SORTING AND SEGREGATION OF WASTE MATERIALS USING COMPUTER VISION

Background:

Solid Waste Management is an universal issue and a need of the hour.

Currently, still many waste management practices involve open dumping which leads to problems like water pollution, land pollution and health hazards. Recycling is the biggest issue since most of the waste is non biodegradable and the biggest challenge we currently face is sorting and segregation in the recycling process.

UNEP reports suggest that so far, only 9% of all plastic waste produced after the 1950s was recycled, and the rest ended up either in landfills or in our environment. One such example is the Great Pacific Garbage Patch, a marine debris collection spot in the Pacific Ocean where several thousands of tonnes of ocean plastic are estimated to be floating on the surface. The concern is not just about plastic waste but it's about all the trash generated : metallic, e-waste, organic, textiles etc.

Problem Statement:

Many waste management facilities are facing an immense problem relating to recycling of waste without finding impurities (misclassified waste) , thus leading to high cost of waste processing and labour. Waste recycling becomes challenging if the waste products are not segregated. Recyclers have to setup methods to identify the waste recycling categories and it is often laborious process and time consuming.

The aim of this project is to find a way to segregate and categorise the waste to mitigate the problems mentioned above. With the help of computer vision, waste management facilities can build or implement robots that can detect the waste type based on product, shape, size, colour, etc. and automate the task of separation resulting in smart recycling. It is also expected to know the amount of a particular type of waste generation based on the modeling data and this can be utilized further to take correct actions by the authorities.

Goals

Our goal is to develop image recognition techniques to improve the sorting and segregation process of solid waste management. It comes under SDG goals of 3 (Good Health & Well Being), 6(Clean Water & Sanitation) and 11(Sustainable Cities & Communities).

- Collection of Data using WebScraping & creation of Image library
- Preprocessing the Image using Computer Vision
- Annotating images to reflect the correct category of waste

- Computer Vision Techniques to identify and classify different types of waste materials
- Deploying Dashboard and Visualisations to enable ML model open source
- Generate a report/presentation on findings

Project Timeline **(4-Weeks Challenge)**

Week 1	Week 2	Week 3	Week 4
- Finding data sources **- Collecting Images** **- Preprocessing images and preparing training/ testing/ validation sets** **- Determining classes/ labelling**	**- Labelling continued** **- Set preparation continued** **- Model Preparation** **- Model Pipeline**	**- Building a Classifier** **- Model Training and Testing** **- Assessing Deployment options**	**- Deployment Pipeline** **- Deploying model** **- Model Testing** **- Presentation Preparation**