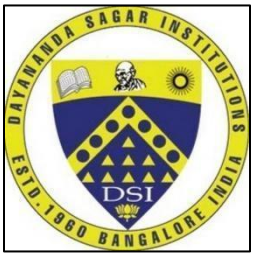


## DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

**DAYANANDA SAGAR COLLEGE OF ENGINEERING**

*AN AUTONOMOUS INSTITUTE AFFILIATED TO VTU*
*APPROVED BY AICTE & UGC, ACCREDITED BY NAAC WITH 'A' GRADE, ACCREDITED BY NBA.*

**Project Synopsis**

**on**

# Computer Vison based Waste Identifier

**Submitted as a part of the First year (Second Semester) Mini- project of**

**BACHELOR OF ENGINEERING**

**in**

**INFORMATION SCIENCE AND ENGINEERING**

***Submitted by***


| | |
|---|---|
| **1DS22IS002** | **AADYA SRIVASTAVA** |
| **1DS22IS008** | **GRESHA JAIN** |
| **1DS22IS053** | **ADITYA SINGH** |
| **1DS22IS125** | **SAHAJ GUPTA** |


***Under the guidance of***

**Mrs. Bhavani K**

**Asst Professor, *Dept. of ISE, DSCE***

**2022-2023**

| | |
|---|---|
| **TITLE OF THE PROJECT** | Computer Vison based Waste Identifier |
| **PROJECT TIMELINE (Tentative Start and End Date)** | **June-September 2023** |
| **FIELD OF PROJECT** | Artificial Intelligence, Machine Learning |
| **OBJECTIVE OF THE PROJECT** | The objective is to accurately detect and classify different types of waste using visual information |
| **PROBLEM STATEMENT** | Current waste management practices rely on manual sorting methods and inaccurate waste identification with Limited recycling optimization. Also Poor waste management practices contribute to soil and water contamination. Hence there is a requirement for an automated system that can accurately identify and suggest waste management. |
| **INTENDED BENEFICIARIES OF THE PROJECT** | Municipalities, Environmental organizations, Communities, and future generations |
| **BASE PAPERS/ RELATED WORK** | **1.** AI explainability framework for environmental management research<br>**2.** Artificial Intelligence (AI) applied to waste management: A contingency measure to fill out the lack of information resulting from restrictions on field sampling<br>**3.** Automated segregation and microbial degradation of plastic wastes: A greener solution to waste management problems |
| **SOFTWARE/HARDWARE REQUIREMENTS** | **Software Requirements:**<br>**1. Programming Language:** Python (with libraries such as OpenCV, TensorFlow, or PyTorch for computer vision tasks)<br>**2. Integrated Development Environment (IDE**): PyCharm, Anaconda, or Jupyter Notebook.<br>**3. Image processing and manipulation tools:** Libraries like PIL (Python Imaging Library) or scikit-image.<br><br>**Hardware Requirements:**<br>1. Computer<br>2. Graphics Processing Unit (GPU)<br>3. Camera or Image Input Device |

**BACKGROUND OF PROJECT WITH REGARD TO THE DRAWBACK ASSOCIATED WITH EXISTING PROJECT:**

**1. Manual sorting limitations:** Existing waste management practices rely heavily on manual sorting, which is time-consuming, labour-intensive, and prone to errors, resulting in inaccurate waste classification.

**2. Inefficient disposal methods:** Traditional waste disposal methods often lack efficiency and proper segregation, leading to environmental pollution and increased landfill usage.

**3. Environmental impact:** Improper waste management has significant environmental consequences, including soil and water contamination, greenhouse gas emissions, and depletion of natural resources.

**4. Resource wastage:** Without accurate waste identification, valuable resources present in the waste stream, such as recyclable materials, are often lost or improperly handled, leading to unnecessary resource wastage.

**5. Need for automation:** The project recognizes the need to automate waste identification and sorting processes using computer vision technology to overcome the limitations of manual methods and enhance waste management efficiency and sustainability.

**ABSTRACT:**

The project "Computer Vision-based Waste Identification" aims to develop an intelligent waste management system using computer vision technology. By accurately detecting and classifying different types of waste, the project seeks to improve waste sorting processes, optimize recycling operations, promote responsible waste disposal practices, and contribute to environmental sustainability.

**PROJECT METHODOLOGY:**

1. **Data Collection:** Gather a diverse dataset of waste images, including various types of waste commonly encountered in real-world scenarios.

2. **Preprocessing:** Apply image processing techniques to enhance image quality, remove noise, and standardize the dataset for analysis.

3. **Training the Model:** Utilize deep learning algorithms, such as convolutional neural networks (CNNs), to train the computer vision model using the annotated dataset.

4. **Model Evaluation:** Assess the performance of the trained model by evaluating its accuracy, precision, recall, and other relevant metrics using a separate validation dataset.

5. **Integration and Deployment:** Integrate the trained model into an application or system that can process real-time input from cameras or images, enabling the identification and classification of waste items. Deploy the system for practical use in waste management scenarios.

**REFERENCES:**

**1.** Mehrdad Arashpour, AI explainability framework for environmental management research, Journal of Environmental Management, Volume 342, 2023, 118149, ISSN 0301-4797, DOI: https://doi.org/10.1016/j.jenvman.2023.118149.
(https://www.sciencedirect.com/science/article/pii/S0301479723009374)

**2**. Igor Pinhal Luqueci Thomaz, Claudio Fernando Mahler, Luiz Pereira Calôba, Artificial Intelligence (AI) applied to waste management: A contingency measure to fill out the lack of information resulting from restrictions on field sampling, Waste Management Bulletin, Volume 1, Issue 3, 2023, Pages 11-17, ISSN 2949-7507, DOI: https://doi.org/10.1016/j.wmb.2023.06.002.
(https://www.sciencedirect.com/science/article/pii/S2949750723000111)

**3.** R. Anitha, R. Maruthi, S. Sudha, Automated segregation and microbial degradation of plastic wastes: A greener solution to waste management problems, Global Transitions Proceedings, Volume 3, Issue 1, 2022, Pages 100-103, ISSN 2666-285X, DOI: https://doi.org/10.1016/j.gltp.2022.04.021.
(https://www.sciencedirect.com/science/article/pii/S2666285X22000577)

Name and Signature of the Students

Signature of Guide with date

**Project Coordinators**

**HOD-ISE**