

TARCIN ROBOTICS LLP

A SUMMER INTERN REPORT

Submitted by

GOURAV PRITHAM G R

21ITB28

In partial fulfillment for the award of the degree of

DEPARTMENT OF INFORMATION TECHNOLOGY

of

Velammal College of Engineering and Technology, (Autonomous)

DEC 2022 – JAN 2023

CERTIFICATE

TARCIN ROBOTIC LLP

LLPIN: AAJ-7077

Ref: TR/2022-2023/VC/100016

TO WHOM IT MAY CONCERN

This is to certify that Mr. Gourav Pritham GR, (Reg No. 913121205024) pursuing Information Technology from Velammal College of Engineering and Technology, Madurai has successfully completed his internship (between 28th December 2022 to 11th January 2023) at Tarcin Robotic LLP.

His internship activity includes Learning of "Design and Fabrication of Robot blocks, Development of Algorithms for developed Robot, Planning and Deploying innovative ideas" Details of the Project work can be found in the Internship Report.

During the period of his internship program with us, he had been exposed to different processes and was found punctual, hardworking and interested to learn from assigned project study.

We wish him every success in his life and career.

For, Tarcin Robotics Llp.

Signature of Authorized Officer

WADURAN F

Tarcin Robotic LLP, 176, U 6th Street, KK, Nagar, Madurai, Tamil Nadu contact a tarcinrobotic, in 91 7010 86 9176 https://tarcinrobotic.in

BONAFIDE CERTIFICATE

Certified that the student **Gourav Pritham G R – 913121205024** completed summer internship 2023 at **Tarcin Robotics Llp** under my supervision.

Dr.R.Kavitha HEAD OF THE DEPARTMENT

Information Technology

Velammal College of Engineering and Technology

Madurai – 625009

Mrs.C.Manjula Devi

ASSISTANT PROFESSOR III

Information Technology

Velammal College of Engineering and Technology

Madurai – 625009

ACKNOWLEGDEMENT

I thank the ALMIGHTY for giving us the moral strength to work on the Internship for the past few months. I would like to express our sincere thanks to Shri. M. V. MUTHURAMALINGAM, founder of the institution for giving an opportunity to do my B.E. in Information Technology. My sincere thanks to our respected Senior Principal Dr. N. SURESH KUMAR and Principal Dr. P. ALLI for the encouragement and motivation they offered me during the period of my internship.

My heartfelt gratitude to our Head of the Department, Information Technology Dr.R.Kavitha, for her valuable guidance, inspiration, and encouraging appreciation, which helped me a lot in completing this internship in time. I convey my thanks to our mentor Ms.C.Manjula Devi, Assistant Professor, Department of Information Technology, for her innovative suggestions and valuable guidance. I would also wish to extend my sincere gratitude to all faculty members of the Department of Information Technology for their valuable guidance throughout my internship.

I would like to thank Mr., the CEO & Founder of Tarcin Robotics llp, for giving me the opportunity to do an internship within the organization. I would like to thank Mr.Pandirajan (Technical Head) and Mr.Sakthivel (Trainer) who made this internship very interesting. I also thank our parents and friends who provided moral and physical support.

ABSTRACT

During the period of December to January, our enriching internship at Tarcin Robotics Inc provided us with an immersive and enlightening experience in the fields of IoT and robotics. Through hands-on learning and engaging projects, we delved into a diverse range of concepts and technologies that underpin these cutting-edge domains.

Throughout the internship, we acquired a solid foundation in fundamental components essential to robotics and IoT applications. These included in-depth explorations of ultrasonic sensors, IR sensors, moisture sensors, PR sensors, LEDs, servo motors, DC motors, and breadboards. Our exposure to these components laid the groundwork for a deeper understanding of their functionalities and applications in various projects.

One of the highlights of our internship was the opportunity to engage in hands-on project work. Under the guidance of experienced mentors, we conceptualized, designed, and implemented robots that showcased a variety of functionalities. We successfully created human follower robots that could track and mimic human movements, line follower robots that adeptly navigated predefined paths, edge detectors that exhibited precise boundary identification, and obstacle avoider robots that autonomously navigated through dynamic environments. These projects were all developed using Arduino, enhancing our proficiency in programming and hardware integration.

In addition to our accomplishments in robotics, we ventured into the realm of smart systems. We designed and executed a fire alarm system that integrated advanced sensors to detect and respond to potential fire hazards promptly.

