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"TECHNOSIGHT "

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DEPARTMENT OF BASIC SCIENCE & HUMANITIES

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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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Automatic Robotic Car

INTRODUCTION

In an Era where innovation Drives progress we present the epitome of Technological advancement The Automatic Robotic Car Seamlessly merging cutting Edge Robotics with Automotive Engineering our project Signifies A paradigm shift in the way we Eercevice transportation Picture A vehicle That Navigates the streets with precision adapts safety without human intervention This is the essence of our Automatic Robotic Car, a marvel of Engineering Designed to Revolutionize Urban Mobility. Through State of the art sensors Advanced AI algorithms and real time data processing our Robotic Car offers unparalleled efficiency & reliability. whether it's navigating congested city streets or cruising along Highway this Autonomous marvel promises a journey that's not only efficient but also safe & comfortable Join us a journey into the future of transportation as we unveil the Automatic Robotic car a testament of human ingenuity & the relentless pursuit of innovation.

COMPONENT LIST ARDUINO UNO BOARD

ARDUINO UNO BOARD

It is a microcontroller board based on the ATmega 328 P It has digital input/output pins 6 anolog inputs, a 16 MHz Ceramic resonator, a USB Connection, a power Jack an ICSP header & a reset button power Jack, an reset button.

L293D MOTOR DRIVER SHIELD

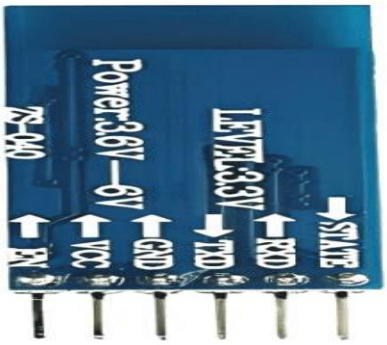
It is based on 1293 1C, which can drive 4 DC motors & 2 Stepper or servo motor at the same time.

ULTRASONIC SENSOR MODULE

A non-contact type of sensor used to measure an object's distance & velocity.

BLUETOOTH MODULE

It is an Bluetooth module which Detect the Signal which we pass & which transfer to the Bluetooth module & on the basic of this it will work.



SG90 SERVO MOTOR 180°

It is designed to rotate within a range of approximately 180° providing a wide range of motion for Controlling mechanisms.

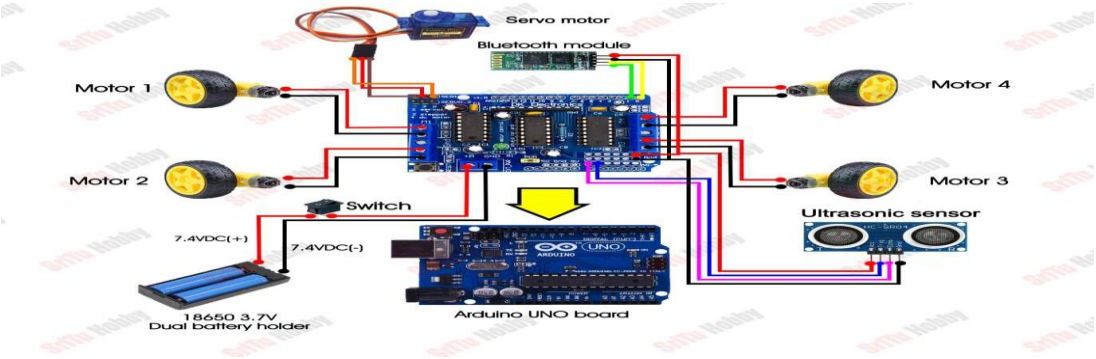
GEAR MOTOR

These compact ret powerful Components from the backbone of robotic movement, providing precise control & torque for various tasks.

BATTERY

A Battery is a source of electric power consisting of one electrochemical cells with external Connection for powering electrical devices when a battery is supplying power, Its positive terminal is the Cathode & its negative terminal is anode

CIRCUIT DIAGRAM



ADVANTAGES

1) Safety = They are provided with Advanced sensor & AI Algorithms that continuously monitor the vehicle's surroundings Leading to safer driving conditions.
2) Efficiency =Robotic cars can optimize route reduces congestion and improve traffic flow through advanced algorithms for navigation and coordination.
3) Cost Saving = Although initial costs may be high, Automatic robotic cars have the potential to reduce overall transportation Cars.
4) Environmental Benefits= By Optimizing driving Behavior and reducing traffic congestion Automatic robotic cars can contribute to lower fuel consumption and Emission

CONCLUSION

Technology played a very important role in our life we use it almost everywhere & everytime. The distinct & quick development that we discover each day proof for us that there is no point to give up& struggle with our obstacle in life. Technology offers us a lot of significant solutions to our problems & disapplies. Our role is to use us properly to reach the success level that benefits individual, society whole country as well.

