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“TECHNOSIGHT “

TECHNICAL MAGZINE 2024-25

DEPARTMENT OF BASIC SCIENCE & HUMANITIES



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Dept. of Basic Sciences & Humanities

I am happy and glad that Department of Basic Sciences & Humanities is releasing out Technical magazine. Proper communication plays a vital role in institution's development. This technical magazine will serve to reinforce and allow increased awareness, improved interaction and integration among all of us. The journey from the inception of technical magazine to its final form in your hands has been wonderful joyful for every member of the technical magazine family that has given their best to accomplish this momentous task.

**Happy Reading!**



### **Vision and Mission of the department:**

#### **➤ VISION**

To be a center of excellence by imparting lifelong learning attitude through dissemination of basic technical and professional knowledge amongst students for the accomplishment of ever-growing needs of society.

#### **➤ MISSION**

- To inspire and motivate promising engineers by catering quality education through effective teaching learning methodologies.
- To develop professional skills and right attitude in students that will help them to succeed and progress in their personal and professional career.
- To imbibe moral and ethical values in students with concern to society and environment.

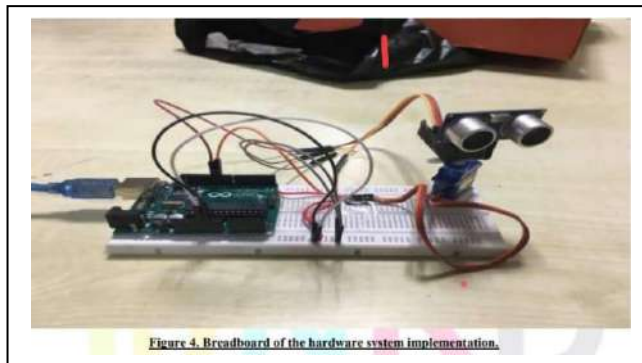
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## Radar System using Arduino

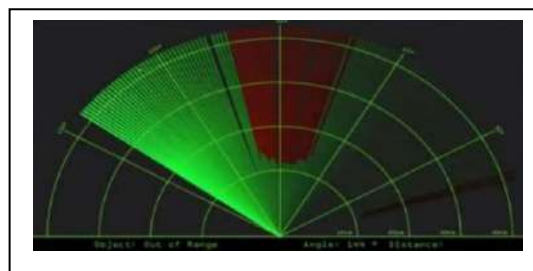
(Ms. Siddhi Dewale ,Ms.Unnati Hajare, Ms.Nandini Dake, Ms.Sonali Ghogare)

**Abstract:** The application of radio detection and ranging in different places such as Military installation, commercial use is done with the help of RADAR SYSTEM which uses Electromagnetic waves for detection of different physical components such as distance, Speed, position, range, direction, size etc which can be either fixed or be in motion. Use of Radar system has been developed greatly specially in field of navigation. The system Consist a basic ultrasonic sensor placed upon a servo motor which rotates at a certain angle and speed. This ultrasonic sensor is connected to Arduino digital input output pins and Servo motor also connected to digital input output pins.



### WORKING:

The aim of this project is to calculate the distance position and speed of the object placed at some distance from the sensor. Ultrasonic sensor sends the ultrasonic wave in different directions by rotating with help of servo motor. This wave travels in air and gets reflected back after striking some object. This wave is again sensed by the sensor and its characteristics are analyzed and output is displayed in screen showing parameters such as distance and position of Object. Arduino IDE is used to write code and upload coding in Arduino and helps us to sense position of servo motor and posting it to the serial port along with the distance of the nearest object in its path. The output of sensor is displayed with the help of processing software to give final output in display screen.



## **ADVANTAGES**

1. Working and maintenance value is low.
2. Distance active resolution is high.
3. It can work in any place.
4. NASA uses radio detection and ranging to map the world and alternative plants.

## **DESIGN IMPLEMENTATION OF RADAR SYSTEM:**

- a) Hardware System Design.
- b) Hardware Circuit Design.
- c) Hardware System implementation
- d) Hardware unit testing.
- e) GUI System Design.
- f) GUI System Implementation.
- g) GUI unit testing.
- h) Entire system integration.
- i) Entire system testing

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# SMART DUSTBIN 2.0

(Mr.Krushna Keripale ,Mr.Samarth Kumbhar, Mr.Sanskar Langare, Mr.Nishant Lokhande)

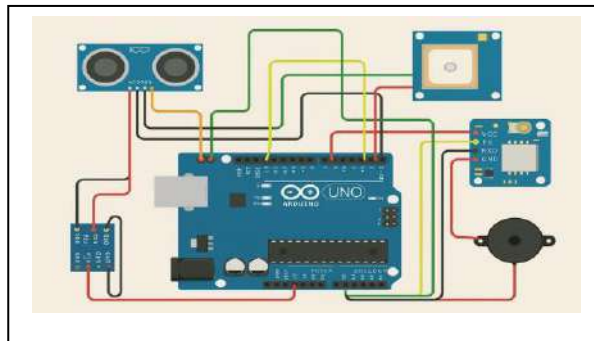
## Intoduction:

In today's world, efficient waste management has become a major challenge due to rapid urbanization and population growth. Traditional dustbins often overflow because of irregular monitoring and delayed cleaning schedules, leading to unhygienic surroundings, foul odors, and environmental pollution. To address these issues, the concept of a Smart Dustbin has been introduced, utilizing modern technology to automate and optimize the waste disposal process.

A smart dustbin is a automated waste container designed using a sensor & microcontroller like ultrasonic sensor and Arduino UNO. It operates on basis of level of waste in the dustbin. It is mainly designed for municipal corporation dustbins.Which can send the location and SMS of "dustbin is full" to Municipal Corporation when it full.

## Components Used:

- Arduino Uno
- Ultrasonic sensor
- GSM module
- GPS module
- buzzer
- jumper wires
- dustbin



## WORKING:

This Arduino code monitors the distance to nearby objects using an ultrasonic sensor (HC-SR04), and if an object is detected within a defined threshold (10 cm), it triggers a buzzer and sends an SMS alert via the SIM800 GSM module. The message includes GPS coordinates from a GPS module (connected via TinyGPSPlus) if a valid location fix is available, or just the distance if not. The system continuously reads GPS data and measures distance in a loop, ensuring that only one alert is sent per detection event to avoid repeated messages, and resets the alert flag once the object moves away.

This Arduino-based system combines an ultrasonic sensor, a GPS module, and a GSM module to detect nearby objects and send location-based alerts. It continuously measures the

distance to objects using an HC-SR04 ultrasonic sensor, and if an object comes within 10 cm, it activates a buzzer as a warning signal. Simultaneously, it checks for a valid GPS location using the TinyGPSPlus library. If a valid location is available, it sends an SMS via the SIM800 GSM module containing both the distance and a clickable Google Maps link to the location. If the GPS signal is not available, it sends an SMS with only the distance data. To prevent multiple alerts for the same event, the code uses a flag (alertSent) to ensure only one SMS is sent until the object is no longer detected. The system uses SoftwareSerial to manage communication with both the GPS and GSM modules independently, and it provides debug output through the serial monitor for tracking the system's behavior.