This internship not only enriched our technical prowess but also instilled in us a deeper appreciation for the limitless possibilities within IoT and robotics. Our experiences at Tarcin Robotics Inc nurtured our problem-solving skills, fostered teamwork, and ignited a passion for continuous learning in this dynamic field. As we reflect on our journey, we are confident that the knowledge and skills we acquired will serve as a strong foundation for our future endeavors in contributing to the ever-evolving landscape of technology.

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INTRODUCTION

- The period from December to January marked a significant juncture in our academic journey as we embarked on an enriching internship at Tarcin Robotics Inc. This enthralling experience granted us unparalleled insights into the intricate world of robotics and the boundless potential of the Internet of Things (IoT).
- I recently completed an internship in the field of Internet of Things (IoT) and Robotics, where I gained hands-on experience and insight into the cutting-edge technology that is transforming the way we interact with the world.
- In this report, I will provide an overview of my internship experience, including the
 projects I worked on, the skills I developed, and the key takeaways from my time in the
 field.
- We will look into the various technologies that I have learnt on my own and have implemented in the same field and in the development of the projects that I have worked in.
- We will learn about the various Devices we used in my internship like Ardiuno, Tinkercad etc....
- In this report, I will provide the about of the company Tarcin Roobtics llp and some Pictures we have taken in the internships.
- Throughout my internship, I developed a range of technical and professional skills that are essential for success in the IoT and robotics field.
- I learned how to program microcontrollers using C++ and I gained experience in using various software tools such as Chitubox, Tinkercad and Arduino IDE.
- During my internship, I had the opportunity to work on several projects that involved developing and testing IoT and robotics systems.



ABOUT THE COMPANY

Tarcin Robotic Llp (TRL) is 6 years 2 months old Limited Liability Partnership 14 June 2017. Its registered office is in Madurai, Tamil Nadu, India.

LLP Identification Number (LLPIN): AAJ-7077

Registrar of Companies: Chennai

Status: Active

Date of Incorporation: 14th June 2017 Age of Company: Approximately 6 years

Registered Address:

No.105, Lake View Garden, First Street, K.K Nagar

Madurai, Tamil Nadu

Pin: 625020

Designated Partners: Trainers:

Rabi Ahamad Arif Mohamed Khan Ajmeer
Balakiruthiha Sakthivel
Abuthahir Shifana Fathima Pandiarajan

Tarcin Robotic LLP is a dynamic and innovative company that specializes in robotics and technology solutions. With a strong focus on cutting-edge advancements in the field, the company has made significant strides since its incorporation on 14th June 2017. Based in Madurai, Tamil Nadu, Tarcin Robotic LLP operates under the LLP Identification Number (LLPIN) AAJ-7077 and falls under the jurisdiction of the Chennai Registrar of Companies.

The company's dedicated team of Designated Partners, including Rabi Ahamad Arif Mohamed Khan, Balakiruthiha, and Abuthahir Shifana Fathima, exemplifies a commitment to excellence and innovation. Their combined expertise and visionary leadership drive the company's mission to explore the limitless possibilities of robotics and technology.

Tarcin Robotic LLP's registered office, situated at No.105, Lake View Garden, First Street, K.K Nagar, Madurai, serves as a hub for its creative endeavors and business operations. The company's active status demonstrates its ongoing engagement and dedication to its objectives.

Despite the lack of specific financial details for the last financial year, Tarcin Robotic LLP remains steadfast in its pursuit of technological advancements and business success. As the company continues to evolve and contribute to the realm of robotics, its innovative spirit and dedication to pushing boundaries are poised to shape the future of technology.

Please note that some details, such as financial information and specific activities, are not provided in the given information. This fictional profile is based on the information provided and is meant for illustrative purposes only.

In tandem with our exploration of robotics, our internship at Tarcin Robotics Inc. provided us with an in-depth understanding of the transformative power of the Internet of Things. We were introduced to the intricate network of interconnected devices that form the backbone of IoT, gaining insights into how data is harnessed, transmitted, and analyzed to drive intelligent decision-making. Hands-on experience with IoT devices equipped us to harness real-world data and leverage its potential to create innovative solutions.

Our time at Tarcin Robotics llp was not only defined by technical exploration but also by exposure to industry best practices. We had the privilege of working alongside seasoned professionals who generously shared their insights and expertise. This exposure not only broadened our understanding of robotics and IoT but also exposed us to the nuances of teamwork, project management, and effective communication within a corporate environment.