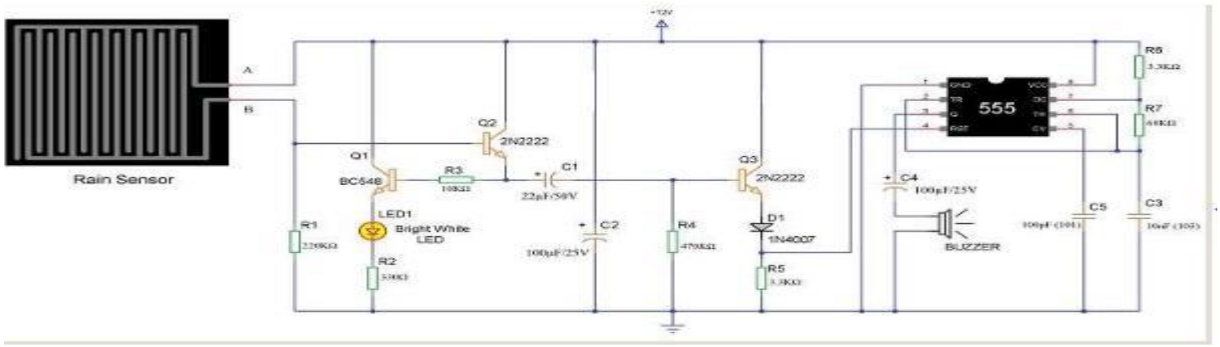
“Water Sensing Detector”

(Ms. Shruti C. Wadkar, Ms. Anisa J. Momin, Ms. Prachi S. Madake , Ms. Shreya N. Khot, Ms. Nivedita D. Khandekar)

INTRODUCTION

Rain Alarm Project is a simple but very useful project that detects Rain (Water Content or Droplets) and automatically triggers an alarm or buzzer. Water is a basic need in every one’s life. Saving water and proper usage of water is very important. Here is an easy project which will give the alarm when there is rain, so that we can make some actions for rain water harvesting and also save the rain water for using afterwards. With the help of saving this rain water through rain water harvesting, we can increase the levels of underground water by using underwater recharge technique. Rain water detector will detect the rain and make an alert, rain water detector is used in the reliable circuit of rain water detector which can be constructed at low cost irrigation field, home automation, communication, automobiles etc. Here is the simple and irrigation field, home automation, communication, automobiles etc.

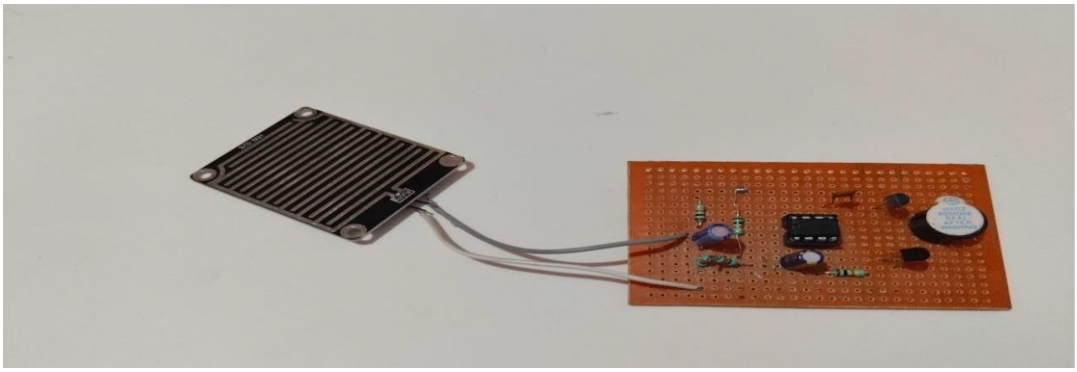
CIRCUIT DIAGRAM



WORKING

When any water content comes in contact with water sensor then driven circuit get actives the Timer IC555 which gives the indications to the buzzer and LED. So that the buzzer will start and Led glows.

IMAGES OF PROJECT



ADVANTAGES

1. To save the Water.

2. Less watering means less water you have pay for on your utility bill.

3. Preventing Water logging: Conversely, water sensing detectors can also help prevent water logging, which occurs when soil becomes saturated with water.

4. Optimizing Irrigation: In desert agriculture, water is a precious resource, and We can store the water when buzzer alerts us.

5. Building Management: Water sensing detectors are used in buildings to detect leaks in plumbing systems and roofs.

6. Industrial Facilities: Water sensing detectors are used in industrial facilities to monitor water levels in tanks, pipelines, and storage areas.