## **APPLICATIONS:**

### **1. Reduces Manual Monitoring**

- Eliminates the need for personnel to physically check each bin, saving time and labor costs.

### **2. Promotes Hygiene and Cleanliness**

- Prevents bin overflow and littering, especially in public areas like parks, streets, and schools.

### **3. Supports Sustainable Waste Management**

- Encourages responsible collection, reduces fuel consumption and carbon emissions from unnecessary collection trips.

### **4. Improves Public Satisfaction**

- Clean and well-maintained bins improve city image and public satisfaction with municipal services.

### **5. Helps in Planning and Scaling**

- GPS and alert data can be analyzed to identify high-waste zones and adjust bin placement or collection frequency accordingly.

### **6. Discourages Illegal Dumping**

- Real-time monitoring and alerts make it harder for people to misuse or overfill public bins.

### **7. Useful in Remote or Rural Areas**

- Ensures timely waste collection even in areas with limited infrastructure or irregular access.
- Can be adapted to detect hazardous materials (e.g., using gas sensors) and send alerts with location for quick response.

# Smart Blind Stick

(Mr.Bavachkar Harshvardhan, Mr.Shivsharan Dikshant,Mr. Patil Pranav,Mr. Ghatge Omkar, Mr.Salunkhe Varunraj)

## Abstract:

Smart Blind Stick is an innovative device, which is an initiative to help blind people to resolve the problems faced by them in their daily life. Smart Blind Stick is system device which incorporates several features like obstacle detection. The main objective of the device is to help blind people to walk with complete relieve and self-dependency. The blind stick is integrated with ultrasonic sensors, buzzer and vibration motor along with Arduino UNO. The Smart Blind Stick automatically detects the obstacle in front of the person by use of sensors present in the systems.



## OBJECTIVE:

- To develop and build a working prototype of a system that will help visually impaired person to sense the obstacle in front of them by sending a vibration from the system.
- To provide an application for blind people to detect the obstacles in various directions detecting pits on the ground to make a free walk.
- To design a smart walking stick that alerts visually impaired people over obstacles and water in front could help them in walking with less accident. It outlines a better navigational tool for the visually impaired.It consists of a simple walking stick equipped with sensors to give information about the environment

## Components Used:

A smart blind stick typically consists of electronic components and sensors, often including a microcontroller, ultrasonic sensors, a buzzer, and a battery, all integrated into a cane-like frame.

## **Working:**

### **1. Obstacle Detection:**

Ultrasonic Sensors emit high-frequency sound waves that bounce off objects. By measuring the time it takes for the sound to return (echo), the stick's microcontroller can calculate the distance to an obstacle. Multiple ultrasonic sensors are often placed at different angles (front, sides, and bottom) to provide a wider field of detection.

### **2. Data Processing:**

Microcontroller (Arduino Uno) brain of the smart stick receives data from all the sensors, processes it, and determines the proximity and nature of obstacles. It's programmed to interpret the sensor readings and decide what kind of feedback to provide to the user.

**3. Feedback Mechanisms:** Buzzer: When an obstacle is detected, the microcontroller activates a Buzzer in the stick. It acts as audible alarm or as warning sound, which indicates that there is obstacle in path and hence user can avoid that obstacle in the path. Vibration motor is often used in conjunction with buzzer to alert the user.

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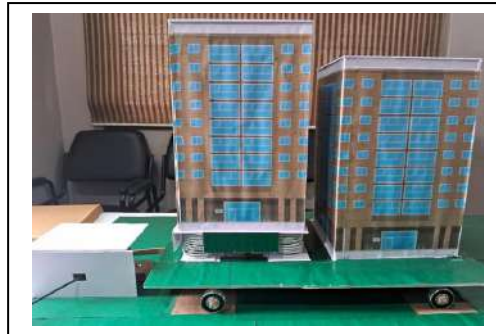
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# Earthquake Resistance Building

(Mr.Arihant Gudale ,Mr. Vivek Mhetre, Mr. Akshat Shaha, Mr. Mr.Pranay Ugale)

## **Intoduction:**

Earthquake resistant buildings are specially designed structures that can withstand the forces and movements caused by seismic activity. These buildings incorporate engineering techniques and construction practices that reduce the risk of structural failure during an earthquake, thereby protecting human life and minimizing damage to property. In regions prone to earthquakes, constructing earthquake-resistant buildings is crucial for community safety, economic resilience, and sustainable development. These structures are built using flexible materials, reinforced frameworks, and advanced design strategies that absorb and dissipate seismic energy, rather than collapsing under it. The primary goal is not necessarily to make the building completely immune to damage, but to prevent catastrophic collapse and ensure the safety of its occupants. As natural disasters become more frequent and intense due to various global factors, the importance of earthquake-resistant construction continues to grow in both urban planning and civil engineering fields.



## **Materials Used in Earthquake Resistance Buildings**

### **Reinforced Concrete (RC):-**

- Concrete +Steel bars improve strength under compression and tension.
- Used in beams, columns, slabs, and foundations.

### **Structural Steel:-**

- High strength, ductility, and flexibility.
- Ideal for high-rise buildings and frames that must sway without breaking.

### **Engineered Wood:-**

- Light weight and flexible.
- Good for low- rise buildings in seismic zones.

### **Base Isolators:-**

- Not a material but a component made from rubber, lead, and steel.
- Placed between building and foundation to absorb seismic shocks.

### **Shape Memory Alloys(SMAs):-**

- Return to original shape after deformation.
- Used in braces and dampers to reduce vibration.

### **Fiber-Reinforced Plastic (FRP) :-**

- High strength-to-weight ratio.
- Used for retro fitting and reinforcing existing structures

## **• Principles of Earthquake Resistance Buildings**

### **Structural Configuration :-**

- Simple, symmetrical, and regular shapes perform better in earthquakes.
- Avoid complex layouts like L-, T-, or U-shapes unless properly engineered.

### **Lightweight Construction :-**

- Use lightweight materials to reduce seismic forces (which are proportional to building mass).

Ductility :-

- Buildings must be able to bend without breaking.
- Use materials and connections that allow controlled deformation.

Strong Foundation :-

- Design foundations to distribute loads evenly.
- Use deep or raft foundations in soft soils.

Proper Load Path :-

- Ensure a continuous and direct path for forces to travel from roof to foundation.
- Avoid weak links in the load-transfer chain.

Redundancy:-

- Multiple load-carrying elements provide backup support if one fails.

Separation of Structures :-

- Provide seismic gaps between adjacent buildings to prevent pounding.

