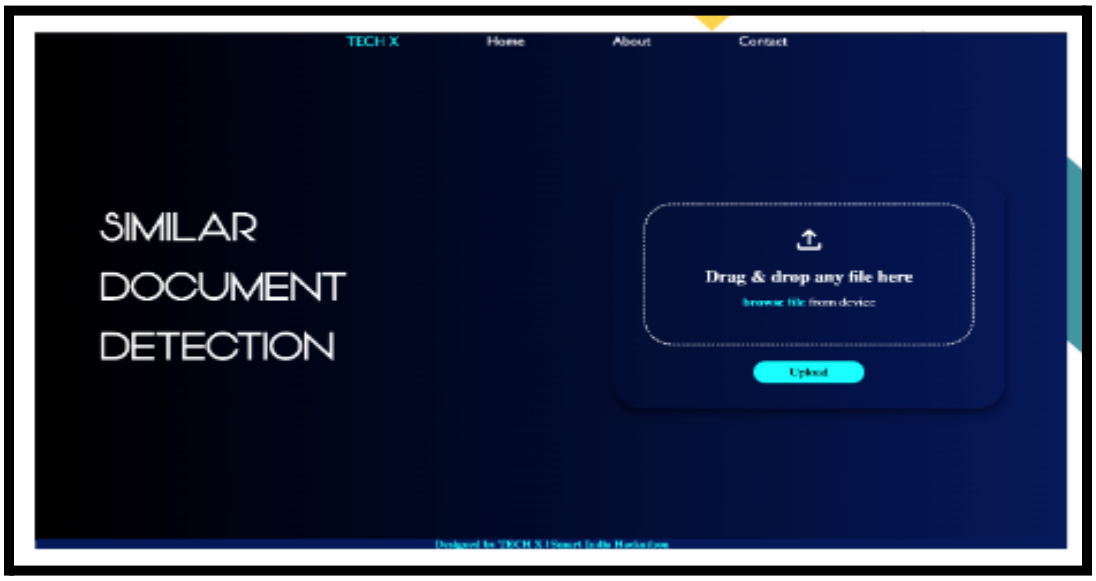
SIMILAR DOCUMENT TEMPLATE MATCHING ALGORITHM



Similar document template matching algorithm is a method to find and compare documents that have the same or similar format, layout, and structure. The scope of this algorithm is to automate the process of document verification, data extraction, and fraud detection, especially for business documents such as invoices, bills, statements, forms, etc. The objectives of this algorithm are to:

- Identify the region of interest (ROI) in the document, which contains the relevant information and data.
- Extract the template from the ROI using techniques such as edge detection, contour analysis, adaptive thresholding, and morphological operations.
- Compare the template with other documents using features such as key points, descriptors, histogram, structural similarity index (SSIM), and optical character recognition (OCR).
- Detect any discrepancies or anomalies in the data and flag them as potential frauds.

The uses of this algorithm are:

- To reduce manual data entry and processing, which can be time-consuming, expensive, and error-prone.
- To improve the accuracy, efficiency, and reliability of document verification and data capture.
- To prevent false claims and frauds, which can cause financial losses and damage the system trust.

Some examples of this algorithm are:

- Similar Document Template Matching Algorithm, which uses machine learning, SSIM, and OCR for fraud detection, template extraction, and comparison.
- One-Shot Template Matching for Automatic Document Data Capture, which uses visual and textual features, image similarity, and textual similarity for template matching and data extraction.
- Hardware implementation of template matching algorithm and its application in document verification, which uses optimized sum of absolute differences (OSAD) for template matching and document verification.

SMART AUTOMATION ON GARBAGE COLLECTION

Smart automation on garbage collection is a method to use Internet of Things (IoT) devices and sensors to monitor and manage the waste collection process in an efficient and sustainable way. The scope of this method is to reduce the environmental impact, operational cost, and human effort of waste management, especially in urban areas. The objectives of this method are to:

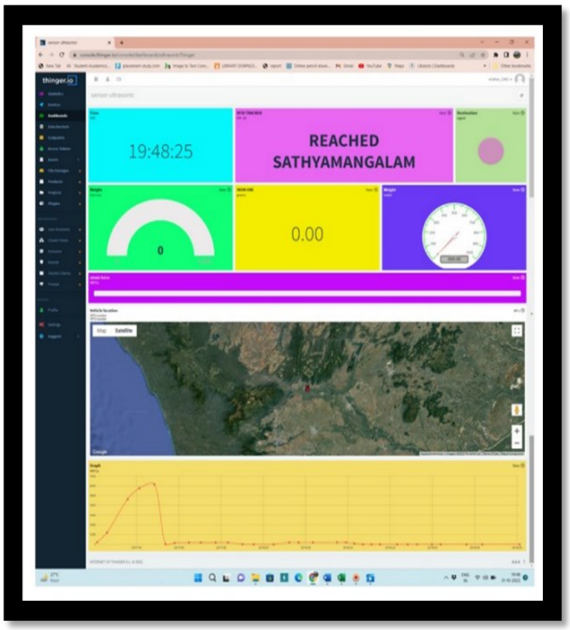
- Measure the fill level, weight, temperature, and location of the garbage bins in real time, and send the data to a cloud server for analysis and visualization.
- Optimize the waste collection routes and schedules based on the data, and avoid unnecessary trips, fuel consumption, and traffic congestion.

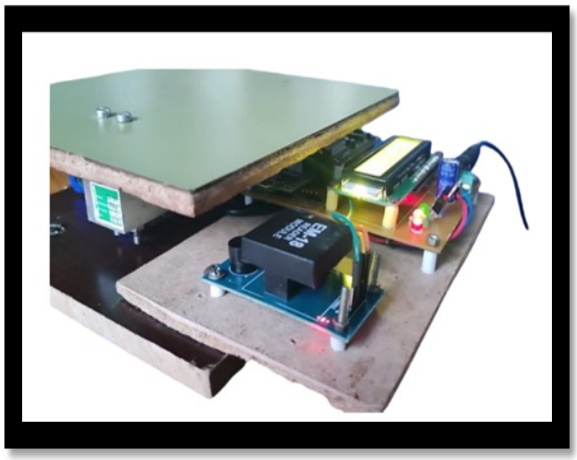
- Control and operate the waste collection vehicles and devices, such as robots, compactors, and actuators, remotely or automatically, and ensure the safety and quality of the service.
- Detect and prevent any anomalies or incidents, such as fire, overflow, theft, or damage, and alert the authorities and the users.

The uses of this method are:

- To improve the cleanliness, hygiene, and aesthetics of the city, and reduce the health risks and the greenhouse gas emissions caused by the waste.
- To save time, money, and resources for the waste management authorities, and increase their productivity and profitability.
- To enhance the user experience and satisfaction, and encourage the user participation and awareness in waste reduction and recycling.

IOT BASED SUPPLY CHAIN MANAGEMENT





IoT-based supply chain management is a method to use Internet of Things (IoT) devices and sensors to monitor and manage the movement and condition of goods and materials throughout the supply chain. The scope of this method is to improve the efficiency, transparency, and sustainability of the supply chain operations, especially in the areas of inventory management, warehouse management, transportation management, and quality management. The objectives of this method are to:

- Track and trace the location, status, and condition of the goods and materials in real time, and send the data to a cloud server for analysis and visualization.
- Optimize the inventory levels, warehouse operations, transportation routes, and delivery schedules based on the data, and avoid overstocking, understocking, wastage, and delays.
- Control and operate the supply chain devices and equipment, such as RFID tags, GPS trackers, smart locks, drones, robots, and vehicles, remotely or automatically, and ensure the security and safety of the goods and materials.
- Detect and prevent any anomalies or incidents, such as theft, damage, spoilage, or recall, and alert the authorities and the customers.

The uses of this method are:

- To reduce the operational costs, environmental impact, and human errors of the supply chain management, and increase the productivity and profitability of the business.
- To enhance the customer satisfaction and loyalty, and provide them with accurate and timely information and services.
- To enable the integration and collaboration of the supply chain partners, and create a smart and agile supply chain network.