APPLICATION

1. In the irrigation, it will detect the rain and immediately alert the farmer.
2. In automobiles, when the rain detector detects the rain it will immediately active the wipers and inform the driver.
3. Leak Detection in Buildings
4. In normal house hold.
5**.** Appliances and Equipment: Water sensing detectors are integrated into appliances such as washing machines, dishwashers, and water heaters to detect leaks and prevent water damage.
6. Environmental Monitoring

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EMOTION DETECTION FROM IMAGE

(Ms. Mahek G. Mujawar, Ms. Pranita A. Kagwade, Ms. Samiksha D. Shinde, Ms. Supriya A. Shinde, Ms. Rutuja R. Ghadage)

ABSTRACT

The abstract describes the implementation of an emotion detection from image by using the python programming language. The objective of the project is to detection of emotion by uploading any image.
The goal of this paper is to build an emotion detect system which can analyze basic facial expression of human. In this study, a frame of emotion recognition system is constructed, including face detection, feature extraction and facial expression classification. In part of face detection, a skin detection process is adopted first to pick up the facial region from a complicated background. Through the feature detection of lip, mouth, and eyes, eyebrow, those feature points are found. Moreover, the changing of these facial feature points, the characteristic values of emotion state are computed. The experiment has shown that the proposed strategy is effective.
Automatic emotion recognition based on facial expression is an interesting research field, which has presented and applied in several areas such as safety, health and in human machine interfaces. Researchers in this field are interested in developing techniques to interpret, code facial expressions and extract these features in order to have a better prediction by computer. With the remarkable success of deep learning, the different types of architectures of this technique are exploited to achieve a better performance. The purpose of this paper is to make a study on recent works on automatic facial emotion recognition FER via deep learning. We underline on these contributions treated, the architecture and the databases used and we present the progress made by comparing the proposed methods and the results obtained. The interest of this paper is to serve and guide researchers by review recent works and providing insights to make improvements to this field.

INTRODUCTION

In this project, we develop a system that can detect peoples' emotions based on their facial expressions. As we move through our daily lives, we experience a variety of emotions. An emotion is a subjective state of being that we often describe as our feelings. The words emotion and mood are sometimes used interchangeably, but psychologists use these words to refer to two different things.

It is AI or “Artificial Intelligence” that detects and studies different facial expressions to use them with additional information presented to them. This is useful for a variety of purposes, including investigations and interviews, and allows authorities to detect the emotions of a person with just the use of technology.

Facial emotion detection technology is becoming more and more advanced every year. The AI used detects and studies the expressions depending on many factors to conclude what emotion the person is showing. Factors such as Location of the eyebrows and eyes, Position of the mouth, Distinct changes of the facial features etc. The project includes that if we upload any kind of image the algorithm gives their facial expression.

OBJECTIVE

- The main objective of this project is to detect an emotion by uploading image.
- To detect the facial expressions.
- To extract the feature of the face.
- To produce an automatic facial emotion detection system to identify different emotions based on these experiments the system could identify several people that are sad, surprised, and happy, in fear, are angry, etc.

SOFTWARE USED

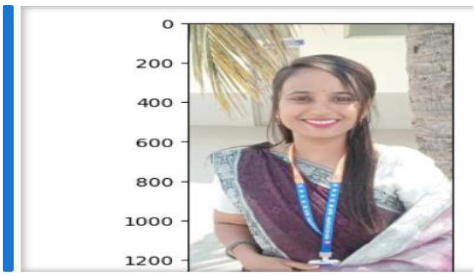
Python [Jupyter Notebook]

PROGRAMME CODE

```
!pip install matplotlib
!pip install deepface
import matplotlib.pyplot as plt
import cv2
import numpy as np
import os
from PIL import Image
!pip install tf-keras
!pip install --upgrade deepface
!pip install deepface
import deepface as DeepFace
from deepface import DeepFace
img1=plt.imread('Downloads/WhatsApp Image 2024-05-02 at 1.53.52 PM.jpeg')
plt.imshow(img1)
plt.show()
result1=DeepFace.analyze(img1, actions=['emotion'],enforce_detection=False)
print(result1)
```

PROGRAMME OUTPUT

Img1:



Result1:

[{'emotion': {'angry': 7.204269326282001e-13, 'disgust': 2.1272196680828344e-24, 'fear': 5.683904577528513e-16, 'happy': 99.99918937683105, 'sad': 4.638044505747563e-11, 'surprise': 1.1100804719887947e-06, 'neutral': 0.0008112994692055508}, 'dominant emotion': 'happy', 'region': {'x': 231, 'y': 262, 'w': 326, 'h': 326, 'left eye': (448, 389), 'right eye': (336, 387)}, 'face confidence': 0.93}]

FUTURE SCOPE

• The future scope of the work is to increase the efficiency of emotion recognition systems in terms of accuracy.

• To improving mental health.

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https://www.youtube.com/

https://openai.com/chatgpt

Vaccum Cleaning Robot

(Ms. Shruti Kadam, Ms. Prajakta Magdum)

INTRODUCTION

The Internet of things (IoT) is a network of physical devices that are embedded with electronics, sensors, software and network connectivity to share the data. The IOT gives access to sense and control the objects remotely in a network which gives direct integration of physical world into computer based systems. The robotics details with design, operations, construction and application of robots. It also details with computer system for the control, information processing and sensory feedback. The Internet of things and Robotics have been hand holding each other contributing to individual growth and development.

In modern era robots are playing an important role in life of mankind with their advance technologies, making the human life easier and comfortable. The cleaning robot are effective in assisting humans in floor cleaning applications at homes, hotels, restaurants, offices, hospitals, workshops, warehouses and universities etc. so they have taken more recognition in robotics research. Fundamentally, the robot cleaners have been distinguished by their cleaning competence like dry vacuum cleaning, floor mopping etc.