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# Automatic Car Parking

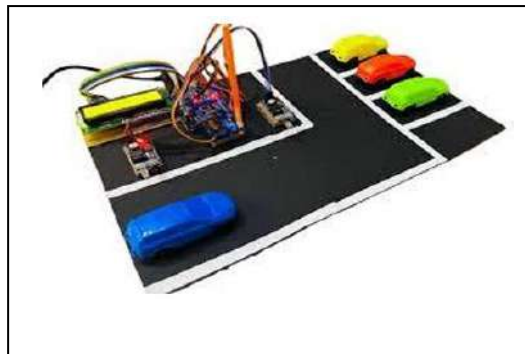
(Ms. Sanika Talandage, Ms. Mayuri Tambade, Ms. Sakshi Shinde, Ms. Pradnya Yadav, Ms. AaryaPatil)

## Introduction:

The Automatic Car Parking System is an innovative solution designed to reduce the time and space required for parking vehicles in urban areas. This project focuses on automating the process of parking using sensors, microcontrollers (such as Arduino/Raspberry Pi), and motorized platforms or servo mechanisms. The system detects the presence of a car, allocates an available parking space, and guides or moves the vehicle into the slot without human intervention. Key components include ultrasonic sensors for obstacle detection, an infrared system for slot monitoring, and a user interface for system interaction. By minimizing human involvement and optimizing space usage, the system enhances efficiency, safety, and convenience in parking operations. This project has potential applications in smart cities, commercial complexes, and automated garages.

## Required Components:

- Arduino UNO
- Mini BreadBoard
- LDC and I2C
- Servo Motor
- IR Sensor



## Description:

**Arduino UNO :** The Arduino UNO is an open source microcontroller board based on the Atmega328P microcontroller. It's widely used for electronics project, automation, and learning embedded systems.

**Mini BreadBoard :** A mini breadboard is a small plastic Board with holes used for prototyping Electronic circuits. It allows you to build Circuits without soldering, making it safe, Reusable, and perfect learning.

**LCD:** LCD stands for Liquid Crystal Module, It is used in embedded system to display Characters or data. A common type is the 16x2 LCD, which can show 16 characters per line over 2 lines.

**I2C:** The I2C module allows the LCD to Communicate via the I2C protocol, Reducing the number of control links to just two: SDA (data) and SCL(clock).

**Servo Motor:** A Servo Motor in an automatic car parking system is used for precise movement control, such as opening/closing gates, rotating platforms, or locking/unlocking slots.

**IR Sensor :** IR (Infrared) sensors are used to detect the presence of vehicles in parking slots and at entry/exit points.

### Wiring Connections

#### ✓IR Sensor:

- VCC → 5V on Arduino
- GND → GND on Arduino
- OUT → Digital pin (e.g., D2)

#### ✓LED (for Slot Status):

- Anode (+) → Digital pin (e.g., D3) via 220Ω resistor
- Cathode (-) → GND

#### ✓Servo Motor (for Gate):

- VCC (Red) → 5V on Arduino
- GND (Black) → GND on Arduino
- Signal (Yellow/White) → Digital pin (e.g., D9)

#### ✓Optional LCD Display:

- Connect via I2C or parallel pins to show slot availability

### **Referances:**

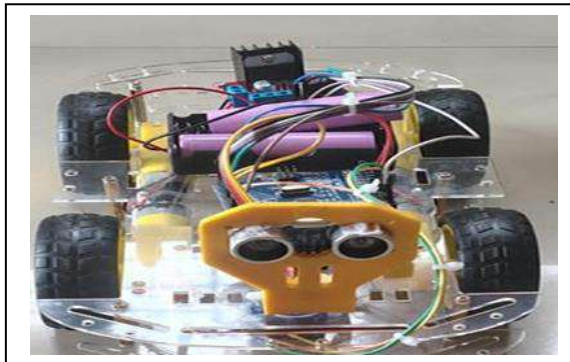
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- Datasheet of component
- Micro-controller data book (microchip details)

# Obstacle detection in automobile

(Sanika Parakale, Pradnya Desai, Kumkum Sutar, Shraddha Patil, Ankita Sutar)

## Abstract

This project aims to improve vehicle safety by making an obstacle detection system using ultrasonic sensors. It is very useful during parking or when driving slowly in narrow or crowded areas. The system helps the driver by detecting nearby objects and giving alerts through lights or sounds. It uses an HC-SR04 ultrasonic sensor and an Arduino Uno microcontroller, which makes the system low-cost and easy to build. The sensor sends waves to measure the distance of obstacles. When something is too close, the system gives a warning. This helps avoid small accidents and damage to the vehicle. This system is simple but very helpful, especially for beginner-level projects in electronics and robotics. It can be added to cars, bikes, or small robots. The system can be improved by adding more sensors to cover all sides of the vehicle, or by using an LCD to show the distance. Other features like vibration alerts, Bluetooth connection with a mobile app, or automatic braking can also be added in the future. This project is also a good step towards building smart vehicles and self-driving system.



## Working Principle

Ultrasonic sensors work using the principle of sound wave reflection. The sensor sends out high-frequency sound waves that travel through the air. When these waves hit an object, they bounce back to the sensor. The sensor then measures the time it takes for the sound wave to return. Using this time and the speed of sound, the distance to the object can be calculated. Formula used:  $\text{Distance} = (\text{Time} \times \text{Speed of Sound}) / 2$  The reason we divide by 2 is because the sound travels to the object and then comes back, so the total time includes both forward and return paths. In this project, we use the HC-SR04 ultrasonic sensor along with an Arduino Uno microcontroller. The sensor continuously checks for obstacles in front of it. If it finds any object within 30 cm, it quickly activates an LED light and a buzzer to alert the driver. This helps the driver know there is something nearby and avoid collision.

## Components Used

Ultrasonic Sensor (HC- SR04): Detects distance using echo of sound waves

Arduino Uno :Microcontroller for controlling system

Sensor holder: To hold ultrasonic sensor

L-298 : as a motor driver IC to control DC and stepper motors

Servo motor :motors are used for their precise control of angular or linear position, velocity, and acceleration

Power Supply: Battery or USB input

### Applications –

- Reverse parking systems in cars
- Obstacle detection in robotic vehicles
- Collision avoidance in autonomous systems
- Smart mobility aids for visually impaired individuals



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# Low Cost IOT Robot

(Mr. Nikhil Kore, Mr. Amey Jagadale, Mr. Varad Gaikwad, Mr. Pramod Mali)

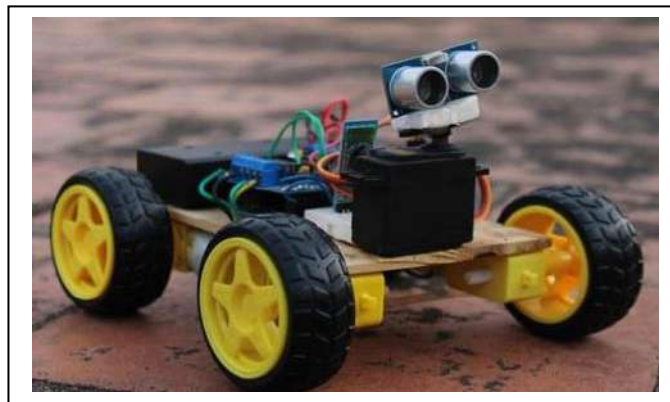
## ABSTRACT

This project focuses on the development of a Bluetooth-controlled robot that can be operated remotely using a smartphone or any Bluetooth-enabled device. The robot receives directional commands—such as forward, backward, left, right, and stop—through a Bluetooth communication module (e.g., HC-05), which is interfaced with a microcontroller (like Arduino Uno). These commands are transmitted from a mobile app or terminal, decoded by the microcontroller, and used to drive the motors accordingly.

