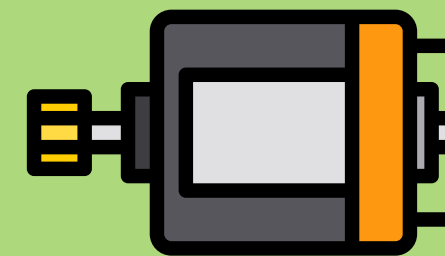EXPLORING ENGINEERING Project

SMART
TRASH CAN

DOMAIN

- Waste Management:

- Smart City Infrastructure:

DOMAIN

- Healthcare Facilities

- Hygiene and cleanliness

PROBLEM STATEMENT

In traditional dustbin systems, there are challenges related to convenience, hygiene, and efficient waste management. Users need to physically open and close the dustbin lids, which can be inconvenient and unhygienic, especially in public spaces. Additionally, overflowing bins and improper waste disposal are common issues that lead to environmental pollution and inefficient waste collection.

OUR APPROACH :

The objective of the project is to design and develop a smart dustbin system that addresses these challenges. The system will utilize an IR sensor to detect the presence of individuals near the dustbin and automatically open the lid, allowing for touchless and convenient waste disposal. The sensor-based technology will enhance hygiene, reduce the risk of cross-contamination, and promote a clean environment.

The project aims to overcome the following specific problems:

1. **Inconvenience**: The project aims to eliminate the need for physical contact with the dustbin, providing a more user-friendly and convenient waste disposal experience.
2. **Hygiene**: Traditional dustbins require users to touch the lids, which can lead to the spread of germs and bacteria. The project aims to implement touchless operation using an IR sensor, minimizing the risk of contamination and promoting better hygiene practices.
3. **Waste Overflow**: Overfilled bins are a common problem, resulting in waste spillover and unsightly surroundings. The smart dustbin system will incorporate sensors to monitor the fill level and provide alerts when the bin needs to be emptied, optimizing waste collection efficiency.
4. **Environmental Impact**: Improper waste disposal and littering have negative environmental consequences. By promoting

Why the world cares about the problem we are solving

- **Our smart dustbin project addresses the growing concern of waste management and environmental sustainability.**
- **By utilising advanced technologies like IR sensors, DC motors, and Arduino, we have created an automated solution that efficiently opens and closes the dustbin lid based on the presence of an object.**
- **This innovation contributes to waste reduction, improves hygiene, and enhances the overall cleanliness of public spaces.**
- **With increasing global attention towards smart and sustainable solutions, our project showcases the potential for technology to revolutionise waste management practices and create a cleaner and greener future.**

Components used

1.Arduino uno R3 compatible development board

2.Infrared obstacle avoidance IR sensor module

3.L298N 2A Dual Motor Driver Module with PWM Control

4.16*2 LCD with Green Blacklight

5.12V 1A Power Supply(SMPS) Adaptor

6.10 RPM DC Motor

WHY USE Arduino uno R3?

- **VERSATILITY**

- **EASE OF USE:** IT HAS A LARGE COMMUNITY OF USERS & EXTENSIVE DOCUMENTATION AVAILABLE, INCLUDING LIBRARIES AND EXAMPLE CODES, WHICH SIMPLIFIES THE DEVELOPMENT PROCESS.

- **EXPANDABILITY:** THE ARDUINO UNO R3 SUPPORTS SHIELDS, WHICH ARE ADDITIONAL MODULES THAT CAN BE STACKED ON TOP OF THE BOARD TO PROVIDE EXTRA CAPABILITIES.

IR SENSORS	Dual Motor Driver Module
1. Function: IR sensors work by detecting the heat emitted by objects in the form of infrared radiation. They can sense and measure the intensity of this radiation and convert it into an electrical signal. 2. Principle of Operation: IR sensors typically consist of an emitter and a receiver. The emitter emits infrared radiation, and the receiver detects the reflected or emitted radiation. Changes in the received radiation indicate the presence or absence of objects or changes in temperature.	1. Functionality: The L298N motor driver module is designed to control the direction and speed of two DC motors simultaneously. It can handle higher currents and voltages, making it suitable for driving motors with higher power requirements. 2. Dual Motor Control: The L298N module can independently control two motors, allowing for differential movement. This capability is beneficial in applications where the smart dustbin require separate motors for lid movement,

FUTURE WORK

- Waste segregation: detection of biodegradable and non-biodegradable waste
- locking the lid of the bin as soon as it is full to prevent overflowing of the bins
- Compression of the waste within the bin using solar power and also rotate the PVC according to the position of the sun .
- send text alerts to respective government bodies to pick up the waste along with it's location when used as a public dustbin.
- Wireless Connectivity: Implementing wireless connectivity, such as Wi-Fi or Bluetooth, would enable remote monitoring and control of the smart dustbin. This could include features like real-time status updates, notifications, and the ability to control the dustbin through a mobile application or a web interface.

wowwwwww!!

CONCLUSION

- In conclusion, the smart dustbin project incorporating the L298N dual motor driver module and other components has successfully achieved its primary objective of creating a convenient and automated waste disposal system.

- By integrating infrared obstacle avoidance IR sensors, the project enables hands-free operation, ensuring a hygienic and user-friendly experience.

- The Arduino Uno R3 microcontroller provides control and processing capabilities,

- while the 10RPM DC motor driven by the L298N module allows for controlled lid movement.

- Further ideas as said in the previous slide will be incorporated in the longer run

it's time for a cleaner and greener environment