Demeter – The Organic Recycler

Recycle. Reuse

Project Synopsis

Topic: Waste Management

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Introduction-need for the product:

There is dire need to process the waste in an efficient manner. Biodegradable green waste and kitchen waste is important among them. These wastes generate about 8 per cent of global greenhouse gas emissions. Wasting a kilogram of wheat and rice would mean wasting 1,500 and 3,500 litres of water respectively that goes into their production. Therefore there is a need to convert all these waste in a very effective manner.

Kitchen waste and degradable green waste can be converted to useful organic manure. This process of conversion organic waste into organic manure is called Organic Recycling, which is domestically done through composting method. Composting process is natural process, which is done by the microorganism in the waste and is time consuming. This process can be fastened by introducing the waste into machines that fasten the work of the microbes by providing optimal condition for the conversion.

Existing Methods of dealing with Green waste

- Compost Pits: Pits are filled with the waste and allowed to decay.
  Disadvantage: Results in foul odor.
  Is a slow process and takes lot of space.
- Incineration: The Wastes are burned at high temperature to convert them into residues.
  Disadvantage: Expensive and requires skilled staff.

Objective of the product:

The product name '**Demeter**' means the Goddess of agriculture.

The proposed work of the product is to convert the organic waste into organic manure. This is achieved through sequential processing of waste through Shredder and hot air inducers. Inducing hot air fastens the process by providing the optimal condition for conversion and increases the effectiveness of the manure produced. The machine is interfaced with an **Android App** connected to the Cloud (AWS). With **IOT** we are able to switch the machine on and get its status.

Abstract:

In Today's Era of Mechanization, Automated machines are the need of the hour as they handle numerous activities not only easily but also efficiently. These machines require minimal human intervention. Demeter is one such machine that converts the green waste to organic manure. The prototype is designed such that it is user friendly and easy to handle. Demeter converts the green waste given as input to organic manure through sequential procedure of shredding, mixing, heating, enzyme induction. The time duration for each process is maintained through a predefined program.

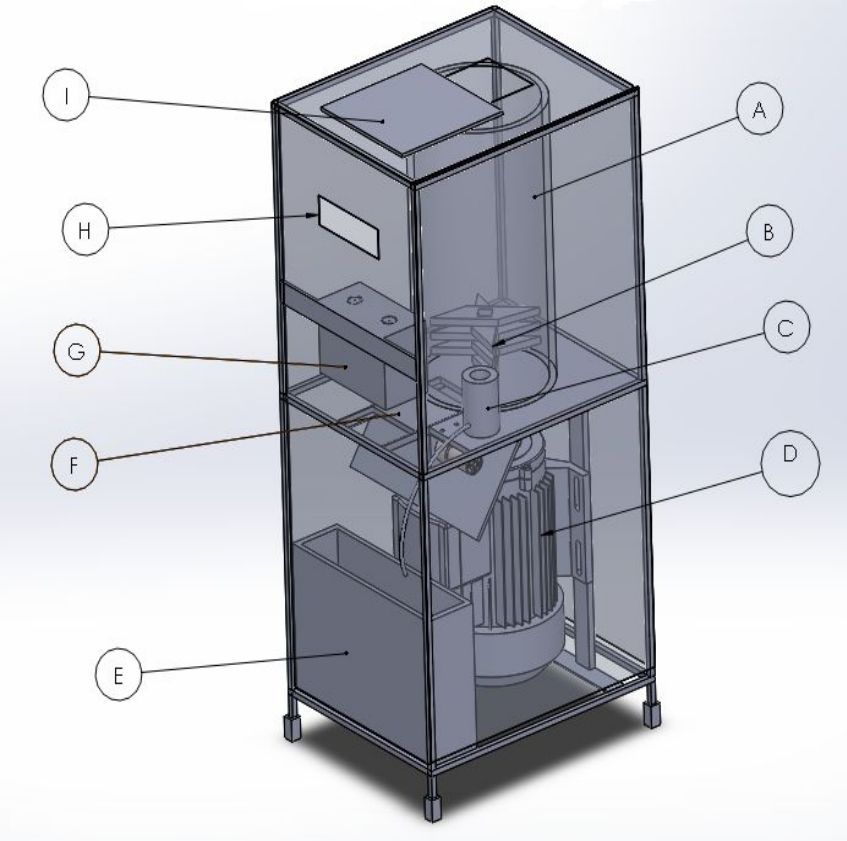
Potential customers of the Product:

- The Product can be used by a wide variety of people and finds its use in almost every field.
- Household: The machine can be used in households to get homemade manure for the plants with the waste that is produced everyday.
- Farmers, Gardeners: They can have their own manure for the plants, Cutting down the extra expense incurred in buying the fertilizer
- Hotels, Hostels, Canteens.

About Demeter:

- The machine is provided with a compartment for Shredding where the blades are fit. The processed waste is then introduced with culture and heat.
- Wi-Fi module – ESP8266 is used to connect the Machine to Cloud. The Progress is sent as input to the cloud from where it is captured by the Android application.
- Android App to switch the machine on and to get its progress at regular interval.
- The model is compact and can fit easily into kitchens.
- The Product is easy to Operate and easy to maintain.

The Product:



A-Mixing bin: Cylindrical enclosure made up of mildsteel for shredding mixing

B-Cutting blades: Made up of stainless steel, ensure effective shredding and mixing.

C-Culture Compartment: Culture/Enzymes required for efficient conversion is added here.

D- Motor: Turns cutting blade to process waste.

E- Output Compartment: The manure is collected here.