This project highlights the integration of communication technology with robotics, offering potential use in defense, industrial automation, and assistive mobility solutions. This project presents the design and implementation of a Bluetooth-controlled robot capable of wirelessly receiving commands via a smartphone or Bluetooth-enabled device.

The core functionality is built around a Bluetooth module (HC-05) interfaced with a microcontroller (such as Arduino Uno), which interprets the received signals and actuates the motors to control the movement of the robot in directions like forward, backward, left, right, and stop. The robot chassis is equipped with geared DC motors, a motor driver module (L298N), and a power supply, allowing it to move precisely in response to user commands. A custom mobile application or Bluetooth terminal app is used to send control signals, ensuring ease of operation and real-time response.

The Bluetooth-controlled robot serves as a foundation for learning modern robotic systems and has potential applications in remote surveillance, home automation, disaster rescue, military operations, and educational robotics platforms. It is an ideal prototype for understanding the practical applications of mechatronics, embedded programming, and wireless communication.



## COMPONENTS USED

**Microcontroller / Processor Function:** Acts as the central control unit that processes inputs from sensors and sends commands to motors and other components. Examples: Arduino Uno, Raspberry Pi, ESP32. **Description:** Responsible for decision-making logic, running algorithms for navigation, user following, and obstacle avoidance.

**Ultrasonic Sensor Ultrasonic Sensors:** Measure distance to obstacles and the user by sending sound waves and calculating echo time. **Description:** The HC-SR04 Ultrasonic Sensor is a widely used distance measuring device that works by emitting sound waves and calculating the time it takes for the echo to return after hitting an object.

**Bluetooth Module** The HC-05 Bluetooth module is a wireless communication module used to enable short-range wireless data transmission between a microcontroller (like Arduino) and a smartphone or

**Motor Driver - L298N** The L298N motor driver module is a dual H-bridge driver IC that allows control of the direction and speed of two DC motors or one stepper motor.

**Gear Motor:** A DC gear motor is a combination of a regular DC motor and a gearbox. The gearbox is attached to reduce the motor's speed while increasing its torque (rotational force).

## Working

- **Bluetooth Manual Control:** In this mode, the user operates the robot by manually pressing directional buttons on a Bluetooth controller app installed on their smartphone. Each button (Forward, Backward, Left, Right, Stop) sends a specific character (like 'F', 'B', 'L', 'R', 'S') via Bluetooth.

**How it works:**

- The smartphone connects to the robot through a Bluetooth module (HC-05).
- When the user taps a button, a command is sent to the Arduino Uno.
- Arduino reads this command and sends signals to the motor driver (L298N).
- The motor driver powers the DC gear motors accordingly to move the robot in the desired direction.

- **Voice Command Mode:** In voice mode, the user speaks commands into the smartphone using a voice recognition app (e.g., Arduino Voice Control, Google Voice Control + Bluetooth Terminal). The app converts the voice into text commands and sends them via Bluetooth to the robot.

**How it works:**

- The user speaks a command (e.g., "forward").
- The app recognizes the voice and sends the corresponding command (like "F") via Bluetooth.
- The HC-05 Bluetooth module receives this data and forwards it to Arduino Uno.
- Arduino interprets the command and drives the motors through L298N, performing

- **Common Between Both Modes:**

The Arduino Uno acts as the brain, interpreting the commands. • The HC-05 module handles wireless communication. • The L298N motor driver controls the DC gear motors. • Motors move the robot based on received signals, performing actions like move, turn, or stop.

Final Workflow Summary: Voice / Button → Smartphone → HC-05 Bluetooth → Arduino Uno → L298N Driver → Gear Motors → Robot Movement.

### **Applications of Bluetooth and Voice-Controlled Robot:**

1. Assistive Technology: Helpful for physically challenged or elderly people who can control robots using voice commands.
2. Home Automation: Used to control smart appliances like fans, lights, and security systems via voice or Bluetooth.
3. Surveillance and Security: Can be used for remote-controlled surveillance robots with cameras in sensitive areas.
4. Industrial Automation: Used to transport materials across factory floors using voice/Bluetooth commands.

### **Referances:**

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3. "Internet of Things: Architecture and Applications" by Rajkumar Buya and Amir, Elsevier.
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# SOLAR POWER BANK

(Samarth Katkar, Sandes Kashid, Rutvik Gurav, Viraj Kadam, Prajwal Kodare)

## ABSTRACT:

"Solar powered mobile power bank system", works on the principle that when light falls on the solar cell, electron-hole pairs are created in the n-type emitter and in the p-type base. The generated electrons (from the base) and holes (from the emitter) then diffuse to the junction and are swept away by the electric field, thus producing. Certain modules are selected and worked out to suitable specifications. Due to the nature of solar energy, two components are required to have a functional solar energy generator. These two components are a collector and a storage unit.

The collector simply collects the radiation that falls on it and converts a fraction of it to other forms of energy (either electricity and heat or heat alone). The storage unit is required because of the non-constant nature of solar energy; at certain times only a very small amount of radiation will be received. At night or during heavy cloud cover, for example, the amount of energy produced by the collector will be quite small. The storage unit can hold the excess energy produced during the periods of maximum productivity, and release it when the productivity drops. In practice, a backup power supply is usually added, too, for the situations when the amount of energy required is greater than both what is being produced and what is stored in the container.

A photovoltaic module can be defined as an assembly of 6x10 solar cells connected and packaged together. The solar array of a photovoltaic system which is generally comprised of these photovoltaic cells generate solar electricity and is used in domestic applications. Under standard test conditions, the DC output power of each module ranges between 100 to 365 watts.

## COMPONENTS

- Solar Panels
- 3000mAh Storage Li-ion batteries
- Charging Module
- Buck Converter
- Switch
- Cell Holder



## PROCESS

- When picking a solar panel or constructing a solar system, there are two crucial factors to consider. The capacity of a battery is measured in Amp Hours. To convert AH to Watt Hours, multiply the AH value by the battery voltage, as shown in the basic technique below.  $(1)$ , where represents available power in Watt-hours and  $X \times Y = Z$  represents the battery's AH capacity.
- We'll never be able to fully utilize a battery because we know we won't be able to power it if the voltage falls below the specifications of our equipment. Lead-acid batteries will provide around half of their rated power, whereas lithium-ion batteries will provide roughly 80%.
- The solar panels are the most significant and final component of a solar panel's design. Watts are the units of measurement for the quantity of power produced by a solar panel.
- The potential energy delivery to a battery is computed by multiplying the solar panel's power production rating (in Watts) by the number of hours the panel is exposed to sunlight.

