano

Model: Arduino Nano

Vendor: Arduino

Price: Rs. 250

Specifications: The Nano has an ATMega328 microcontroller with operating voltage at 5V and 3.3V with 8 digital IO pins and 6 Analog Pins and a flash memory of 32KB.

Component Functionality: The Arduino Nano is used in our system to control the Music On and Off capabilities of our product.

(2). Bluetooth Module – HC-05

Fig. 2: Bluetooth Module – HC 05

Model: HC 05

Vendor: CFEOII Microcontrollers

Price: Rs 250

Specifications: It follows the Bluetooth 2.0 protocol and operates at the 2.4GHz ISM band. It follows the GFSK modulation with a max speed if 2.1MBps

Component Functionality: The Bluetooth module is used to transfer the sensor input to the smartphone.

(3). TTP-223 Touch Sensor

Fig. 3: TTP-223 Touch Sensor

Model: TTP-223

Vendor: ePro Labs

Price: Rs 100

Specifications: The module has an integrated touch sensing area of 11 mm x 10.5 mm with a range of 5mm. An on-board LED will give an indication of when the sensor is triggered.

Component Functionality:

The module will sense the user's touch feedback and acts as an input for our product.

Summary of Components in Tabular form

S.No	Item	Model	Vendor	Price In Rs.
1.	Microcontroller	Arduino Nano	Arduino	Rs 250
2.	Bluetooth Module	HC – 05	CFEOII	Rs 250
3.	Resistors	220 ohms	Generic	Rs 10
4.	LEDs	2 RED and BLUE	Generic	Rs 10
5.	Jumper Wires	M-M, M-F	Generic	Rs 30
6.	Touch Sensor	TTP-223	ePro Labs	Rs 100

Table 1: Summary of Hardware Components

Description of Software Component:

(1). Android Studio

Fig 4.: Android Studio

Model: Version 3.3

Vendor: Google

Price: Free

Specifications: It is the fastest tool for building android apps and has many features like APK analyser for finding app size and fast emulator for fast installation on target device.

Component Functionality:

Android Studio will be used by us to build an android application to control the starting and stopping of the music.