One of the key responsibilities of each and every person is keeping the environment around us clean. More personnel will be required to clean an area that is larger. Some locations may be so filthy that cleaning them has a significant negative impact on health. People are more susceptible to allergies, watery eyes, colds, coughs, rashes, etc. due to the presence of dust in the environment.

A vacuum cleaner, commonly referred to as a vacuum or a hoover, is a machine that creates suction to take dirt off of surfaces like floors, couches, draperies, and other objects. Typically, electricity is used to power it. Either a dust bag or a cyclone collects the dirt for subsequent disposal. Small battery- powered hand-held vacuum cleaners, wheeled canister models for home use, domestic central vacuum cleaners, enormous stationary industrial machines that can hold hundreds of liters of dirt before being emptied, and self-propelled vacuum trucks for cleanup of significant spills or removal of contaminated soil are all different sizes and models of vacuum cleaners that are used in both homes and industry.

An automatic hoover cleaner is created in this project. It consists of an attached hoover to an RC car. If an impediment is detected, an ultrasonic sensor attached to the front of the vehicle measures the distance. The car alters its course in accordance with the code if, let's say, there is an obstruction.

Circuit Setup

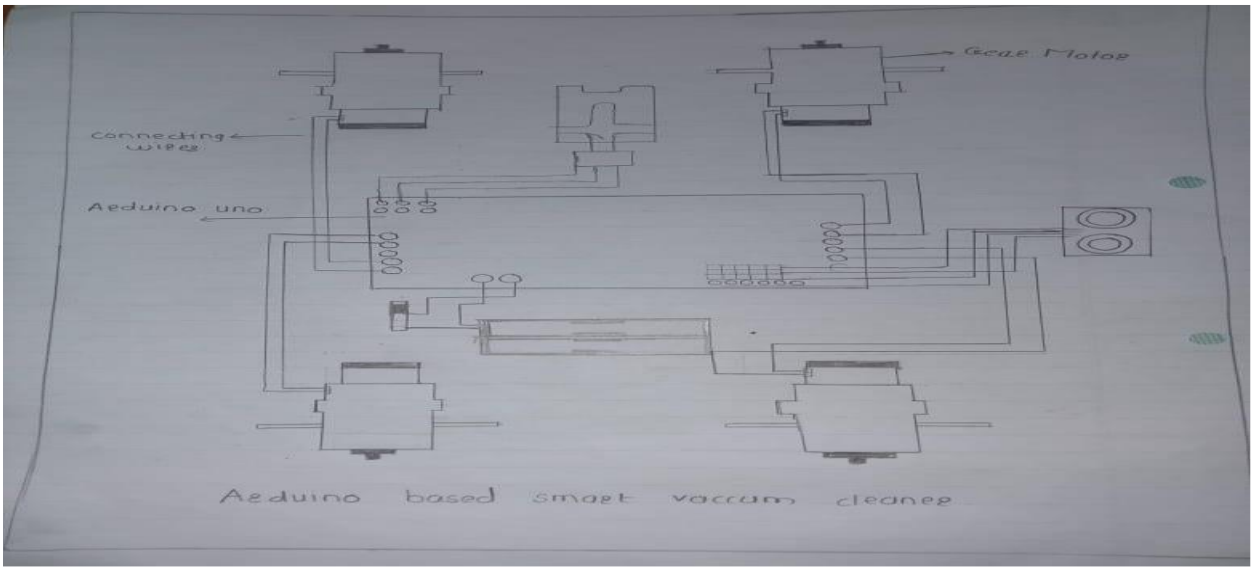
1. Connect the servo’s power cable (usually red) to the 5V output on the Arduino.

2. Connect the servo’s ground cable (usually brown or black) to one of the GND pins on the Arduino.

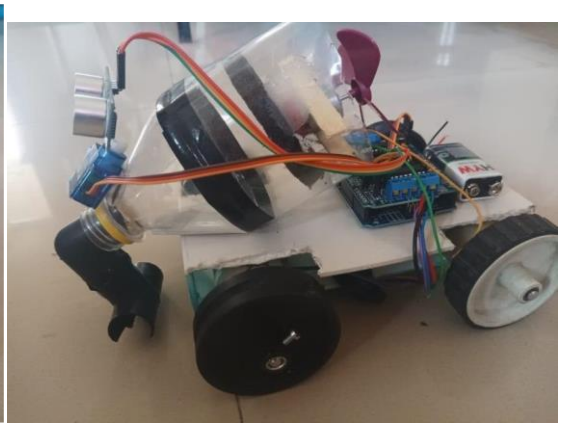
3. Connect the servo’s signal cable (usually orange or yellow) to digital pin 9 on the Arduino.

4. Insert the potentiometer into the breadboard and connect one of its outer pinsto 5V and the other outer pin to GND on the Arduino.