### APPLICATIONS:

They are usually portable enough to be carried about for use when the need arises, but some are big and so need to be stationed at a spot. Solar power banks come in various capacities (usually between 1000-50,000 mAh). The solar power bank is an innovative device that you will find highly beneficial as long as you buy one of high quality. Solar power banks are affordable, environment friendly, cost saving and a reliable source of power supply for your gadgets.

## REFERENCE

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# SMASH OR PASS

(Leena Adake, Yashonandini Malvekar, Shivani Nagargoje, Bhumika Naxine)

## INTRODUCTION:

The primary goal of this project is to create a platform where learning becomes enjoyable, engaging, and competitive. The quiz game starts with a simple, user-friendly login page. This ensures that every player has their own account, making the experience more personalized and secure. Only logged-in users can access the quiz, providing a basic level of security and laying the foundation for additional features in the future.

The entire project is developed using fundamental web development technologies, namely HTML, CSS, and JavaScript. HTML provides the structure of the website, CSS makes the interface attractive and responsive, while JavaScript adds interactivity and functionality to the game. The quiz consists of multiple choice questions, with options for the player to select the correct answer. To make the game more interesting and challenging, a countdown timer has been included, pushing players to think quickly. In addition, a hint feature is available to help users when they are stuck, enhancing the learning experience.

At the end of the quiz, the game displays the final score, giving users instant feedback on their performance. This not only helps in self-assessment but also motivates users to replay and improve their scores. The login system not only secures the quiz but also creates possibilities for future development. Features like saving scores, tracking progress, and maintaining leaderboards can easily be added later on. This project is ideal for beginners who want to understand the basics of building interactive web applications. It combines essential programming concepts such as form validation, timers, DOM manipulation, and basic logic handling. The project is designed to be scalable and customizable. In future versions, additional quiz categories, difficulty levels, and even different question types like true/false, image-based questions, or puzzles can be incorporated to make the game more diverse and appealing.

## **This project is built using the following main components:**

### 1. HTML (HyperText Markup Language):

- Used to create the basic structure of the quiz application.
- Includes elements like headings, buttons, forms, and the quiz layout.
- Provides the content and layout of the webpage.

## 2. CSS (Cascading Style Sheets):

- ❑ Used to design and style the quiz interface.
- ❑ Adds colors, fonts, padding, animations, hover effects, and responsive layout.
- ❑ Ensures the app looks clean, attractive, and works well on different screen sizes.

## JavaScript:

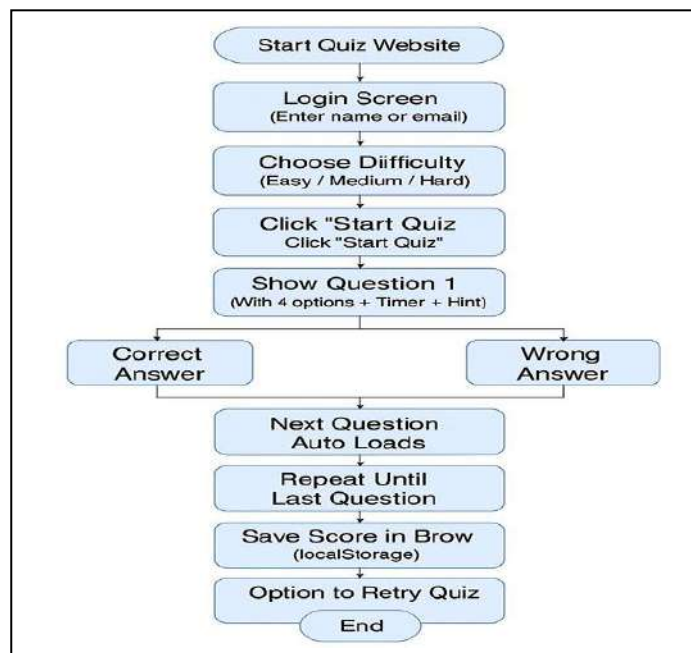
- ❑ Handles the functionality and logic of the quiz.
- ❑ Used to display questions, check answers, calculate scores, and manage the timer.
- ❑ Adds features like hint buttons, instant feedback, and switching between difficulty levels.

## localStorage:

- ❑ A web storage API used to store quiz data like user scores and selected answers in the browser.
- ❑ Keeps the data available even after page reload without a database or server.

## 5. Responsive Design:

- ❑ Makes sure the quiz works on mobile, tablet, and desktop screens using media queries



## **WORKING OF THE SYSTEM**

This quiz website is made using only HTML, CSS, and JavaScript. It works completely in the browser and doesn't need any server or database.

step: 1. Login Screen: When you open the quiz app, you first see a login screen. You have to enter your name and password . This helps in keeping your result personal.

2. Choose Difficulty Level: After login, you see a dropdown to choose the quiz level – Easy, Medium, or Hard. (Right now, only Easy might work; the other levels can be added later.)

3. Start Quiz: When you click the "Start Quiz" button, the quiz begins. Questions are loaded based on the selected level.

4. See the Question: One question is shown at a time with four options to choose from. You'll also see a \*timer\* counting down, and a \*hint\* button if you need help.

5. Select an Answer: You click on an option. The app checks your answer and shows you immediately whether it's correct or wrong.

6. Next Question: After answering or when time runs out, the next question appears automatically. This continues until all questions are done.

7. Quiz Result: At the end, the app shows your total score — how many answers you got right or wrong. You can also try the quiz again.

8. Data Saving: Your score and details are saved in your browser (using something called localStorage). This means even if you reload the page, your score stays.

9. Mobile-Friendly: The quiz works perfectly on phones, tablets, and computers. The layout changes automatically to fit the screen size.

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3. W3Schools, JavaScript Tutorial, <https://www.w3schools.com/js> – For adding interactivity such as modals, tab switching, and form handling.

4. YouTube - Codehal, Thapa Technical, GreatStack, and other web development channels – For step-by-step guidance and visual demonstrations in building modern personal web quiz

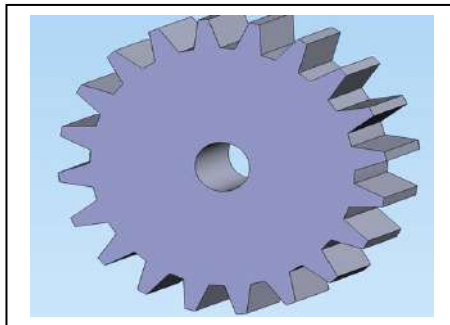
# Development of Spur Gear using Additive Manufacturing

(Samrudhdi Patil, Komal Sutar, Tanuja Tandale, Purva Toraskar, Misba Ashtekar)

## INTRODUCTION

What is a spur gear? A spur gear is a type of cylindrical gear with straight teeth that are cut parallel to the axis of rotation. They are the simplest and most common type of element in mechanical drive systems. Spur gears transmit power and motion between two parallel shafts. In order to do so, both the pitch and the pressure angle of both gears must be the same. Spur gears can increase or decrease the speed and torque of the rotating shaft depending on the sizing and arrangement of the gears. The teeth of a spur gear are cut using a gear hobbling machine or a gear shaping machine. Spur gears can be produced from various materials, including steel, brass, bronze, or plastic, and depending on the application, they can be hardened based on the requirements for strength and durability.