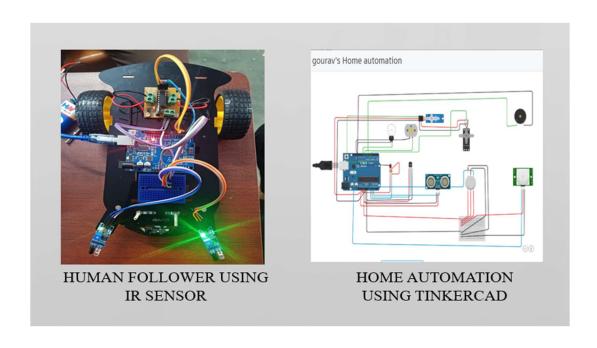
Despite the lack of specific financial details for the last financial year, Tarcin Robotic LLP remains steadfast in its pursuit of technological advancements and business success. As the company continues to evolve and contribute to the realm of robotics, its innovative spirit and dedication to pushing boundaries are poised to shape the future of technology.

Tarcin Robotics LLP collaborated with our college, Velammal College of Engineering and Technology and initiated a robotics lab on our campus under the Department of Information Technology.



INTERNSHIP OVERVIEW

- During my internship, I had the opportunity to work on several projects that involved developing and testing IoT and robotics systems.
- One of the projects involved designing a smart home system that could automate various tasks, such as adjusting the temperature, turning off lights, and monitoring security.
- The system was built using sensors, microcontrollers, and a mobile app that allowed users to control and monitor their home remotely.
- Another project I worked on involved designing and building a robotic arm that could be used in manufacturing processes.
- The arm was designed to be flexible, precise, and easy to operate, and it was controlled using a custom software interface that I developed.
- I also had the opportunity to collaborate with other interns on the project.
- Tinkercad is a free web app for 3D design, electronics, and coding, trusted by over 50 million people around the world.
- Communication and teamwork: Robotics and IoT projects are typically collaborative efforts that require good communication and teamwork skills. You will learn how to work with others and communicate effectively to achieve common goals.



<u>Title of Summer Internship</u>: - Accomplishment of Robotics and IOT

Date from: 28.12.2022 Date to:11.01.2023

| Day & Date | Time | Tasks assigned | Tasks completed | Observations |
|---------------------------|--------------------------|--|-----------------------|--|
| 28.12.2022 to 30.12.2022 | 10:00AM To 12:00PM | Introduction on robotics and basic components. | Yes completed | I learnt about the some basic components like arduino etc. |
| 02.01.2023 to 04.01.2023 | 10:00AM To 12:00PM | Introduction to Basic sensors and motor driver | Yes completed | I Learnt about the L293D motor driver & its working. |
| 05.01.2023 to 07.01.2023 | 10:00AM To 12:00PM | Tasks in Tinkercad | Yes completed | I learnt about the working of tinkercad and worked on some projects in tinkercad |
| 09.01.2023 to 11.01.2023 | 10:00AM To 12:00PM | Hands on project | Yes completed | I worked on a human follower bot and executed well and learnt about the working of proximity sensor and raindrop sensor. |
| Remarks of In | dustry Guide | : : | | |
| Note: -Weekly by mail. | report to be | sent every Friday to res | spective Faculty guid | e |

PROJECTS

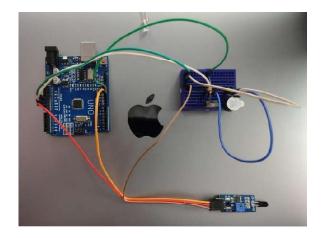
Fire Alert System:

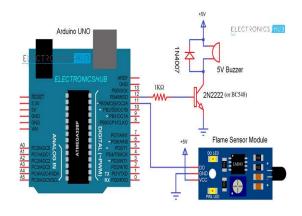
A Flame Sensor is a device that can be used to detect presence of a fire source or any other bright light sources. There are several ways to implement a Flame Sensor but the module used in this project is an Infrared Radiation Sensitive Sensor.

This particular flame sensor is based on YG1006 NPN Photo Transistor. The black object at the front of the module is this <u>Photo Transistor</u>. The YG1006 Photo Transistor looks like a black LED but it is a three terminal NPN Transistor, where the long lead is the Emitter and the shorter one is the collector (there is no base terminal as the light it detects will enable the flow of current).

