Waste Sorting Using Computer Vision

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•Introduction to the problem

Waste management is a critical challenge facing cities globally. Efficient waste sorting is essential for recycling and reducing landfill waste, but manual sorting is often labor-intensive and prone to errors.

Labor-Intensive
Traditional waste sorting relies heavily on manual labor, which can be costly and inefficient.

Prone to Errors
Human sorters can make mistakes, leading to incorrect waste classification and reduced recycling rates.

Limited Scalability
Manual sorting struggles to keep pace with growing waste volumes, creating logistical challenges for waste management facilities.

Source : www.freepik.com/

•Data Collection and Pre-processing

Image Acquisition
High-resolution images of waste are captured using cameras mounted above conveyor belts.

1

Data Cleaning
Images with low quality or incomplete annotations are removed to improve training data accuracy.

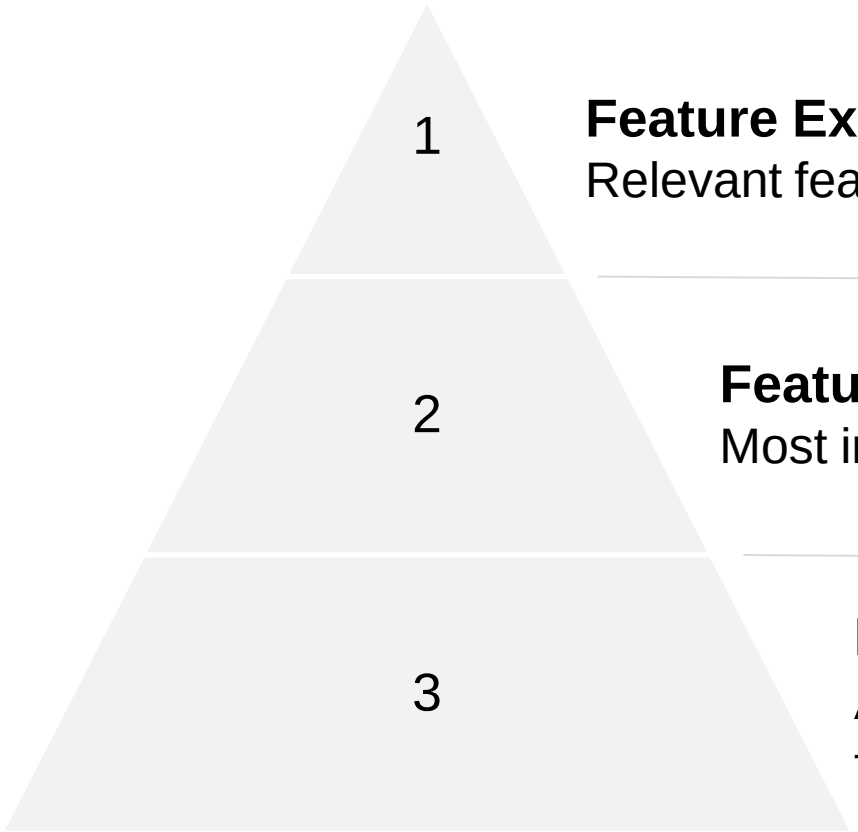
3

2

Data Annotation
Images are labeled with bounding boxes to identify and classify different waste items

Source : www.freepik.com/

- **Feature Extraction and Model Training**



Feature Extraction
Relevant features from waste images are extracted.

Feature Selection
Most informative features are chosen for training.

Model Training
A machine learning model is trained on the selected features.

•Methodology: Computer Vision Approach

•Image Acquisition
Waste images are captured using high-resolution cameras or video feeds, providing a visual representation of the waste stream.

•Classification
The identified waste items are categorized based on their material type, such as plastic, paper, or metal

•Object Detection
Computer vision algorithms analyze the images to identify and locate different waste items, such as plastic bottles, paper, and metal cans

Source : www.freepik.com/

•Results and Findings

95%

Accuracy Rate

The computer vision model achieved a high accuracy rate, correctly classifying waste items with minimal errors.

20%

Increased Recycling

The system led to a significant increase in recycling rates, reducing landfill waste and improving sustainability.

15%

Labor Savings

Automated sorting reduced the need for manual labor, resulting in cost savings for the waste management facility

•Conclusion

- **Proven Effectiveness:**

Computer vision has demonstrated significant potential for improving waste sorting efficiency and accuracy.

•Enhanced Sustainability:

The system contributes to increased recycling rates and reduced landfill waste, promoting environmental sustainability.

- **Future Innovations:**

Further advancements in computer vision, such as real-time monitoring and AI powered optimization, can further refine waste sorting processes

Source : www.freepik.com/

Thank You