In spur gear design, key parameters include the module (metric) or diametral pitch (imperial), pressure angle, number of teeth, and profile shift coefficient. The module or diametral pitch determines tooth size, with a larger module or smaller diametral pitch resulting in larger teeth. The pressure angle, typically  $20^\circ$ , affects load distribution and gear strength. The number of teeth defines the gear ratio; for instance, a 1:2 ratio means the driving gear has half as many teeth as the driven gear. The profile shift coefficient, usually zero for standard gears, can be adjusted to modify tooth geometry, avoid undercutting, and alter centre distances. Understanding these parameters is essential for designing efficient and reliable spur gear.



**METHODOLOGY:** To design a spur gear and perform stress analysis using Finite element analysis (FEA) on Structural Steel material and compare those values with the calculation that we have performed using Lewis equation.

**STEP:1** calculate the bending stress by Lewis bending equation

STEP:2 A 3D model of Spur gear of different design is designed on Solidworks2021 software for obtaining the variation between stress considering the calculated values in the specifications table.

STEP:3 Converting the 3D model in the IGES format and export it into ANSYS Workbench where we did Static Structural project for all sizes. Then we mesh the models and applied the boundary conditions.

STEP:4 calculate the stress of different design in Ansys and compare it with theoretical calculation.

Contact Region: When two spur gears are connected, they work by meshing their teeth together. The contact between the teeth of the two gears is what allows one gears to drive the other. This contact is not just a simple point-it follows a path and plays a key role in how smoothly the gears work.

How does the contact happen:-

1. Initial Touch: As the driving gear (the one getting power)rotates, one of its teeth starts to touch a tooth on the driven gear.
2. Sliding and Rolling: As the gears continue to rotate, the point of contact moves across the tooth surface. At the beginning and end of the contact, the teeth slide against each other. In the middle of the contact, They almost roll over each other. This combination helps in smooth motion.
3. Line of Action: The path along which the contact moves is called the line of action. It's a straight line that is tangent to both gears tooth curves (called involutes).All the contact between the teeth happens along this line.
4. Leaving contact: As the teeth continue to rotate, they reach the end of contact and disengage, and the next pair of teeth come into contact and repeat the process.

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# Development of knuckle joint in 3D printing

(Ms. Lakshmi Kamble, Ms. Neha Dalavi, Ms. Sanika Jadhav, Ms. Supriya Jagtap, Ms. Priyanka Kamble)

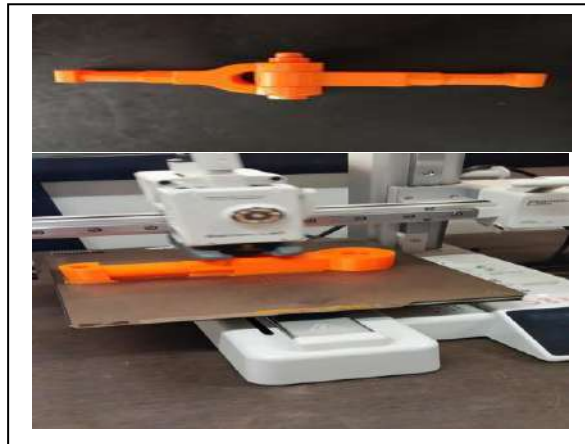
## INTRODUCTION

A knuckle joint is a type of mechanical joint used to connect two rods under tensile load, allowing limited angular movement between them. It is commonly employed in applications where the rods are subjected to axial forces and slight flexibility is required, such as in automotive steering systems, linkages in machinery, and tie rods in structures. This project focuses on the design, analysis, and fabrication of a knuckle joint. The objective is to understand its mechanical behavior, study the stress distribution, and ensure its efficiency under practical load conditions. The project includes material selection, dimensional calculations based on mechanical principles, and a demonstration of how the joint performs under simulated or real loading.

## CONSTRUCTION:

The construction of the knuckle joint in 3D printing|

- Single eye
- Double eye or fork
- Knuckle pin
- Taper pin
- Collar



## WORKING:

### 1. Two rods

The knuckle joint is typically connected with two shafts. One rod has an eye at one end, whereas the other has two ends that resemble a fork.

## **2. Double-Eye End or Fork End**

This double-eye end typically has two ends and a fork-like structure. Because one end is for entering the knuckle pin and the other for the collar in which the taper pin is put, this joint does not open.

## **3. Single-Eye End**

The single-eye end of the two holes is positioned between the double-eye end of the two holes so that all three holes—two double-eye holes and one single-eye hole—are

## **4 Knuckle Pin**

The knuckle pin is inserted through holes, firmly joining them. The taper pin is typically inserted into a tiny hole at the extremity of the knuckle pin.

## **Advantages of a Knuckle Joint**

### **1. Simple Design and Easy to Manufacture**

The components (eye, fork, and pin) are relatively simple to produce and assemble.

### **2. Allows Angular Movement**

Can accommodate slight angular misalignment between connected parts, which is beneficial in applications like steering linkages.

### **3. Easy to Assemble and Disassemble**

The pin can be removed easily, making maintenance or replacement straight forward

### **4. Strong and Reliable**

Capable of handling significant tensile loads without failure, making it suitable for load-bearing structures.

### **5. Cost-Effective**

Due to the simplicity of its design and ease of manufacturing, it is generally low-cost compared to more complex joints.

## 6. Versatile Applications

Used in a variety of mechanical systems like bicycles, automotive systems, and structural frameworks.

## 7. Reusable Components

If the pin wears out, it can be replaced without discarding the entire joint.

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# Library Management System

( Ms. Anwasha Pawar, Ms . Pranjal Varpe, Ms. Shravani Vathare, Ms. Srushti Chougule)

## ABSTRACT

The Library Management System is a modern digital solution designed to streamline and enhance the way libraries operate, making it more efficient and user-friendly for students, faculty, and avid readers. As reflected in its clean and visually appealing web interface, this system serves as a centralized platform for accessing a wide collection of books and resources with just a few clicks. From the elegant layout to the thoughtful color scheme—featuring calming sage greens and a minimalist design—the system ensures a seamless and pleasant user experience. The homepage welcomes users with a clear and inviting hero section that highlights the system's purpose: to offer easy exploration, management, and discovery of books. A fixed navigation bar offers intuitive access to core areas such as Home, About Us, and the Library Catalog, allowing users to navigate effortlessly. The header and footer reinforce the brand identity while offering important context and continuity.

