PDA College of Engineering

## Department of Computer Science and Engineering

SYNOPSIS OF THE PROPOSED MINIPROJECT (22CSMP56)

ON

# AI-BASED WASTE SEGREGATION SYSTEM

Submitted by

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## Under the Guidance of

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**Academic Year : 2025-26**

##### Department Vision Mission Statement

##### Vision

To become a premier department in Computer education, research and to prepare highly competent IT professionals to serve industry and society at local and global levels.

##### Mission

* To impart high quality professional education to become a leader in Computer Science and Engineering.
* To achieve excellence in research for contributing to the development of the society.
* To inculcate professional and ethical behaviour to serve the industry

### 

## Title

**AI-Based Waste Segregation System**

## Introduction

Waste management has become one of the major environmental challenges in modern cities. Improper waste segregation leads to pollution, health hazards, and inefficient recycling. Manual sorting is time-consuming, unsafe, and often inaccurate.

The AI-Based Waste Segregation System is designed to automatically classify waste into biodegradable, non-biodegradable, and recyclable categories using advanced image recognition techniques. By integrating computer vision and machine learning, the system identifies different types of waste items from captured images and directs them into the appropriate bins, promoting efficient recycling and sustainable waste management.

## Problem Statement

* Existing waste management processes rely heavily on manual labor and lack automation, resulting in:
* Inefficient sorting and contamination of recyclable materials.
* Health risks for workers handling hazardous waste.
* Increased environmental pollution due to improper segregation.
* Lack of scalability for large-scale waste processing.
* To address these challenges, an AI-driven waste segregation system offers an intelligent, fast, and contactless solution.

## Objectives

* 1. To develop a machine learning model capable of classifying different types of waste.
* 2. To automate the waste segregation process using image-based recognition.
* 3. To improve recycling efficiency and reduce manual labor.
* 4. To promote sustainable environmental practices through smart technology.

## Implementation Tools

* Programming Languages: Python
* Frameworks/Libraries: TensorFlow, Keras, OpenCV
* Hardware (Optional): Raspberry Pi with camera module for real-time classification
* Database: MySQL / MongoDB
* Frontend: HTML, CSS, JavaScript for dashboard visualization

### ● Programming Language

* Python