CHAPTER 5
Architecture

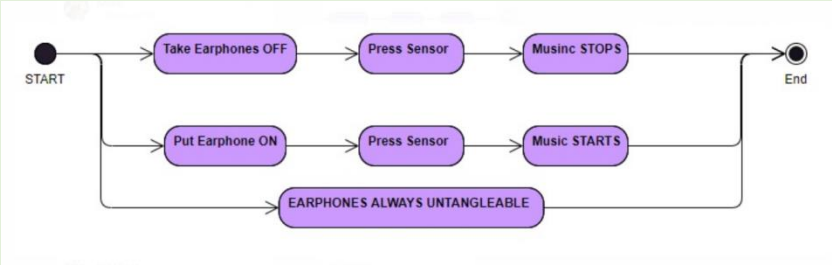


Figure 1 flow chart

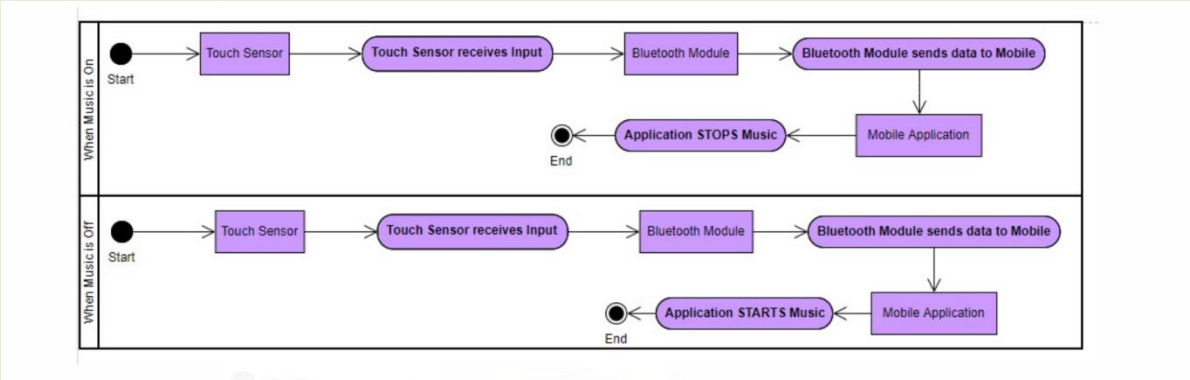


Figure 2 sequence diagram

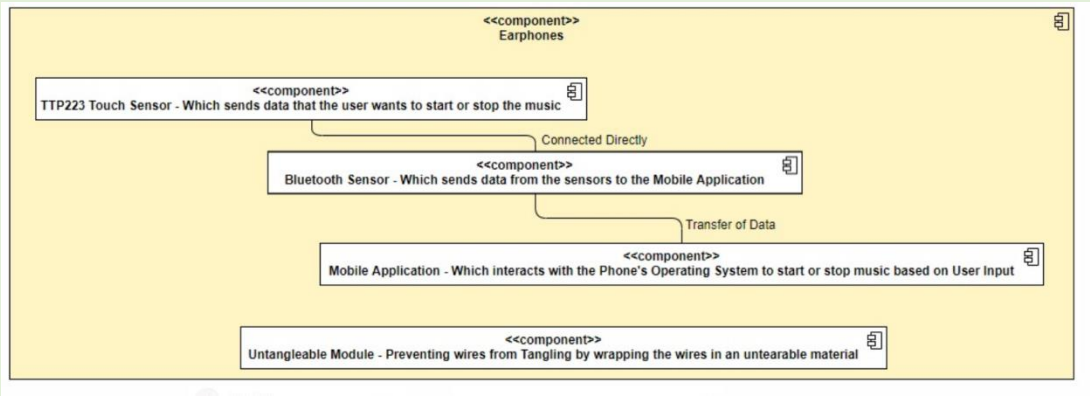


Figure 3 module diagram

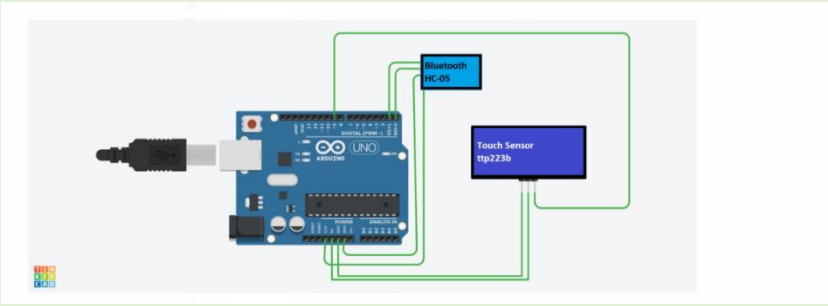


Figure 4 Circuit diagram

Tangled, rather our aim is to build a generic case, or a cover which can be used with any earphones and make them tangle free. And not just this, we aim that our product should cover all aspects where a customer feels the need that earphones should improve. Our team noticed a problem that earphone users face frequently, while listening to the music if someone comes to talk them, they (generally) just remove the earphones from their ears and start talking. But, the music still continues to play, sometimes the conversation goes long, and still the music is on which leads to unnecessary wastage of battery power. Apart from power, another issue is that the song that was playing or the video that was being played, has to be turned on again by the user, which is not user friendly given the technological automation that the industry is based on these days.

Idea #1 for the case/sleeve

We will be making a very thin case in which any earphone can be placed and can be made tangle free. To do this we are using a material named "Tyvek".

Tyvek is a nonwoven product consisting of spun bond olefin fibre. It was first discovered in 1955 by a researcher for the DuPont textile company, named Jim White. While working in an experimental lab, Jim noticed a type of white fluff coming out of a pipe in a DuPont experimental lab. Tyvek is generally used as a packaging for sterile instruments that are to be used by surgeons and doctors in the medical field.

Properties of Tyvek

Tyvek has many properties which makes it best suited material for our product.

The fibers of Tyvek are 0.5–10 μm. The nondirectional fibres (plex filaments) are first spun and then bonded together by heat and pressure, without binders.

Tyvek is also:

- Light weight
- Class one flammability rating
- Chemical resistant
- Dimensional stabilized
- Opaque
- Neutral pH
- Tear resistant

Tyvek looks like paper, with the same colouring and texture. It can even be written on. However, it is actually a plastic made of high-density polyethylene fibres. The material is very strong and it's very hard to tear.

So, the product will be like a cover for earphones in which the earphones can be inserted, and then the cover will get rolled around the earphones, and the process is done.

This will have 2 benefits

1. Make the earphones tangle free
2. Prevent any sort of damage to earphones

We plan to use the strength of this material to prevent any damage by tightly packinig the earphones into the material case.

Idea #2 (Tangle free wires by beads case)

This idea is very simple and straightforward, and yet so powerful and effective. The basic idea still remains to increase the surface area of the wires so that they don't get tangled. We can achieve this by wrapping our wires with beads as shown in the figure

While implementing this solution, there is one problem that we thought of that we will be facing, width of earplugs and the jack is much bigger than the jack. Then how will the earphone bead jacket will fit in the wire? We came out with a solution that we will be creating a cylindrical wired case on which the beads will be attached, and the earphones can be put into it.The cylindrical hollow tube will act as an outer cover and also make it earlier for the earphones to fit in.