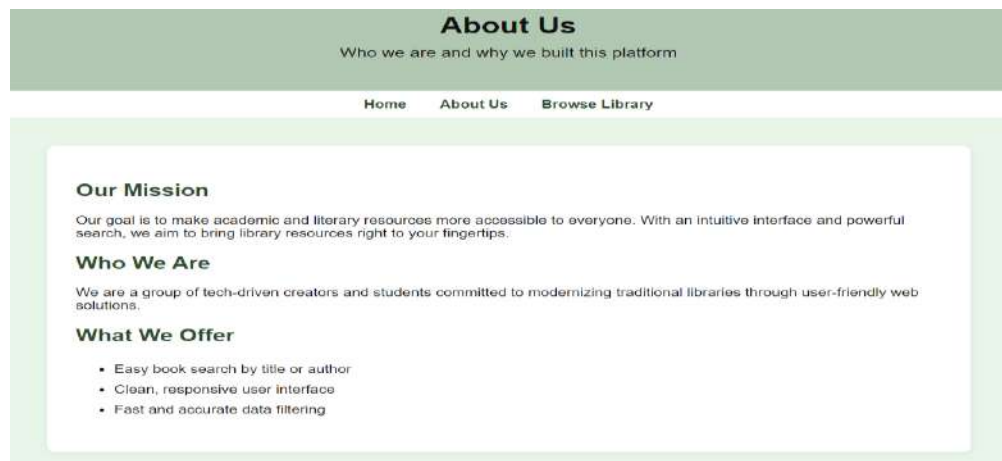
The Library Management System is an innovative digital platform developed to modernize and simplify traditional library operations. It functions as a one-stop solution for managing book collections, tracking borrowing records, and providing users with a seamless experience in searching and accessing educational resources. Designed with both aesthetic appeal and functional clarity in mind, the system features a responsive and user-friendly interface, crafted using HTML and styled with CSS to ensure clarity and ease of navigation. The elegant homepage welcomes users with a clean header, an intuitive navigation menu, and a visually engaging hero section that communicates the core mission of the platform—to support students, faculty members, and general readers in their pursuit of knowledge. By offering organized access to a wide range of digital resources, the Library Management System not only enhances library efficiency but also reduces manual workloads, minimizes the risk of errors, and encourages a culture of independent learning and intellectual exploration. This system is ideal for educational institutions looking to digitize their libraries and provide an accessible, secure, and efficient resource management experience to their users. With continuous enhancements and the potential for integration with advanced features such as search filters, user authentication, and data analytics, it stands as a scalable solution built for the future of digital learning.

## WORKING

**Home Page :** The **Home Page** of the Library Management System serves as a **welcome and navigation hub**.



The "**About Us**" page of the Library Management System introduces the platform and its purpose, highlighting three key sections:



This page displays **available books** based on user searches. It works by:

**Searching** – Users enter keywords to find books by **title or author**.

**Listing** – The system shows book details in a table.

**Filtering** – It dynamically updates results based on the search query.

Library Management System			
Search by book title or author...			
#	Book Title	Author	Date of Publish
1	Journey to the Unknown 1	Agatha Christie	1969-04-02
2	Secrets of the Past 2	J.K. Rowling	1984-10-30
3	Mystery of the Night 3	Mark Twain	1998-05-12
4	Mystery of the Night 4	Jane Austen	1953-01-27
5	Journey to the Unknown 5	Jane Austen	2003-03-18
6	Journey to the Unknown 6	Agatha Christie	2009-04-19
7	Mystery of the Night 7	Mark Twain	1962-07-12
8	The Great Adventure 8	Jane Austen	1988-09-08
9	Secrets of the Past 9	Agatha Christie	2021-05-02
10	Journey to the Unknown 10	J.K. Rowling	2007-08-04

## FUTURE SCOPE:

**AI-Powered Search** – Use **machine learning** for smarter book recommendations and search results.

**Cloud-Based Storage** – Store book records on **cloud platforms** for remote access and scalability.

**Mobile App Integration** – Develop a **mobile-friendly version** for users to access the library via smartphones.

**Automated Book Issuing** – Implement **RFID-based tracking** for seamless borrowing and returning of books.

**Voice Search & Chatbots** – Enable **voice commands** and AI chatbots to assist library users.

**Blockchain Security** – Enhance security using **blockchain technology** to prevent data manipulation.

**Data Analytics & Reports** – Generate **usage statistics** to optimize book collections and lending patterns.

**Multi-Library Connectivity** – Link multiple libraries into a **shared digital network** for resource sharing.

**Augmented Reality (AR)** – Create **AR-based book previews** for an interactive learning experience.

**Eco-Friendly Digitalization** – Reduce paper usage by **digitizing book records and transactions**.

## REFERENCES

•**Library Management System Project Guide** – This article provides a **step-by-step breakdown** of how to create an LMS, including **team formation, requirement gathering, coding, testing, and project presentation**.

<https://www.geeksforgeeks.org/software-engineering/library-management-system/>

•**Library Management System Project Report** – A structured project report outlining **implementation details, acknowledgments, and project structure** for a similar system.

[https://arkajainuniversity.ac.in/naac/Criteria%201/1.3.4/1\\_3\\_4\\_DOCUMENTS/CSIT/AJU190371.pdf](https://arkajainuniversity.ac.in/naac/Criteria%201/1.3.4/1_3_4_DOCUMENTS/CSIT/AJU190371.pdf)

•**Mini Project Report on LMS** – A detailed **academic report** covering the **design, development, and execution** of a Library Management System.

[https://www.academia.edu/37726542/Library\\_Management\\_System\\_Mini\\_Project\\_Report\\_On\\_LIBRARIY\\_MANAGEMENT\\_SYSTEM](https://www.academia.edu/37726542/Library_Management_System_Mini_Project_Report_On_LIBRARIY_MANAGEMENT_SYSTEM)

# “Hospital Mangement System”

(Ms. Mandira Belamkar, Ms. Shweta Gurav, Ms. Sadhana Koravi, Ms. Ananya Potadar,  
Ms. Saniya Shaikh)

