Hackmsit

Team name : ENIGMA

Team members :

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Theme : Waste Management

Idea And Plan Of Action

What is waste management?

Waste management is all of the activities that handle waste materials, from the time it is made to its disposal. This includes how your business collects, transports, processes, recycles or disposes its waste.Managing what you waste in your business can equate to lost opportunities or profits.Waste management is about being more efficient with raw materials and making the most of each stage of the production process.

Why is managing waste important?

The most important reason for proper waste management is to protect the environment and for the health and safety of the population.

Certain types of waste can be hazardous and can pollute the environment. Bad waste management practices can also cause land and air pollution which can result in serious medical conditions in humans and animals.

Implementing good waste management practices not only helps to protect the environment but can be beneficial to your business.

- **It can enhance your business' reputation** – take a busy restaurant as an example. Would you go there if it had garbage piling up, or food scraps left lying around? Or would you support that same restaurant if it had a policy of donating leftover food to a charity for the homeless?
- **Energy efficiency** – have you thought of how you could use waste products as a combustion fuel for things such as cooking or heating?
- **Cost savings** – managing the waste your business produces can result in valuable materials to reuse. This can save you money while potentially creating new jobs and business opportunities.
- **Resource recovery** – reducing, reusing and recycling your waste is important for the environment, and it can also be profitable. It decreases the amount of waste for disposal, saves space in landfills, and conserves natural resources.
- **Workplace safety** – storing and disposing your rubbish in the wrong place can be harmful to employees or customers. If you work with sharp objects, dangerous fumes and chemicals, you will need special procedures for how you dispose of them.

Our field of work

Waste management is a serious issue in today's world.Indian people do not segregate garbage so it becomes difficult to recycle the reusable products as they are not educated enough and or are too ignorant to do so.Recyclable items end up in landfills which pollute our environment and biodegradable items which we can use as manure dumped out unused.

SCOPE:

Since reusable objects are not being recycled, new items need to be manufactured to fulfil the needs of the population. Manufacturing of these new products leads to increased pollution. These products again end up in dumps and contribute to the pollution.

PROJECT BRIEF :

- We will first segregate garbage into biodegradable and non biodegradable category based on their image. The non-biodegradable garbage will be further segregated into plastic, metal, glass and miscellaneous categories.

- To achieve this objective we will be using labelled garbage dataset provided online and also further improve it by supplementing it with our own localised dataset(images of garbage items from home).
- We will be using python language to implement this idea. Pandas, numpy, sklearn and keras are some of the modules that will be required to implement this project. Other than this, OpenCv module will also be required to preprocess the images. The images will then be converted into a matrix of RGB values of each pixel. This matrix will act as input for our machine learning algorithms.
- The machine learning algorithms that we would use in our project are SVM and neural networks because of their high accuracy and versatility in detecting objects in images and classifying them. Specifically we would be using Convolutional Neural Networks and Residual Neural Network

Project Enhancements:

- We can increase our dataset by using more diverse images. This will help in improving the accuracy of our model.
- Improved machine learning algorithms can be used in the future as the technology progresses.
- Feedback from users will also help to better classify the garbage items.
- The software can be supplemented by designing a hardware prototype in the form of a dustbin which automatically disposes off garbage in the respective container by taking live images of the garbage item.
- When applied to a hardware model, the model can send data to cloud server where it can be analysed how much of metal/plastic/paper etc is collected and when it is about to get full, send data to worker to empty the bin.

Benefits of segregation

Waste is not something that should be discarded or disposed of with no regard for future use. It can be a valuable resource if addressed correctly, through policy and practice.

- The biodegradable garbage can be used to build manure and provided as subsidy for farmers.
- Energy recovery from waste is the conversion of non-recyclable waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolyzation, anaerobic digestion, and landfill gas recovery.Poor section of society can be uplifted by fulfilling their energy requirement needs .
- The segregated non biodegradable garbage can be recycled and hence reduces burden on the environment by eliminating carbon emissions which would otherwise be produced during the manufacturing of new products.
- Instead of just 2 dustbins present in today's time for bio and non bio at public places, instead create 1 single bin powered by solar energy which segregates the waste using our software.
- In hardware implementation segregating garbage is good because sometimes garbage bins contain sharp glass pieces, sharp nails, etc so it is also harmful for the garbage collectors who might get hurt. Therefore, with our garbage collector will aware of hurtful things.

FUTURE USE:

- The problem of waste will always be a problem and with the increasing production of electronic devices, this problem will only get more complex due to the huge electronic waste generated.
- Managing resources will be key to sustainable development.
- With the advent of smart cities, requirement of a good waste management will only increase.