Idea #3 (Tangle free wires by Cord Cruncher)
The idea is to make a compressible wire case, which will compress in size when the headphones are not in use so that they don't get tangled.

The Technical Specifications
As already discussed above, we plan on including a special feature in our product which is that the music will stop or the volume will get reduced whenever a person
The basic idea is to have a module that senses whether the earphones are inside ears or not and sends a signal based on the same to the mobile, turning on or off the music.

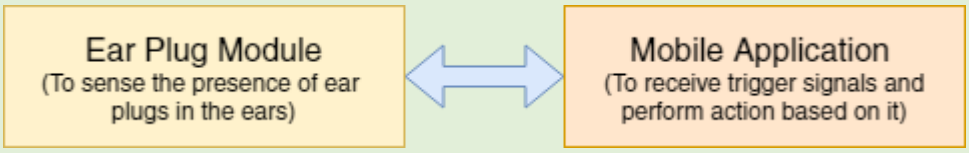


Figure 5

A similar idea has been proposed in the US Patent US9648409B2. An electronic device is put together with the earphones and it has sensors to detect if the earphone is placed in or out of the ear.

CHAPTER 6
INVENTION DETAILS

6.1. Objects of the Invention

It is thus the essential object of the innovation to as well as sensors aboard a bit printed circuit to the headphones with the goal that we will create a notice/alert framework. it's been seen that various people stroll out and concerning with headphones on, even in VIT. This propensity is very unsafe because it will prompt mishaps wherever the person on foot doesn't hear the vehicle sounding and move off the crushed path. to require care of this issue,

An object of this development is to change the headphones with sensors therefore a sound past a position sort of a horn maybe recognized and a caution is raised to alarm the shopper to a moving toward vehicle.

Another object of the current creation is ornamental and wearable. Crossloop headphones is used as a hand arm band. you'll be able to simply wear it in your grasp once not getting used. It arrives in AN assortment of hues and causes you to increasingly seductive and uncommon once you wear it. it's likewise a rare gift for your friends and family.

Another object of the current creation is to empower individuals to accomplish untangable headphones. Our untangleable headphones aren't simply serving to United States to administer a superior item, but they assist our general public too. This item won't simply convey the same quality however larger reliableness, so it helps society ANd its kin to convey an item that won't get destroyed.

One more item is to administer a superior affectability and truth for the acknowledgment of bit.

Another item is to administer multi-structure yields in each content and discourse.

One additional object of the current development is we are going to presumably have a more drawn out life headphones.

This won't simply facilitate people to spare their money, however have a solid item and be sure of a difficulty that we tend to face on regular routine.

6.2. Summary of Invention

The above mentioned objects are achieved through the development of the current invention that can aid the millions who need a technology that can redress their difficulties with earphones. The current invention can be viewed both as a product and as a service. As a product, it can be a part of the market where people can buy it. As a service, it can be provided to the students and all the elderly who are using earphones daily and want it to auto play and auto pause.

6.3. Brief Description of the Drawings

Figure 1 is a flow chart indicating the flow of our invention and how the earphones will respond and react.
Figure 2 is a sequence diagram indicating the sequence of actions by the touch sensor present on the earphone, the Bluetooth module used with Arduino and the implementation cooperating with the mobile application.

Figure 3 is a module diagram depicting the various modules and how they synchronize with each other to work properly in accordance with our invention.
Figure 4 is the circuit diagram showing the connections our jumpers with the various hardware and software components of our system as mentioned before.