5. Connect the potentiometer’s middle pin to analog pin A0 on the Arduino.



OUTPUT



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Line Follower Robot

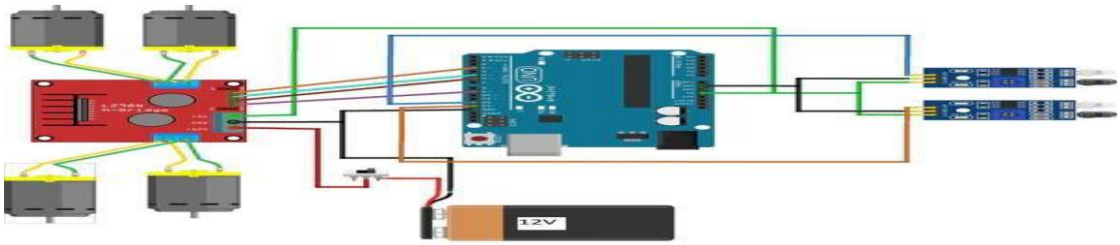
(Mr.Armaan J. Patel , Mr.Tanmay Umesh Dhonushke , Mr.Siddhesh J. Patil, Mr.Adarsh M. Patil, Mr.Ganesh V. Gundajwar)

INTRODUCTION

Most industries now use crane systems to transport packages or goods from one location to another. Sometimes, Lifting heavy loads during that time might result in the breaking of lifting equipment and harm to the packages. Using a line follower robot is the way forward to solve this problem. A Line Follower Robot (LFR) is a robot that can move independently and follow a line drawn on the surface. The path may seem like a dark line against a light background (Jha et al. 2016). When a sensor finds a line and the robot moves along it, the system is simple and works well. The driver continually adjusts the vehicle's trajectory in response to sensor feedback. Black surfaces take in the lightest. The white surfaces reflect the most, and black characters reflect the least. So, to find the line, use this feature of the light. An infrared sensor or an LDR (light-dependent resistor) is used to find the light. In this project, the digital infrared sensor is used for its superior precision. The inbuilt op-amp comparator receives the output from the sensor, which detects the IR light reflected from the surface. Positioning the sensor over a white background causes the light to be reflected off the receiver. But when placed on a black background, the sensor doesn't see any reflection of the source light. The sensor measures the strength of the reflected light. The output from the sensor is sent to the microcontroller. It then tells the controller how to run the motor. Based on what the sensor says, the Arduino Uno is set up to move the robot forward, turn to the right or left, and stop. The motor controller receives the Arduino's output. In this case, we need to use a motor controller because the signal from an Arduino isn't strong enough to run the motor, and we need to be able to spin the motors in both directions. Here, we employ an L293D motor controller, a dual-h bridge motor controller that is good for driving two direct-current motors.

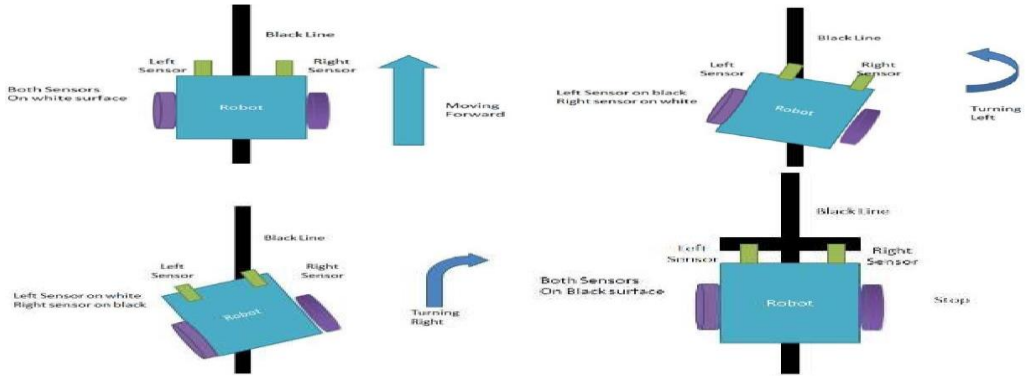
CIRCUIT DESIGN

The circuit consists of an Arduino Uno connected to the motor driver (L298N), which controls the DC motors. Infrared (IR) sensors are placed underneath the robot to detect the black line on a white surface.



WORKING PRINCIPLE

- IR sensors detect the contrast between the line and the background surface.
- Based on the sensor readings, the Arduino decides whether to turn left or right to stay on the line.
- The Arduino sends appropriate signals to the motor driver to control the speed and direction of the motors.
-By adjusting the motor speeds and directions, the robot can effectively follow the line.



APPLICATIONS OF LINE FOLLOWER ROBOT

Industrial Applications: These robots can be used as automated equipment carriers in industries replacing traditional conveyer belts. Automobile applications: These robots can also be used as automatic cars running on roads with embedded magnets. Domestic applications: These can also be used at homes for domestic purposes like floor cleaning etc. Guidance applications: These can be used in public places like shopping malls, museums etc to provide path guidance.

ADVANTAGES

Robot movement is automatic, Used for long distance applications, Used in home, industrial automation and Health Care, Cost effective, Simplicity of building.