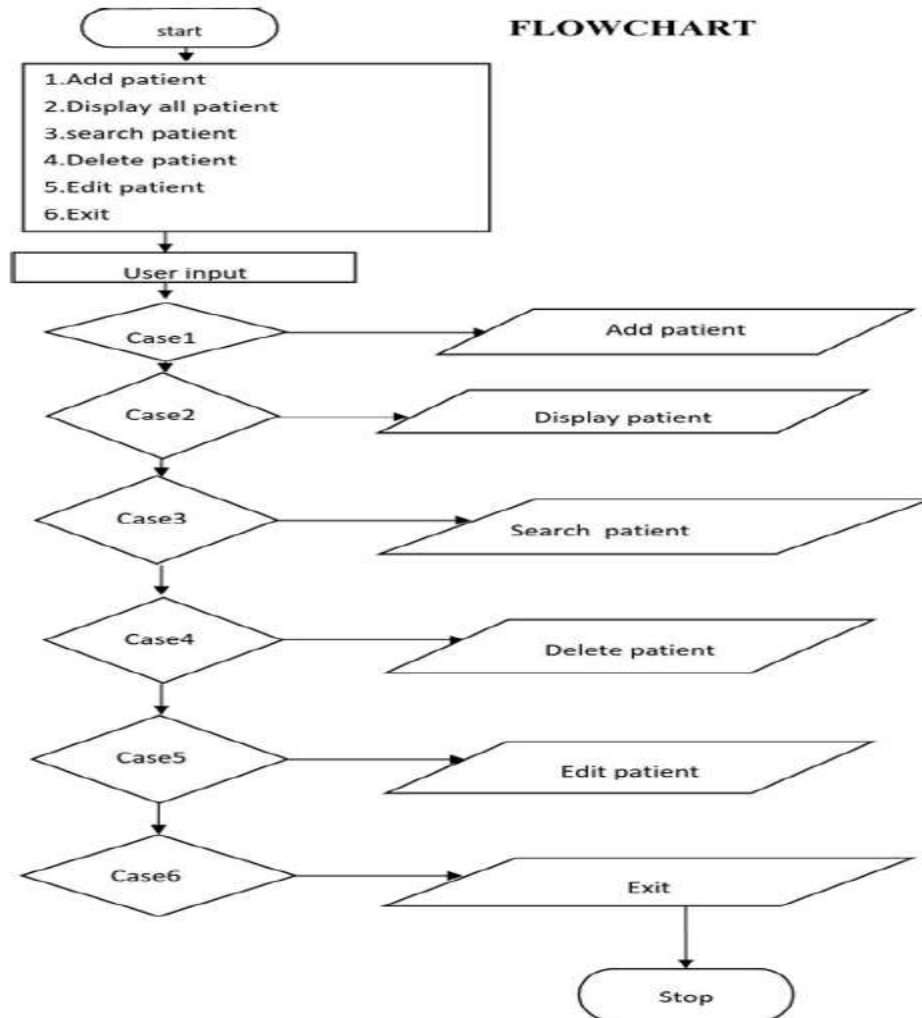
## ABSTRACT

Hospital Management System: The Hospital Management System is a console-based application developed in the C programming language that provides basic but essential functionalities for managing patient records using file handling. This system allows efficient and systematic storage, retrieval, and management of patient information. The project uses a binary file (patients.dat) to store patient data persistently. Each patient record includes attributes such as Patient ID, Name, Age, Disease, Bed Number, and Aadhaar Number, which are managed using a struct.

The Hospital Management System developed in C programming language is a simple, filebased solution that simulates the process of managing patient records in a hospital environment. It provides a basic yet effective platform to store, retrieve, search, edit, and delete patient information through a console-based interface. The data is stored in a binary file, allowing persistent storage without the use of complex databases. This project uses key programming concepts such as structures, file handling, conditional logic, and menu-driven navigation to create a functional hospital record system. Each patient's record includes their ID, name, age, disease, bed number, and Aadhaar number, making it easy for hospital staff to manage and access patient data efficiently.

## Key Features:

1. Add Patient – Records new patient details and appends them to the binary file.
2. Display All Patients – Reads and displays all stored patient records in a formatted table.
3. Search Patient – Searches the patient database by ID and displays detailed information.
4. Edit Patient – Allows modification of an existing patient's details using ID-based search and updates the binary file.
5. Delete Patient – Removes a patient record based on ID by creating a temporary file and replacing the original file.



## METHODOLOGY

The methodology of this project involves a structured approach to developing a console-based hospital management system using the C programming language. The system is designed to perform CRUD (Create, Read, Update, Delete) operations on patient records stored in a binary file.

1. Requirement Analysis Identify the basic needs of a hospital for managing patient data. Determine the key fields required for each patient (e.g., ID, Name, Age, Disease, Bed No, Aadhaar No). Choose a suitable development environment (e.g., Code::Blocks, Turbo C, GCC).
2. Design Phase Create a struct called Patient to group patient attributes. Design a menu-driven interface that allows users to select operations. Decide the use of binary files (patients.dat) to store records securely and efficiently.

3. **Development Phase** Implement the following core functionalities using C: **Add Patient:** Collect patient details and append them to the file using `fwrite()`. **Display Patients:** Read and display all patient records using `fread()`. **Search Patient:** Find and display patient information by ID. **Edit Patient:** Modify existing patient records using `fseek()` and overwrite the data. **Delete Patient:** Remove patient by copying all other records to a temporary file and renaming it.
4. **File Handling** Use `fopen()`, `fwrite()`, `fread()`, `fclose()`, `fseek()`, and `remove ()` functions for handling file operations. Store data in binary mode to maintain data integrity and ensure efficient access.
5. **Testing and Validation** the program with sample inputs to verify the correctness of each function. Check boundary conditions such as empty files, non-existent patient IDs, or invalid inputs. Debug errors and validate outputs to ensure reliable performance.
6. **User Interface** Keep the interface text-based and simple, suitable for beginners and easy to operate. Provide clear prompts and messages for each operation to improve user experience.
7. **Deployment** Compile the program to generate an executable file

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### **FROM STUDENT EDITOR'S DESK:**

In this issue, “Technosight” - Technical Magazine 2024-25, we continue exploring the latest advancements, innovative technologies, and insightful research that shape the future of engineering.. It's a field where creativity meets precision, where theoretical concepts translate into practical applications, and where collaboration across disciplines drives groundbreaking innovations.

Our articles offer in-depth analyses, practical insights, and real-world applications, providing readers with valuable perspectives to navigate the dynamic landscape of engineering. As the field continues to evolve at a rapid pace, it's crucial for professionals, researchers, and enthusiasts to stay updated about the latest trends and developments.

Through this magazine, we aim to foster knowledge exchange, spark inspiration, and promote dialogue .We extend our sincere gratitude to all the contributors, and readers who have contributed to making this magazine a platform for sharing knowledge and fostering innovation. We hope you find this issue informative, engaging, and inspiring. Happy reading!

Best Regards,

Ms. Sadhana Koravi

F.Y. B.tech.

## **EDITOR MESSAGE:**

It is with great enthusiasm that I present “Technosight” - Technical Magazine 2024-25” This magazine serves as a platform to explore the ever-evolving landscape of engineering, bringing together the latest advancements, innovative technologies, and insightful research that shape the future of engineering.

Through this magazine, we aim to provide in-depth analyses, practical insights, and real-world applications that will enrich the knowledge of students, researchers, and professionals alike. As technology advances at an unprecedented pace, staying informed about the latest trends and developments is crucial.

" Technosight " aspires to be a catalyst for knowledge exchange, inspiration, and intellectual discussions within the engineering community. I extend my heartfelt gratitude to all the contributors, authors, reviewers, and readers who have played a significant role in making this magazine a valuable resource. Your efforts and enthusiasm drive the success of this initiative. I hope you find this edition insightful and engaging.

Ms.S.S.Parmaj

Assistant Professor,

BSH Department,

Sharad Institute of Technology, College of Engineering.