A Review of Awareness of Waste Recycling based on Web Application

Prachi Hirachand Nikhare[1], Vijeta Sadanand Bokde[2], Ankita Prakash Kango[3],

Shravani Sanjay Dandekar[4] , Prof. Geeta Nikude[5]

[1-4]*BE Computer Science & Engineering & Govindrao Wanjari College of Engineering & Technology, Nagpur*

[5]*Professor. Computer Science & Engineering & Govindrao Wanjari College of Engineering & Technology, Nagpur*

---***--

Abstract - Recycling is as of now a critical work for all nations. Among the turn out required for Recycling, trash arrangement is the most crucial stage to empower cost-proficient Recycling. In this paper, we endeavor to recognize single trash object in pictures and order it into one of the Recycling classes. We concentrate on a few methodologies also, give extensive assessment.

Key Words: Recycling waste, Garbage classification.

1. INTRODUCTION

The world produces something like 3.5 million tons of waste each day and this number is as yet expanding step by step that is the reason we want to mindful about squander. The rising urbanization of India acts such countless dangers like with expansion in populace land utilization increments, utilities builds, utilization of food expands, utilization of assets increments and more than these the amount of waste created by 1.37 billion individuals increments. Squander the executives framework is quite difficult for metropolitan regions among most pieces of nations everywhere. An enormous nature of trash is expanded every single day in India. It is miserable to know that 5% of this enormous measure of trash is reused. The main answer for this issue is to distinguish and characterize the trash at the underlying stage without anyone else. The legitimate detachment cycle of waste is overseen to get less measure of dangers on our wellbeing and environment. By and by there is no best and productive framework for order of squanders. Our point is to decrease the actual endeavors and really isolate the waste.

2. BACKGROUND

The world generates at least 3.5 million tons of waste per day and this number is still increasing day by day that's why we need to aware about waste.

This web application can classify waste with different types of waste materials and it will show you the details of that particular waste materials and also will show you the waste materials related videos. This will help to raise awareness for people to reduce and recycle waste.
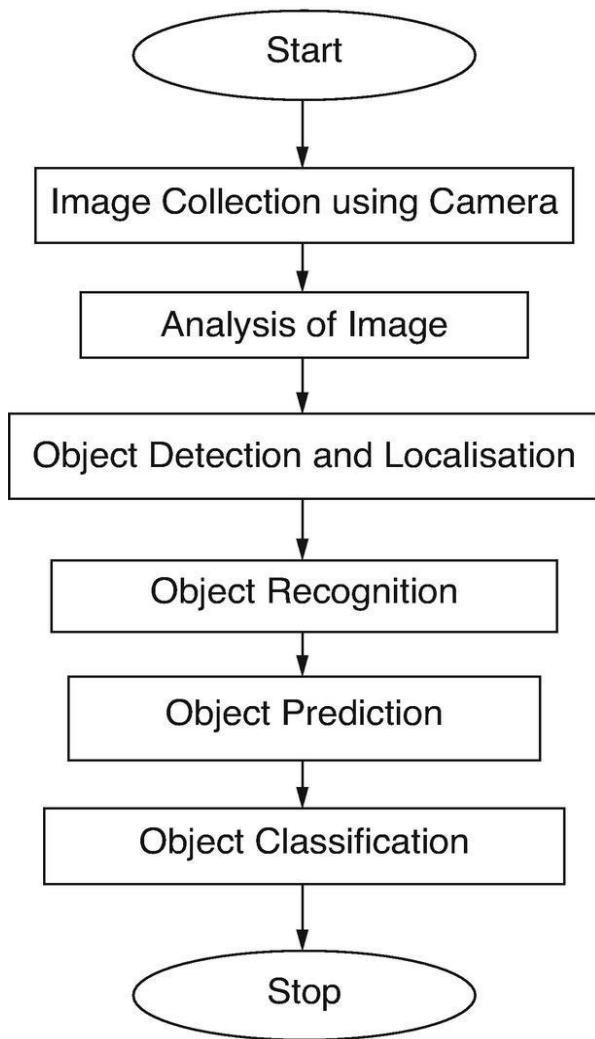
Fig. 1., Automatic Classification of Solid Waste Using Deep Learning

3. LITERATURE SURVEY

This project is had been an interesting topic to work on. This project is basically a web application which means self-contained software reason the system on which it had been installed under the user control and it will work for a particular image.