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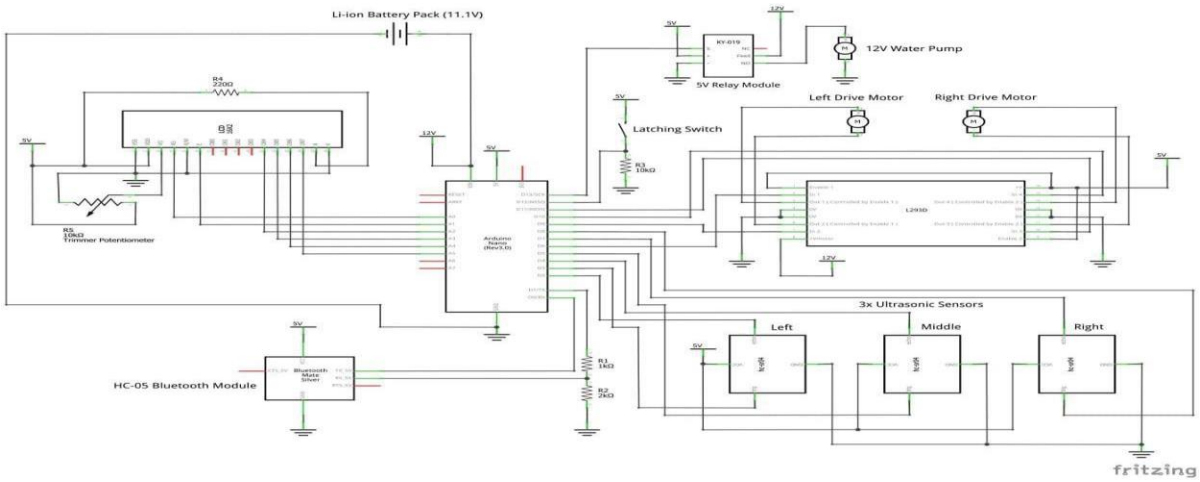
“Floor cleaning robo”

(Ms. Pradnya R. Kesarkar, Miss. Sandhya G. Kadam, Ms. Shravani M. Kothale, Ms. Samruddhi P. Awalekar.)

INTRODUCTION

The floor cleaning Robot cleans the floor with the help of mob controls and module. This device can be controlled from a phone app via bluetooth but here we have also added autonomous control. We used three ultrasonic sensor one look at front, one looks left and another one at right. The Latching switch is used to switch between autonomous and manual mode. We also added LCD display for displaying command and debugging. We also used the lithium iron batteries as a power supply. We used glucose drip infusion mechanism to control the flow of water. The ultimate solution for spotless floors with minimal effort. Just sit back, relax, and let this smart machine do the dirty work for you. With advanced technology and precision engineering, our robot effortlessly navigates your space, leaving behind sparkling floors and extra time for you to enjoy the things that matter. Experience convenience, efficiency, and cleanliness like never before with our floor cleaning robot.