This photo transistor is coated with black epoxy, making it sensitive to Infrared radiations and this particular Photo Transistor (YG1006) is sensitive to Infrared Radiation in the wavelength range of 760nm to 1100nm. Using this particular type of Flame Sensor, you can detect Infrared Light up to a distance of 100cm within its 60 degrees of detection angle.

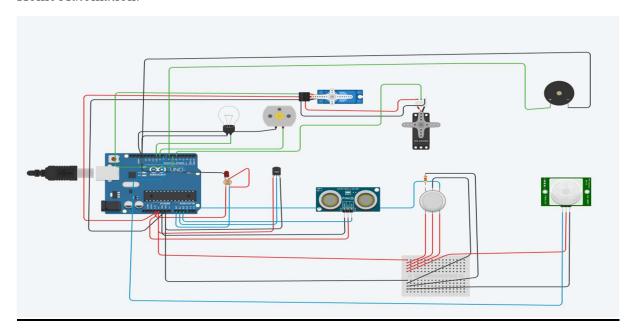
There are two types of implementations of Flame Sensors using YG1006 Photo Transistor: one is with both Analog Output and Digital Output while the other is with only the Digital Output. Both these implementations require same components but the difference is that one module (the one with the Analog Output) provides the Sensor output as Analog Output. The Flame Sensor that I am using in this project has only Digital Output.



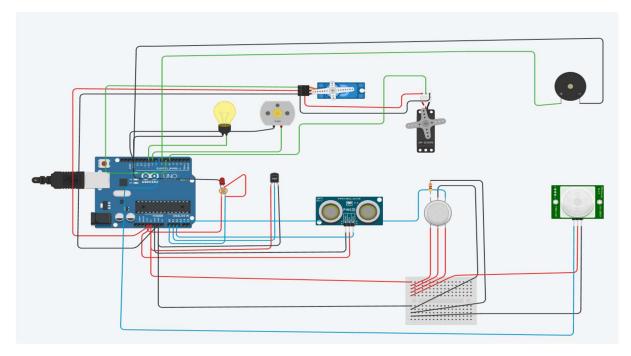


PROJECTS USING TINKERCAD:

Home Automation:



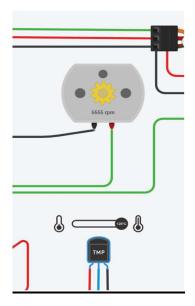
1. For Light Turn on/off



Details:

This is used glow the bulb by using the photo resistor to adjust the brightness. If the room is dark then the light will be on and when the room is bright then the light will be in off.

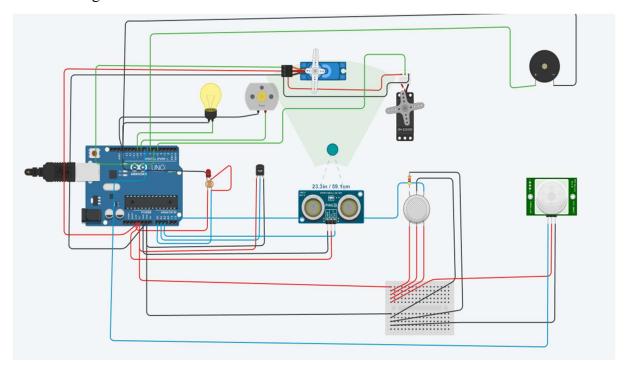
2. For Fan on/off



Details:

This is used to rotate the fan by using the temperature sensor. If the temperature is high the fan will be on, then when the temperature is low, the fan will be off.

3.Door Using Ultrasonic Sensor



Details:

This is used to open the door by using ultrasonic sensor by calculating distance.

When the person will be near the door the door will be open or else door will close.

As an intern at Tarcin Company, my primary focus was to enhance my understanding of fundamental robotic concepts and gain practical experience in the field. During my internship, I had the opportunity to work alongside industry professionals who provided guidance and mentorship throughout my journey.

Additionally, I was also involved in various departmental activities, including attending team meetings, assisting in product testing, and reviewing technical documentation. These tasks helped me develop a comprehensive understanding of the day-to-day operations within a Robotic products development company.

Arduino: (Main component)



The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits.