GESTURE CONTROL CAR

Bannari Amman Institute of Technology

Stay Ahead

A gesture control car is a car that can be controlled by the hand gestures of the user, without using any physical or remote device. The scope of this project is to design and implement a wireless communication system between the user and the car, using a sensor module, a microcontroller, and a radio frequency transmitter and receiver. The objectives of this project are to:

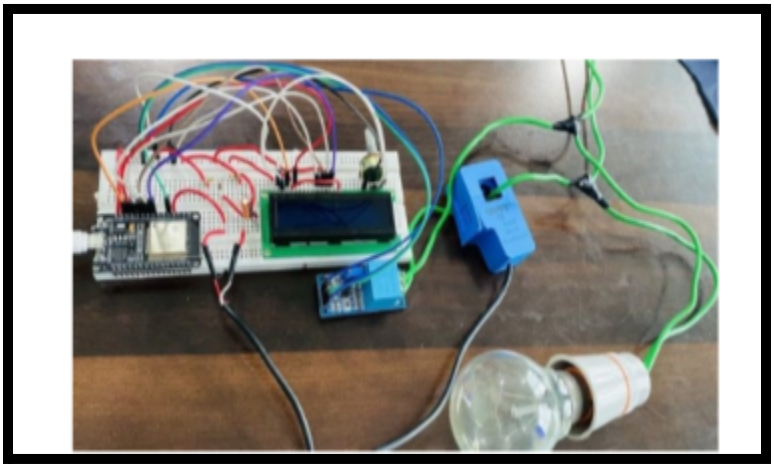
- Detect and recognize the hand gestures of the user, such as tilt, rotation, and movement, using an accelerometer sensor attached to a glove.
- Convert the sensor data into digital signals and transmit them to the car using a radio frequency module and an Arduino microcontroller.

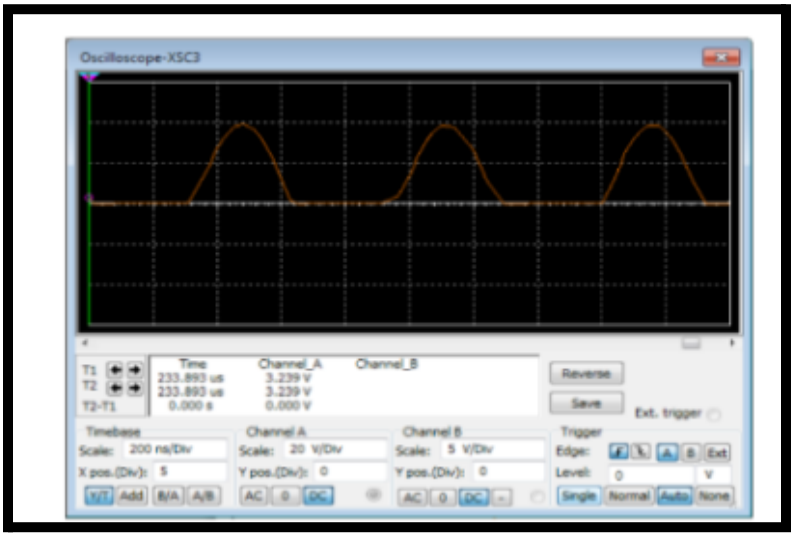
- Receive and decode the signals in the car and control the direction, speed, and movement of the car using a motor driver and a DC motor.

The uses of this project are:

- To provide a novel and intuitive way of controlling a car, which can enhance the user experience and satisfaction.
- To demonstrate the application and integration of various technologies, such as sensor, microcontroller, wireless communication, and motor control.
- To explore the potential and challenges of gesture control in the automotive industry, such as safety, reliability, and compatibility.

SMART EV CHARGING STATION





A smart EV charging station is a station that can charge electric vehicles (EVs) using intelligent and interactive features, such as cloud connectivity, dynamic pricing, load balancing, and vehicle-to-grid (V2G) services. The scope of this project is to design and implement a smart EV charging station that can optimize the energy consumption, cost, and reliability of the EV charging process, especially in the context of renewable energy integration and grid stability. The objectives of this project are to:

- Monitor and control the charging status, power level, and battery condition of the EVs using IoT devices and sensors, and send the data to a cloud server for analysis and visualization.
- Adjust the charging rate, price, and mode of the EVs based on the demand, supply, and price of the electricity, and the user’ s preference and behavior, using machine learning and optimization algorithms.
- Enable the bidirectional flow of electricity between the EVs and the grid, and provide ancillary services, such as frequency regulation, peak shaving, and voltage support, using V2G technology and smart grid communication.

The uses of this project are:

- To improve the user experience and satisfaction, and provide them with convenient, flexible, and affordable EV charging services.
- To reduce the environmental impact, operational cost, and human errors of the EV charging management, and increase the productivity and profitability of the business.
- To enhance the integration and utilization of renewable energy sources, and improve the resilience and stability of the power system.