CIRCUIT DIAGRAM

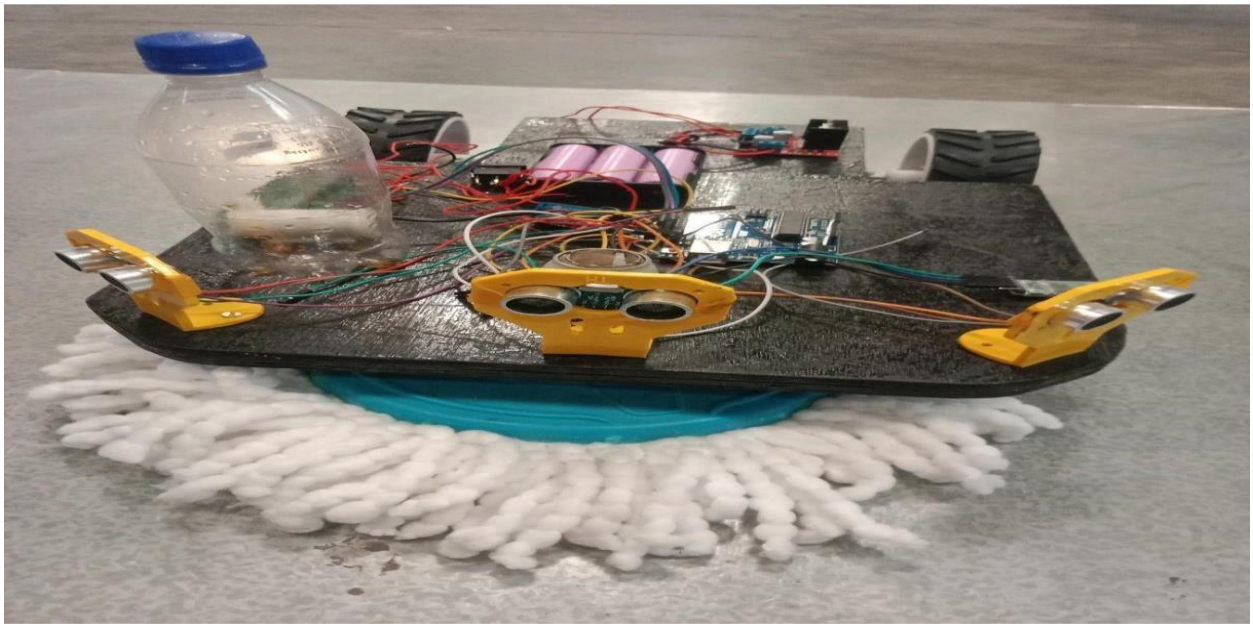


WORKING

For staring the robot 1st we have to switch on the power supply with the help of the provided switch. For controlling the robot with mobile we have to connect the mobile with the robot with the help of blutooth module. The water pump will get started and it will provide the water which will split on the mob. With the help of mobile app we can move the robot in front ,back, left,right anywhere as per our requirement. The ultrasonic sensors will keep the robot safe from any

obstacles. With the help of latching switch we can shift the robot in autonomous mode.We can clean the floor with the help of this robot.

OUT PUT



ADVANTAGES

• Clean complicated and dangerous area.

• Less manual work.

• Usefull for office workers.

• Low maintenance.

• It also controlled by app. • This device is automatic.

• This makes cleaning staff work easy.

• Human efforts are low.

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TRAIN ACCIDENT PREVENTION

(Ms. Sakshi G.Ekate, Ms. Santosh Kumari, Ms. Payal P. Malikwade, Ms. Pradnya R. Malikwade, Ms. Sajida I. Sutar)

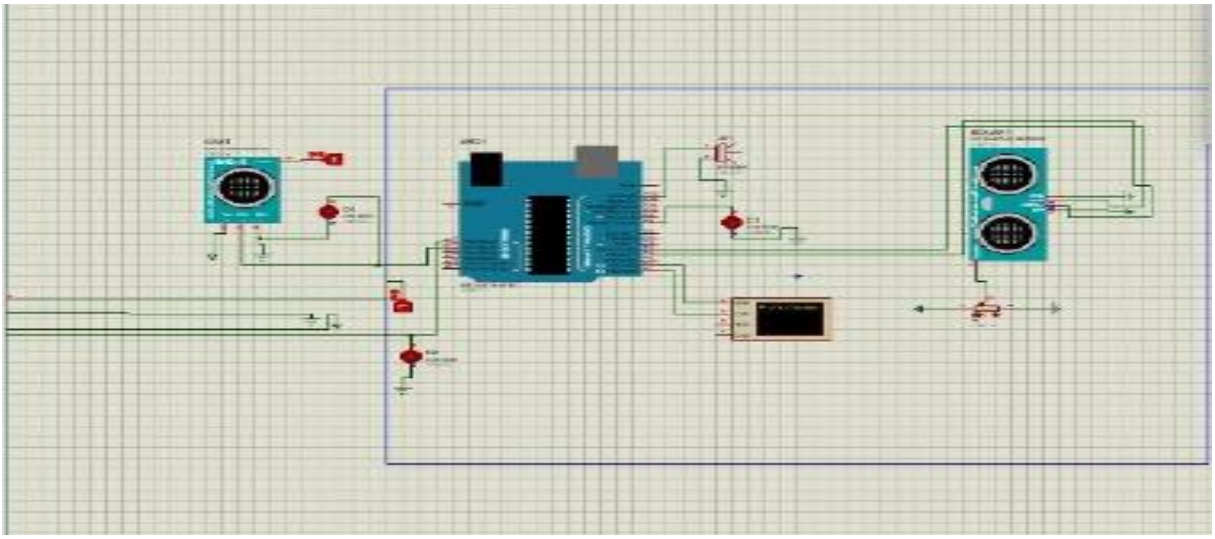
INTRODUCTION

Railways serve as vital arteries of transportation, facilitating the movement of people and goods across vast distances with efficiency and reliability. However, with this indispensable role comes the responsibility to ensure the safety of passengers, crew, and the general public. Train accidents, though relatively infrequent, can have catastrophic consequences, leading to loss of life, injury, and substantial economic and environmental damage.

In light of these challenges, our project endeavors to address the multifaceted issue of train accident prevention through a comprehensive approach. By integrating cutting-edge technology, rigorous safety protocols, and proactive community engagement, we aim to mitigate the risks associated with railway operations and enhance overall safety.

Join us on this journey as we strive to make significant strides in enhancing railway safety and preventing train accidents, ultimately ensuring a secure and sustainable future for railway transportation.

CIRCUIT DIAGRAM



WORKING PRINCIPLE

Arduino, an ultrasonic sensor, and a buzzer are used in this. The train that is approaching the track is detected by this ultrasonic sensor-based technology. The ultrasonic sensor is turned on by the Arduino. The proposed technology locates the train using ultrasonic sensors.