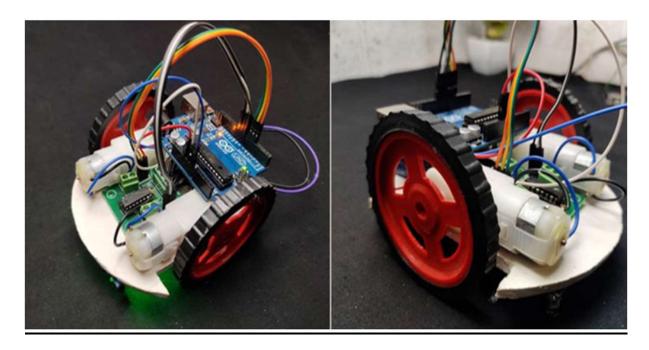
The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms.

Line Follower Robot

Line Follower Robot (LFR) is a simple autonomously guided robot that follows a line drawn on the ground to either detect a dark line on a white surface or a white line on a dark. The LFR is quite an interesting project to work on! In this tutorial, we will learn how to build a black line follower robot using Arduino Uno and some easily accessible components.

line follower robot (LFR) follows a line, and in order to follow a line, robot must detect the line first. Now the question is how to implement the line sensing mechanism in a LFR. We all know that the reflection of light on the white surface is maximum and minimum on the black surface because the black surface absorbs maximum amount of light. So, we are going to use this property of light to detect the line. To detect light, either LDR (light-dependent resistor) or an IR sensor can be used. For this project, we are going with the IR sensor because of its higher accuracy. To detect the line, we place two IR sensors one on the left and other on the right side of the robot as marked in the diagram below. We then place the robot on the line such that the line lies in the middle of both sensors. We have covered a detailed <u>Arduino IR sensor</u> tutorial which you can check to learn more about the working of IR sensors with Arduino Uno.

Infrared sensors consist of two elements, a transmitter and a receiver. The transmitter is basically an IR LED, which produces the signal and the IR receiver is a photodiode, which senses the signal produced by the transmitter. The IR sensors emits the infrared light on an object, the light hitting the black part gets absorbed thus giving a low output but the light hitting the white part reflects back to the transmitter which is then detected by the infrared receiver, thereby giving an analog output. Using the stated principle, we control the movement of the robot by driving the wheels attached to the motors, the motors are controlled by a microcontroller.



TMP36 Temperature Sensor With Arduino in Tinkercad:

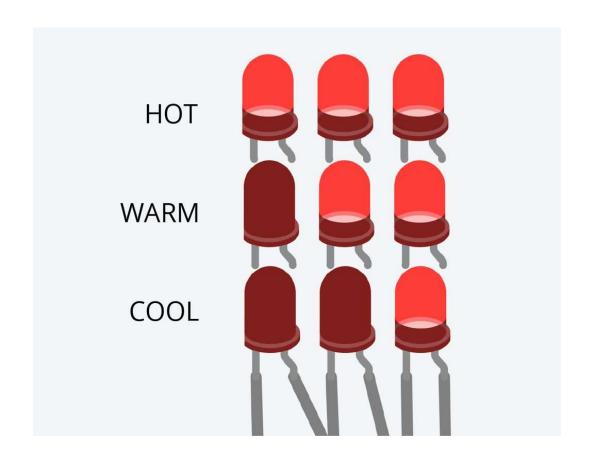
- ➤ In this project, you will turn the Arduino into a thermometer! Use a temperature sensor to measure your skin temperature, and register the output with three LEDs.
- A temperature sensor creates a changing voltage signal depending on the temperature it senses. It has three pins: one that connects to ground, another that connects to 5 volts, and a third that outputs a variable voltage to your Arduino, similar to the analog signal from a potentiometer.

STEPS:

> Step 1: Build a LED Circuit

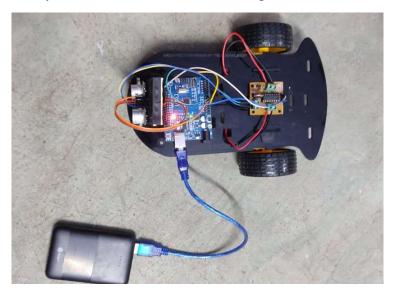
> Step 2: Add Temperature sensor

> Step3: Write code



HUMAN FOLLOWER USING ULTRASONIC SENSOR

The uses of arduino is increasing day by day. Arduino can be used in a simple project or even it can be implemented in a complex project to simplify the project. Today we come to you with a new example of arduino project which is "human following robot". The name simply suggest a robot which can follow the humans. But it is not so simple. A lots of action has to be done for the proper functionality of a human following robot. This complex process can be simplified and modified using an arduino. If you are well known about the properties of arduino, then it will be more easier for you to make this human following robot.



