

**“Domestic Waste Management”**

Batch Details

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Algorithm Details:

**Step 1: Geotagging Algorithm for Waste Reporting**

This step presents the implementation of a geotagging algorithm that enables accurate location tracking for waste accumulation reports. The algorithm utilizes GPS data extraction from mobile devices and integrates with mapping APIs for visualization. It ensures high precision through coordinate correction techniques and timestamp synchronization.

*Algorithm Workflow:*

1. User captures an image with a smartphone.
2. Extract GPS coordinates from EXIF metadata.
3. Validate the location data and correct inaccuracies.
4. Store geotagged data in the database.
5. Display waste reports on an interactive map.

**Step 2 : Real-Time Waste Reporting System Using REST APIs**  
This step discusses the REST API-based waste reporting system, which enables efficient data transmission between users and waste management authorities. The API framework follows a client-server architecture to ensure real-time updates.

*Key Algorithm Steps:*

1. User submits a waste report via the application.
2. REST API receives the request and validates inputs.
3. Data is processed and stored in the database.
4. API notifies the authorities through a push notification system.
5. Authorities respond with status updates, updating the client.

**Step 3: Task Assignment Algorithm for Waste Management Authorities**  
The system implements a dynamic task assignment algorithm that assigns waste clearance tasks based on priority and location. The algorithm employs a weighted decision model to optimize task allocation.

*Algorithm Details:*

1. Retrieve pending reports from the database.
2. Rank reports based on severity, location, and report age.
3. Match reports with available authorities using load-balancing techniques.
4. Assign tasks and notify the concerned department.
5. Track completion status and update the system.

**Step 4: Image Processing Algorithm for Waste Classification**

This paper explores an image recognition algorithm for classifying waste based on uploaded photos. The algorithm uses deep learning models, specifically CNN (Convolutional Neural Network), to differentiate between organic, recyclable, and hazardous waste.

*Workflow:*

1. Preprocess the uploaded image (resize, enhance contrast).
2. Apply a CNN model trained on waste images.
3. Classify waste into predefined categories.
4. Store classification results in the database.

5.Use classification insights for better waste management strategies.

**Step 5: Predictive Analytics for Waste Accumulation Patterns**  
The system incorporates a machine learning-based predictive model that analyzes waste accumulation trends. The algorithm utilizes historical data to forecast areas prone to high waste generation.

*Algorithm Steps:*

1. Collect past waste reports and geotagged data.
2. Apply data cleaning and feature engineering techniques.
3. Train a regression model to predict waste levels.
4. Validate predictions using cross-validation methods.
5. Provide insights to authorities for proactive waste management.