6.4. Detailed Description of the Invention

An electronic contraption can be coupled to an additional, as an example, a pair of headphones having clamor cancellation highlights. The commotion retraction highlights can be used to diminish the impact of encompassing clamor on the sound substance that's compete through the headphones.
The headphones might have ear closeness device structures that decide if speakers within the headphones are accessible at the ears of the shopper. knowledge from the ear closeness device structures can be used to manage the task of the clamor undoing highlights. In one applicable encapsulation, commotion retraction highlights can be actualised utilizing clamor crossing out hardware within the headphones. With this type of style, management hardware within the headphones might modify the clamor dropping hardware in lightweight of information from the ear closeness device structures. for example, management hardware within the headphones might consequently deactivate clamor wiping out hardware once knowledge from the ear closeness device structures demonstrates that the headphones are expelled from a client's ears. At the purpose once knowledge from the ear closeness device structures demonstrates that the headphones are place in or on the client's ears, the management hardware within the headphones might, whenever wished, naturally initiate the commotion cancellation hardware.
In another applicable encapsulation, commotion dropping highlights can be actualised utilizing clamor undoing hardware within the electronic contraption. With this type of arrangement, knowledge from ear closeness device structures can be passed on to manage hardware within the electronic contraption. The management hardware might modify the clamor wiping out hardware in lightweight of information got from the ear closeness device structures. for example, management hardware within the electronic contraption might naturally deactivate clamor retraction hardware once knowledge from the ear closeness device structures demonstrates that the headphones are expelled from a client's ears. At the purpose once knowledge from the ear closeness device structures shows that the headphones are place in or on the client's ears, the management hardware within the headphones might, whenever wished, consequently initiate the commotion cancellation hardware.
Controlling the task of clamor wiping out hardware keen about whether or not the headphones are accessible at the client's ears might diminish the facility utilization of battery within the headphones or in the electronic contraption

6.5. Working Examples:

6.5.1. Working Example 1

At the point when a client puts their ear bud in or takes it out, a gushing music administration can begin or quit playing. This specific arrangement would probably spare significantly more power as gushing media over remote or even Wi-Fi is a power concentrated task.

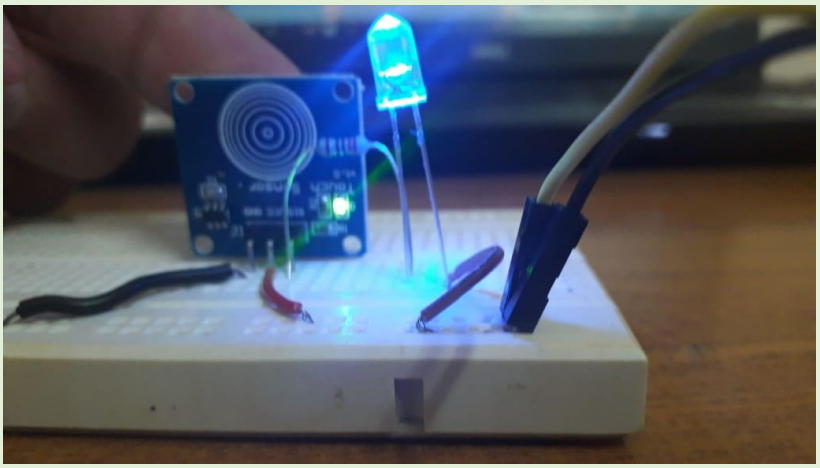
6.5.2. Working Example 2

Consider a user who wants to work with untangled earphones this portable material can easily switch from one earphone to another causing them to use carefree untangled earphones.

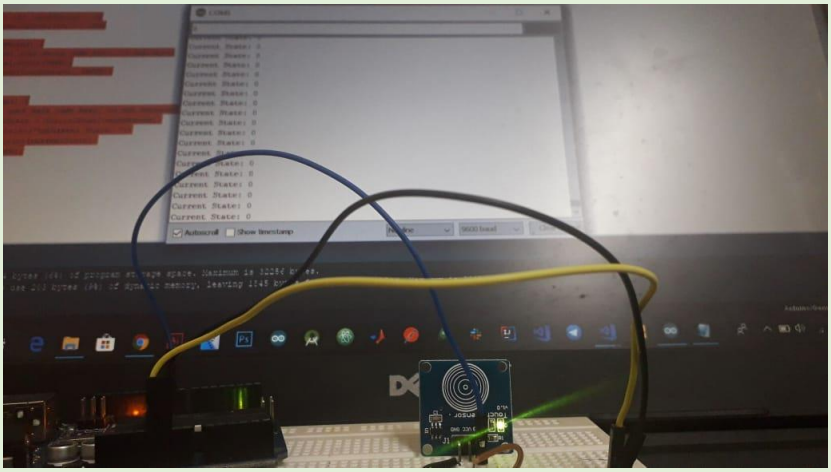
CHAPTER 7
IMPLEMENTATION

This project consists of three phases of implementation:

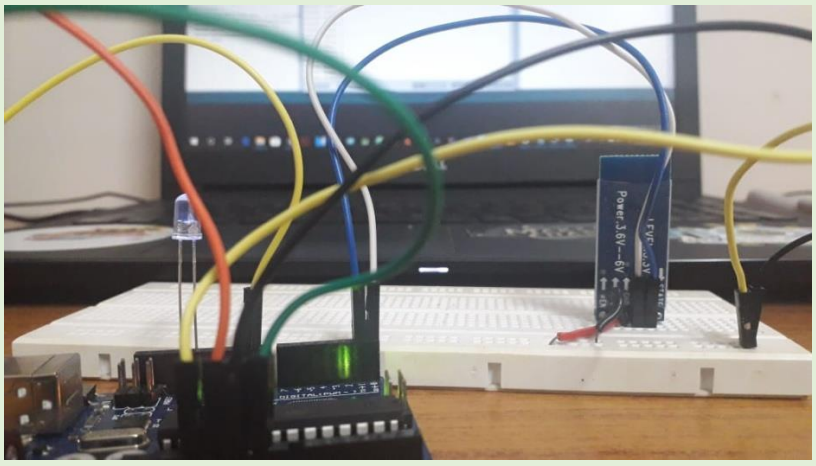
1) Creating a touch sensor



2) Connecting touch sensor to the device using Bluetooth



3) The application



7.1 **IMPLEMENTATION – PSEDOCODE**

Arduino code:

```
/**
 * Read Signals from touch sensor and display it to serial monitor
 * @date 17/03/2019
 */

const int touchSensor = 9;
boolean currentState = LOW;

void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  pinMode(touchSensor, INPUT);
}

void loop() {
  // put your main code here, to run repeatedly:
  currentState = digitalRead(touchSensor);
  Serial.print("\nCurrent State: ");
  Serial.print(currentState);
  delay (500);
}
```

CHAPTER 8
Applicability category

Applicability category – Society Relevant and Hardware Based

Our untangle-able earphones are not only helping us to provide a better product, but they help our society also. This product won't only deliver the same quality but more reliability, hence it helps society and its people to deliver a product that won't get destroyed. It is very cost effective too. Since major damage to earphones is done due to untangling of earphones, since the earphones won't tangle hence, we will be able to have a longer life earphone. This won't only help people to save their money, but have a reliable product and solve a problem that we face on daily basis. The product also requires a Bluetooth interface as we are using generic components. The Bluetooth module will help transfer the sensor data so we know when the user wants to stop or start the music.
The project is an initiative to give back a solution to the society's very common problem.

Chapter 9
CONCLUSIONS

Once in a while, you have a terrible day at the workplace/school when the time simply doesn't appear to move and the day crawls. At long last when the painful hours close, you're depleted as damnation. You're surely in no state of mind to hear individuals jabbering about their issues amid your drive back home, so as to loosen up and recover some vitality, you choose to take out your headphones, siphon up that music, and shut out the world. But oh well, now we have a puzzle to solve- untangling the earphones. How not welcomed? Well we have a solution now:

- The common problem of our earphones constantly getting tangled as soon as we put them away is tackled by introducing an earphone jacket system.
- Pausing the music when the user takes of his earphones is another application of our project.
- The music automatically resumes to play once the user places the earphone back in hid ear.

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Books

- Learning Arduino Programming using 37 sensors for beginners: Practical Way to Learn Arduino – ISBN: 978-1521566763

BRIEF BIOGRAPHY OF EACH TEAM MEMBERS

Rashi Wadhwani

Ms. Rashi Wadhwani

completed her schooling from the Daly College, Indore adjudged to be the best boarding cum non boarding school in India.

Aspiring and a Confident Student Pursuing B. Tech Computer Science from VIT univeristy,Vellore With Good Academic Score and Extra Co-Curricular Activities.Adept at Working across Departments with Faculty, Administrators and Students with Good Oratory Skills.

Sreelakshmi Sunil Kumar

completed her high school Delhi Public School,Singapore following the ICSE syllabus.

She is persuing Computer science and engineerging in Vellore Institute of technology, Vellore. Currently studying 3rd year of engineering.

Extremely interested to take up such projects and work on them.

Student with good managerial skills.

Aspiring to do MBA in Human Resource Management.

Omkar Vivek Sabnis

- is a junior year student of Vellore Institute of Technology pursuing his bachelor's degree in Computer Science and Engineering with Specialization.
- He is good at academics - 3rd in his branch and was his branch's program representative.
- He has participated in many interdisciplinary projects and is good at managing such projects.

Madhav Bahl

- Madhav is a pre-final year student of Vellore Institute of Technology pursuing his bachelor's degree in Computer Science and Engineering .
- He is a good team worker and is skilled in software development.
- Being an active part of many communities, also through his own tech community, CodeToExpress, Madhav has been contributing to make the youth of this world well versed with programming.

Rishab Gupta

- Rishabh Gupta is a junior year student of Vellore Institute of Technology and is pursuing his bachelor's degree in Computer Science and Engineering. He is a great team worker and considers graphic designing as one of his greatest skills. He is self-confessed foodie and has worked on many inter-departmental projects.