WEB DEVELOPMENT:

During the Internship, We learnt the introduction about the HTML5,CSS,JS and learnt how to create a resume.

Web development is the building and maintenance of websites; it's the work that happens behind the scenes to make a website look great, work fast and perform well with a seamless user experience.

The most common programming languages involved in web development are:

- HTML (Hypertext Markup Language)
- CSS (Cascading Style Sheets)
- JavaScript

HTML:

The Hyper Text Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as cascading style sheets (CSS) and scripting languages such as javascript.

CSS:

- o CSS stands for Cascading Style Sheet.
- o CSS is used to design HTML tags.
- o CSS is a widely used language on the web.
- HTML, CSS and JavaScript are used for web designing. It helps the web designers to apply style on HTML tags

JAVASCRIPT:

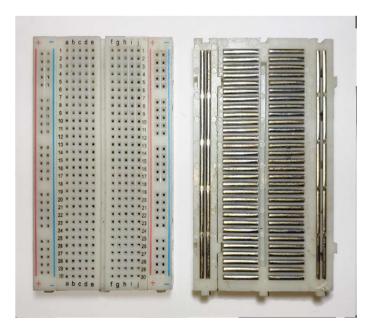
JavaScript is a lightweight, interpreted programming language. It is designed for creating network-centric applications. It is complimentary to and integrated with Java. JavaScript is very easy to implement because it is integrated with HTML. It is open and cross-platform.

BASIC COMPONENTS:

- 1. Breadboard
- 2. Capacitor
- 3. Resistor
- 4. Light Emitting Diode (LED)
- **5.** Transistor
 - ➤ Bipolar Junction Transistor (BJT)
 - ➤ Field Effect Transistor (FET)

BREADBOARD:

A breadboard, solderless breadboard, or protoboard is a construction base used to build semi-permanent prototypes of electronic circuits. Unlike strip board, breadboards do not require soldering or destruction of tracks and are hence reusable.

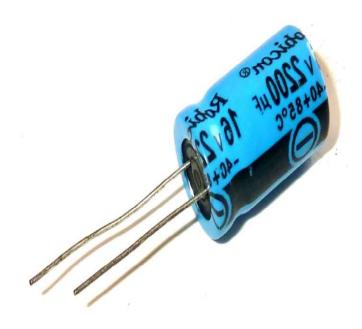


A breadboard is used for building temporary circuits. It is useful to designers because it allows components to be removed and replaced easily. It is useful to the person who wants to build a circuit to demonstrate its action, then to reuse the components in another circuit.

CAPACITOR:

A capacitor is a device that stores electrical energy in an electric field by virtue of accumulating electric charges on two close surfaces insulated from each other. It is a passive component with two terminals.

The effect of a capacitor is known as capacitance. While some capacitance exists between any two electrical conductors in proximity in a circuit, a capacitor is a component designed to add capacitance to a circuit. The capacitor was originally known as the condenser, a term still encountered in a few compound names, such as the condenser microphone



LIGHT EMITTING DIODE:(LED)

A light-emitting diode (LED) is a semiconductor device that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.



RESISTOR:

A resistor is a passive two terminal electrical component that implements electronic resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

| - Widiuplier | | | |
|---|------------------------|------------|------------|
| 1 st Band 2 nd Band Tolerance | | | |
| Color | Significant Figures | Multiplier | Tolerance |
| Black | 0 | × 1 | |
| Brown | 1 | × 10 | ±1% (F) |
| Red | 2 | × 100 | ±2% (G) |
| Orange | 3 | × 1K | ±0.05% (W) |
| Yellow | 4 | × 10K | ±0.02% (P) |
| Green | 5 | × 100K | ±0.5% (D) |
| Blue | 6 | × 1M | ±0.25% (C) |
| Violet | 7 | × 10M | ±0.1% (B) |
| Grey | 8 | × 100M | ±0.01% (L) |
| White | 9 | × 1G | |
| Gold | | × 0.1 | ±5% (J) |
| Silver | | × 0.01 | ±10% (K) |

TRANSISTOR:

A transistor is a semiconductor device used to amplify or switch electrical signals and power. The transistor is one of the basic building blocks of modern electronics. It is composed of semiconductor material, usually with at least three terminals for connection to an electronic circuit. A voltage or current applied to one pair of the transistor's terminals controls the current through another pair of terminals.