ADVANTAGES

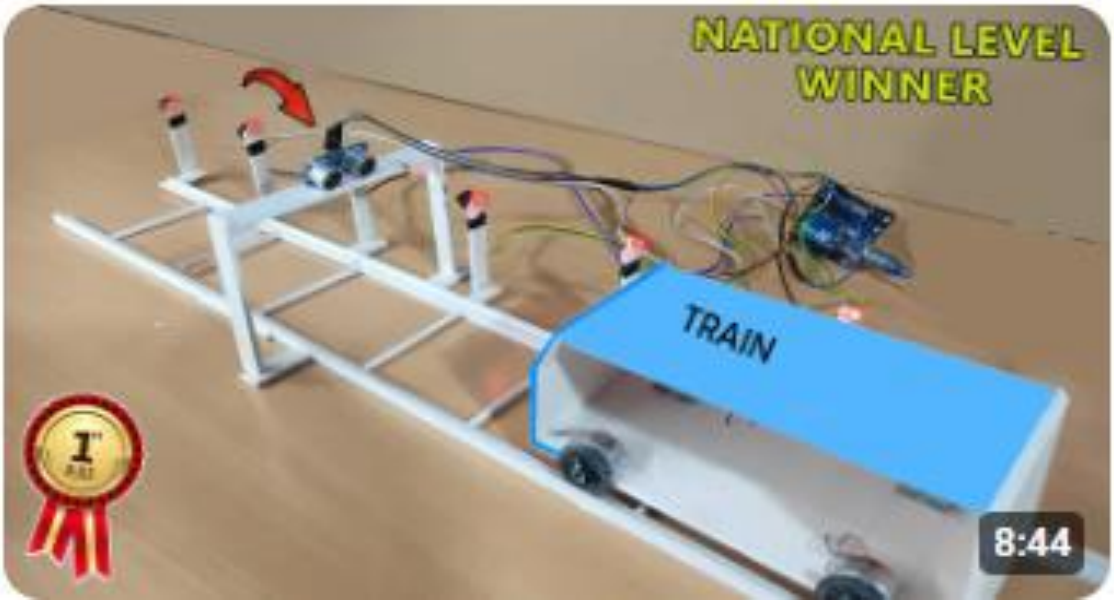
- Safety: The foremost advantage is the preservation of human life. Preventing accidents reduces injuries and fatalities among passengers, crew, and bystanders.
- Economic savings: Train accidents result in significant financial losses due to property damage, legal fees, medical expenses, and compensation claims. Prevention measures save money for both the railway companies and the government.
- Efficiency: Accidents cause disruptions in train schedules and traffic flow, leading to delays and inconvenience for passengers and freight transportation. Accident prevention helps maintain efficient operations and timely delivery of goods and services.
- Environmental protection: Train accidents can result in hazardous material spills, leading to environmental pollution and ecosystem damage. Preventing accidents helps preserve natural resources and protects wildlife habitats.
- Public trust: A strong safety record builds public trust and confidence in the railway system. It encourages more people to choose train travel, which benefits both the transportation industry and the environment by reducing reliance on less sustainable modes of transportation like cars or planes.
- Regulatory compliance: Prevention measures ensure compliance with safety regulations and standards set by authorities, avoiding penalties and legal consequences for non-compliance.
- Employee well-being: Train accidents can harm railway workers directly involved or indirectly affected by the aftermath. Prevention measures prioritize the safety and well-being of employees, fostering a positive work environment and morale.
- Reputation: A good safety record enhances the reputation of railway companies and the broader transportation sector. It attracts investment, partnership opportunities, and favorable public perception, which are crucial for long-term sustainability and growth.
-

APPLICATIONS

- Certainly, here are some daily applications of train accident prevention:
- **Routine Inspections**: Conducting daily inspections of tracks, signals, switches, and train equipment to identify any issues or abnormalities that could pose safety risks.
- **Train Operator Training**: Providing ongoing training to train operators on safe operating procedures, emergency response protocols, and how to effectively communicate with control centers and passengers.
- **Monitoring Weather Conditions**: Regularly monitoring weather forecasts and conditions along railway routes to anticipate and mitigate potential hazards such as flooding, landslides, or ice buildup.
- **Track Maintenance**: Performing daily track maintenance activities such as clearing debris, repairing track defects, and ensuring proper drainage to prevent derailments and accidents.
- **Signal Testing**: Conducting daily tests of signaling systems to ensure they are functioning correctly and effectively communicating information to train operators.

- **Grade Crossing Maintenance**: Inspecting and maintaining grade crossings to ensure they are properly equipped with warning signals, barriers, and signage to alert drivers and pedestrians of approaching trains.
- **Safety Communication**: Promoting safety awareness among railway employees and the public through regular safety briefings, posters, announcements, and educational campaigns.
- **Emergency Response Drills**: Conducting regular emergency response drills to ensure railway personnel are prepared to effectively respond to accidents, evacuate passengers, and coordinate with emergency services.

MODEL DIAGRAM



FROM STUDENT EDITOR'S DESK:

In this issue, "TechToday" - Technical Magazine 2023-24, 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. Pallavi Patil

F.Y. B.tech.

EDITOR MESSAGE:

It is with great enthusiasm that I present “TechToday” - Technical Magazine 2023-24” 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.

"TechToday" 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.