RECYCLABLE ITEM DETECTION MODEL

Under the supervision

Of

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Chapter 1:Introduction

Recycling of solid waste is a big challenge around the world. Human activities result in a lot of solid waste, without sorting solid-waste there is a negative impact on the environment. Recycling of solid waste problem in developing countries, such as India, has a number of aspects related to them, such as technological, official, financial, environmental and communal aspects.

When people are throwing away something seemingly useless, they are often in doubt: Is this recyclable or not? Recyclable items are valuable material rather than trash. By reusing recyclable items, a huge amount of energy cost to manufacture new materials and to deal with waste can be saved to help sustain a greener living environment for us all. Many kinds of glass, paper, metal, plastic, textiles, and electronics are recyclable materials, and should not be put into trash bins where non-recyclable materials should stay. But can people memorize all that recycling knowledge? No. However, with the help of a specific software, images of items that will be thrown away can be processed by computer vision and classified by supervised machine learning methods, thus intelligently tell users the recyclability of their items without pain.

Chapter 2:Problem Statement and Feasibility Study

Problem Statement

Key challenges facing the recycling industry provide an opportunity to improve and create a responsible recyclable item detection model for the future that ensures the recycling of quality materials and limits the harm that can be done “downstream” from poorly sorted, problematic, or contaminated materials.

Datasets

There are no public datasets of images appropriate for deciding the recyclability of an item. I plan to collect hundreds of images to build a dataset. An image in the dataset contains one item, either recyclable or non-recyclable, and is properly labelled. Datasets will be enforced the following restrictions to improve the accuracy of identification. Image should be taken in a clear white blank background to ensure the item does not confuse with irrelevant objects.

Item must be entirely contained within the image.

Introduction to method

The main purpose of Recyclable item detection model is to detect the objects that are recyclable and can be used in a different form. An image will be captured by the camera and it will be compared with the images of the dataset. A test set and training set will be formulated which will contain photos of recyclable and non-recyclable products. The training set will be trained using ANN (Artificial neural network) and CNN (Convolutional neural network). To test it an input image will be uploaded and it will give the result. A prediction matrix (confusion matrix) will be generated which will give the accuracy of the model. It will be implemented using a live camera set i.e the laptop camera and it will be checked whether the result is correct or not. This model will be deployed on frontend (HTML and CSS, Flask) and make it live. The aim of this project is to make it usable worldwide.

Feasibility Study

* Sustainable development
* The model is user-friendly, reliable and flexible.
* Awareness regarding products
* Maintenance of the project is easy.
* Reduced manual work.
* Timely Re generation.

Above mentioned are some of the advantages of the proposed model, which makes the project workable and low maintenance.

Chapter 3: Hardware and Software Requirements

4GB Ram

Graphics card

Programming language Used: python

Presentation layer: HTML and CSS, flask

Network Layer: TCP/IP

Technology used: Anaconda, Machine Learning

Operating System: Windows

Chapter 4: Workload Matrix

Title Name Time (in hours)

|  |  |  |
| --- | --- | --- |
| CNN / ANN | Dev, Harshit, Nowsheen | 7 - 8 |
| Flask | Dev | 4 |
| Data Pre-Processing | Nowsheen , Dev , Harshit | 6-7 |
| HTML/CSS | Harshit | 4 |
| Dataset Creation | Nowsheen | 2 |

Total Time = 30 approx (including studying and testing)

REFERENCES

1. <https://keras.io/>
2. <https://towardsdatascience.com/introduction-to-artificial-neural-networks-ann-1aea15775ef9>
3. <https://www.udemy.com/course/machinelearning/>

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| **S.NO.** | **G.No.** | **Student Name** | **Project Tittle** | **Guide Allotted** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
|
| 1. | 12 | Dev Gaur | Recyclable Item  Detection | Mrs. Charu  Gupta | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 3 | 2 |
| 2. | Harshit Abrol | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 |
| 3. | Nowsheen Ishtiyaq Mufti | 3 | 3 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Percentage:** 80.7% **Guide Signature:** Mrs. Charu Gupta

**Student Signature:** Dev Gaur, Harshit Abrol, Nowsheen Ishtiyaq Mufti