TYPES:

Bipolar Junction Transistor:

Bipolar transistors are so named because they conduct by using both majority and minority carriers. The bipolar junction transistor, the first type of transistor to be mass-produced, is a combination of two junction diodes and is formed of either a thin layer of p-type semiconductor sandwiched between two n-type semiconductors (an n-p-n transistor), or a thin layer of n-type semiconductor sandwiched between two p-type semiconductors (a p-n-p transistor). BJTs have three terminals, corresponding to the three layers of semiconductor—an emitter, a base, and a collector. They are useful in amplifies because the currents at the emitter and collector are controllable by a relatively small base current.

Field Effect Transistors:

The field-effect transistor (FET) is a type of transistor that uses an electric field to control the flow of current in a semiconductor. FET are devices with three terminals: source, gate, and drain. FETs control the flow of current by the application of a voltage to the gate, which in turn alters the conductivity between the drain and source.



L293D MOTOR DRIVE CONTROLLER:

- The Motor Driver is a module for motors that allows you to control the working speed and direction of two motors simultaneously. This Motor Driver is designed and developed based on L293D IC.
- This type of motor drive controller is used to design two wheel vehicles by using sensors like IR sensors and PIR sensors.
- Applications:
 - Relay Driver module
 - High current LED's can be driven
 - Used to drive high current Motors using Digital Circuits



ARDUINO IDE



```
sketch jan09a | Arduino 1.8.19 (Windows Store 1.8.57.0)
 sketch_jan09a
int IRpin = A0;
int led = 13;
  Serial.begin(9600);
                                                       // start the serial port
  pinMode(led, OUTPUT);
   digitalWrite(led, LOW);
  float volts = analogRead(IRpin)*0.0048828125;
float distance = 65*pow(volts, -1.10);
  Serial.println(distance);
   delay(1000);
   if (3000 < distance < 6000) {
   digitalWrite(led, HIGH);
  else (
  digitalWrite(led, LOW);
```

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.

Arduino uses a variant of the C++ programming language. The code is written in C++ with an addition of special methods and functions. Moreover, when you create a 'sketch' (the name given to code files in this language), it is processed and compiled to machine language.

Arduino is important part in robotics because it provide creativity and problem-solving. It is plugged in the computer and programmed with easy commands i.e.; when Arduino is placed in a circuit, and it will manipulate the functioning of the device. It emphasizes the involvement of Arduino in many things around.

Conclusions & Outcomes

In conclusion, my internship in the field of IoT and Robotics was an invaluable experience that provided me with the skills, knowledge, and confidence to pursue a career in this exciting and rapidly growing field. I am grateful for the opportunity to work with a talented and supportive team, and I look forward to applying the lessons I learned to future projects and endeavours.

My internship in the field of IoT and Robotics taught me several valuable lessons that will stay with me throughout my career. I learned the importance of collaboration and communication in complex projects, as effective communication is crucial for the success of any team. I gained an appreciation for the power of technology to transform the world and make our lives easier, safer, and more efficient.

Throughout my internship, I developed a range of technical and professional skills that are essential for success in the IoT and robotics field. I learned how to program microcontrollers using C++ and I gained experience in using various software tools such as Chitubox, Tinkercad and Arduino IDE.

- ➤ Problem-solving skills: Building and working with robots and IoT systems requires a lot of problem-solving skills. You will learn how to troubleshoot issues that arise and developcreative solutions to complex problems.
- ➤ Communication and teamwork: Robotics and IoT projects are typically collaborative efforts that require good communication and teamwork skills. You will learn how to work with others and communicate effectively to achieve common goals.

My internship in the field of IoT and Robotics was an invaluable experience. It provided me with the skills, knowledge, and confidence to pursue a career in this exciting and rapidly growing field.

I am grateful for the opportunity to work with a talented and supportive team, and I look forward to applying the lessons I learned to future projects and endeavours.

To understand the hardware and software integration: Robotics and IoT systems involve a combination of hardware and software components that work together seamlessly. Studying these fields can help you gain a better understanding of how to integrate different hardware components with software to create a functional system. I learned that the key to success in this field is a willingness to learn and adapt, as technology is constantly evolving, and we must keep up with the latest developments to remain competitive.

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