This application is built for automatic processing of classifying waste material. It also helps to finding waste material.

https://www.researchgate.net/publication/236853189_Environmental_awareness_and_paper_recycling

https://www.researchgate.net/publication/269520226_Awareness_Attitude_and_Practice_of_School_Students_towards_Household_Waste_Management

https://www.nature.com/articles/s41598-020-79688-y

4. THE RECYCLING PROCESS

I. Collection Of Waste Materials And Processing

Waste materials are collected through drop-off centers, curbside collection, deposit or refund programs. The waste materials are then transported to a materials recovery facility or recycling centers where they are sorted out, cleaned and processed into ideal materials for manufacturing. The recyclable waste materials can be bought and sold the same way raw material would be. The prices fluctuate depending on demand and supply throughout the country.

II. Manufacturing

Manufacturing is where the processed waste materials are converted into useful products. Many products in the modern day are manufactured using recycled waste materials. Common products manufactured using waste materials include paper towels, newspapers, steel cans, soft drink containers made of plastic glass and aluminum and plastic laundry detergents.

III. Dissemination of manufactured products to the market

The finished recycled product is then made available on the market. You can be part of waste reduction campaigns by purchasing products made from recycled materials. It's pretty easy to pinpoint products of recyclable material because the words are plastered on the labels. Recycling has a plethora of advantages to humans and environments. Surprisingly, the whole process of recycling comes along with some shocking impacts unknown to a lot of people.

5. Advantages of Recycling

I. Recycling minimizes pollution

All forms of pollution in the modern world emanate from industrial waste. Recycling of these industrial wastes such as plastics, cans, and chemicals go a long way towards considerably cutting back on

levels of pollution because these waste products are reused rather than just being thrown away recklessly.

II. Protects the environment

The great benefit of recycling waste material is that it plays a big part in protecting Mother Nature in the most balanced way. While many trees are felled every day, recycled paper manufactured from specific trees is continually utilized to reduce deforestation.

This classic example demonstrates that other natural resources can be recycled and made useful this way to conserve the environment.

III. Recycling minimizes global warming

It is perfectly true that recycling minimizes global warming and its grave impacts. During waste disposal, huge amounts of waste have combusted that lead to the emission of vast greenhouse gases such as carbon dioxide, sulfur, and nitrogen, which contribute to climate change and global warming.

The recycling process involves minimal combustion and waste is transformed into reusable materials with zero or minimal harmful impact on the environment.

The whole process of processing and manufacturing products from waste materials emits few greenhouse gases because the waste recycling industries burn little fossil fuels.

IV. Conserves natural resources

If the process of recycling used and old materials was not there, it means new products will be manufactured by the extraction of fresh raw materials underneath the earth through the process of mining and extraction.

Recycling is a surefire way of conserving existing raw materials and protecting them for future use. Taking steps to conserve natural resources like minerals, water, and wood ensure sustainable and optimal use.

V. Recycling cuts down the amount of waste in landfill sites

Recycling old and used materials into reusable products enormously reduces the possibility of choking of landfill sites. This is beneficial because it helps minimize land and water pollution.

Since landfills contribute mightily to environmental degradation, less landfill and waste littering ensures the less erosion of the topmost fertile soil. As wastes are saved from being dumped in the ocean, aquatic biodiversity is also maintained.

VI. Recycling ensures sustainable use of resources

Recycling guarantees that existing resources will be used sensibly and sustainably. The recycling process alleviates the possibility of discriminate use of raw materials when they are obtainable in huge supply.

Governments these days have stepped in to encourage recycling from lower levels, for instance, schools, small-sized organizations and also at global levels.

This means that manufacturing industries can leave existing natural resources for exploitation by our children in the future without affecting current production.

VII. Recycling contributes to the creation of jobs

To add to the benefits it brings to the environment, recycling opens up job opportunities. Recycling means many recycling plants will be set up, thus, leading to a long chain of collection and delivery. All these activities are performed by humans, so this will also trigger an explosion of opportunities.

VIII. Reduces energy consumption

A lot of energy is used to process raw materials in the course of manufacture. Recycling plays a big role in reducing energy consumption, which is vital for large-scale production, for instance, mining and refining.

Recycling also renders the whole process of production less expensive, which is a great victory for manufacturers.

IX. Recycling helps to make and to save money

Electronics, old water bottles, and other trash can be sold for cash. So if you sell trash, you not only save the environment but make money in exchange.

If you buy recycled materials, they are less expensive, and you will also save money. If you reuse some of the trash that your home produces, you will make and save more money.

X. Recycling spreads environmental awareness

Recycling is just the beginning of a revolution that will help preserve the planet for our future generations. With calls for sorting waste into biodegradable, non-biodegradable and recyclable, people become aware of recycling while reducing environmental impact.

When everyone becomes accustomed to recycling, people will be more eco-conscious and will participate in more eco-friendly activities.

XI. Recycling can reduce allied activities needed for the production of fresh products

Industries are the biggest producers of greenhouse gases and pollution. If the need for fresh materials is lessened due to recycling, there will be a lesser need for allied activities that usually make huge environmental impacts like mining and transportation.

XII. Recycling of organic matter

Recycling of organic matter leads to the generation of valuable compost, which serves as plant fertilizer. "Even when all actions have been taken to use your wasted food, certain inedible parts will still remain and can be turned into compost to feed and nourish the soil," the EPA says with regards to food waste scraps and yard waste. "Composting these wastes creates a product that can be used to help improve soils, grow the next generation of

XIII. Innovations drive scientific advancements

Scientific advances are producing less natural resource-intensive products making it easier to recycle numerous products. New sorting technologies can identify grade and type of plastic, automatically speeding up the process of the work to reduce landfill content.

A new polymer can be added to both polyethylene and polypropylene that creates a tough new plastic to recycle the second time easily.

6. PROPOSED WORK

The garbage collection in India still depends on unorganized collection of waste. The segregation process is still handled by mankind which has many health issues, time consuming, costly and less effective. In the existing system, all the garbage collected from households and industries was dumped on the outskirts of towns and cities. Due to uncontrolled dumping of waste, it gave rise to the problems like overflowing landfills but also contributed a huge amount in terms of ground waste pollution and Global Warming. A new concept uses deep learning algorithms to segregate the waste at initial level thus making waste management more powerful. The designed method sorts the waste into different categories with higher accuracy. This study reviews the best and effective approach to segregate the garbage into different types. The proposed method mainly focuses on identification and segregation of waste by using deep learning algorithms like convolution neural networks (CNN) Usually, all the toxic wastes are dumped with recyclable waste which causes huge damage to land. This project proposes an idea where to segregate the toxic waste with higher accuracy.

• This method work in different phrases which are as follows:

A. Capturing of images

B. Collection of datasets

C. Pre-processing of images

D. Training data

E. Testing data

F. Evaluation of model

G. Model Deployment

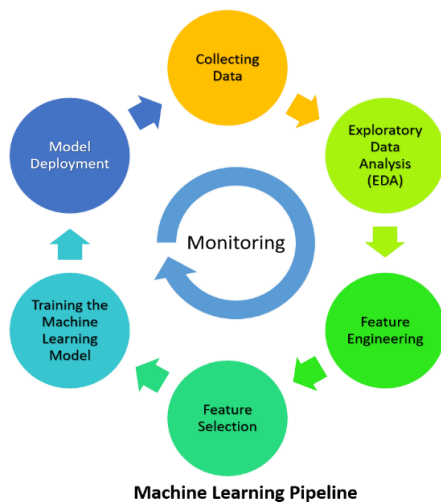
Machine Learning Pipeline

Fig. 2., Machine Learning Pipeline

7. AIMS & OBJECTIVE

Promote the principles of ecologically sustainable development.

Protect, restore and enhance the quality of the environment.

Regulate all aspects of waste management, and activities and products that cause environmental harm through the production of waste (see what and why we regulate).

The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health and the environment to support economic development and superior quality of life.

Waste classification can reduce the cost of terminal waste disposal and improve the efficiency of the overall disposal process, as well as prevent harmful substances from polluting water and land resources, effectively avoiding landfill or incineration pollution.

garbage classification and collection can reduce the amount of garbage disposal and treatment equipment, reduce the treatment cost, reduce the consumption of land resources, and have social, economic, and ecological benefits.

Waste segregation is included in law because it is much easier to recycle. Effective segregation of wastes means that less waste goes to landfill which makes it cheaper and better for people and the environment. It is also important to segregate for public health.

8. BENEFITS OF RECYCLING

- Reduces the amount of waste sent to landfills and incinerators.
- Conserves natural resources such as timber, water and minerals.
- Increases economic security by tapping a domestic source of materials.
- Prevents pollution by reducing the need to collect new raw materials.
- Saves energy.

9. FUTURE SCOPE

This project indeed has a very vast scope not only in India but Globally too because the project is very effective in segregating the waste this segregation will finally lead to protecting our environment and people's health which is major problem in today's world
Project can be further improved in many ways

A: It is obvious that after a certain period of time the bin will get full. Using modules such as wifi and proximity sensors etc. the data that bin is filled completely can be sent to the concerned authority who can then be alerted to see and empty the bin.

B: Work can also be extended in introducing a robot in the bin which automatically dumps the bin when it finds it to be full.

10. CONCLUSIONS

Saves Energy, Reduces Pollution, and Preserves Landfill Space.

In conclusion, we proposed a waste classification system that is able to separate different components of waste using the Machine learning tools. This system can be used to automatically classify waste and help in reducing human intervention and preventing infection and pollution. to improve our system to be able to categories more waste item, by turning some of the parameters used.

REFERENCES

1. S. Meng and W. -T. Chu (2020), "A Study of Garbage Classification with Convolutional Neural Networks," 2020 Indo – Taiwan 2nd International Conference on Computing, Analytics and Networks (Indo-Taiwan ICAN), Rajpura, Punjab, India, 2020, pp. 152-157, doi: 10.1109/IndoTaiwanICAN48429.2020.9181311

2. H. Wang (2020), "Garbage Recognition and Classification System Based on Convolutional Neural Network VGG16," 2020 3rd International Conference on Advanced Electronic Materials, Computers and Software Engineering (AEMCSE), Shenzhen, China, 2020, pp. 252-255, doi: 10.1109/AEMCSE50948.2020.00061.

3. He, Kaiming & Zhang, Xiangyu & Ren, Shaoqing & Sun, Jian. (2016). Deep Residual Learning for Image Recognition. 10.1109/CVPR.2016.90, pp. 770- 778.

4. M. R. Guedira, A. E. Qadi, M. R. Lrit and M. E. Hassouni (2017), "A novel method for image categorization based on histogram oriented gradient and support vector machine," 2017 International Conference on Electrical and Information Technologies (ICEIT), Rabat, 2017, doi: 10.1109/EITech.2017.8255229, pp. 1-5.

5. C.CHANG (2018), "Garbage Classification." Kaggle, 2018, doi:10.34740/KAGGLE/DS/ 81794.

6. G Mittal, K B Yagnik, M Garg, and N C Krishnan (2016), Spot Garbage: Smartphone App to Detect Garbage Using Deep Learning, ACM International Joint Conference on Pervasive and Ubiquitous Computing, pp. 940-945

7. A. Mikołajczyk and M. Grochowski (2018), "Data augmentation for improving deep learning in image classification problem," 2018 International Interdisciplinary PhD Workshop (IIPhDW), Swinoujście, 2018, pp. 117-122, doi: 10.1109/IIPHDW.2018.8388338.

8. M. Yang and G. Thung (2016), "Classification of Trash for Recyclability Status," Stanford University, CS229, 2016. [Online].