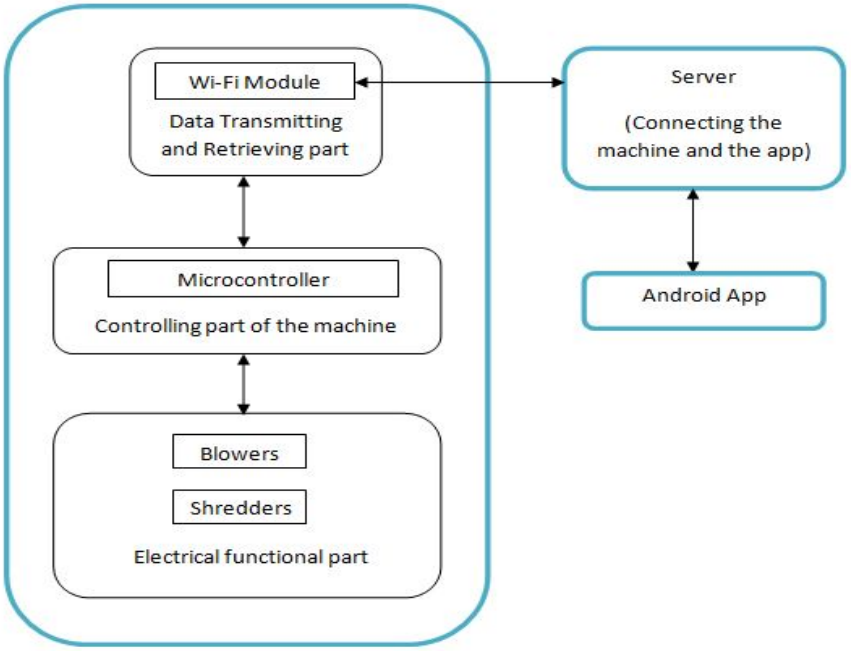
F- Sliding plate: Innovative gear driven method to transfer the contents to the next compartment.

G-Heater: Provides the Heat required for the manure production.

H-LCD Display: For easy understanding of the process going on in the Machine.

I-Sliding Lid: Seals off the Mixing Bin when waste is not added.

Product Architecture:



Product Specifications:

Mechanical	**Electrical**
Height: 550mm Length: 400mm Breadth: 300mm	Voltage: 4.8 to 5.2 V
Weight: 20kg	Power supply AC: 220 V
Skeleton material: mild steel	Power supply DC: 9V
Mixing motor rpm-2880	Torque DC motor: 150 rpm
Heater rating-1000 W	

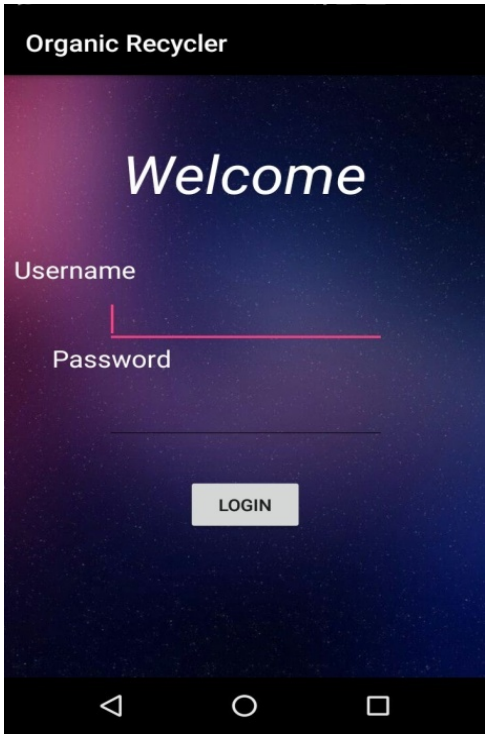
Android App for machine interfacing:

An Android Studio Application was designed for this project:

- To Switch ON the machine: The App sends signal to the AWS cloud which is read by the microcontroller and the machine is turned on.
- To get the Progress of the Machine: The Microcontroller sends data to the cloud during the process, which is read by the App and displayed.
- An About Device Screen which briefly explains about the different processes happening in the machine.
- Help and Support Section to get in contact with the makers.

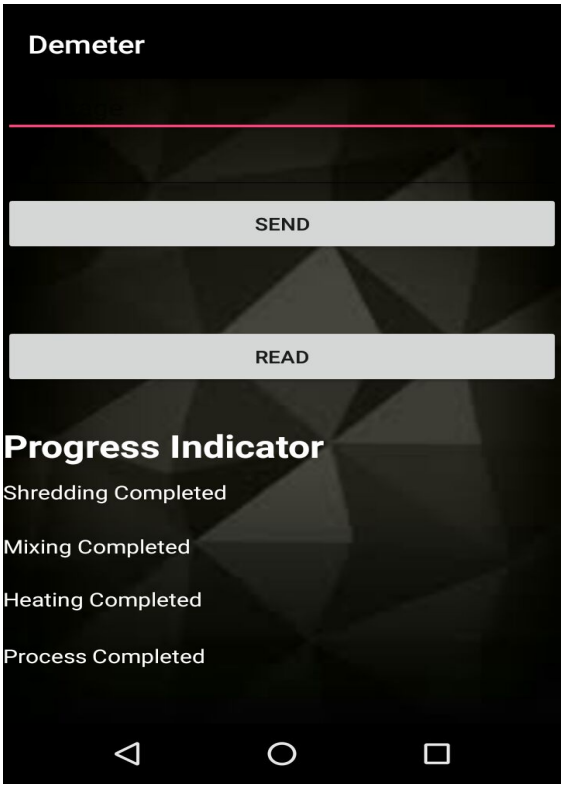
On the launch of the application, the user has to enter his/her credentials which is matched with the ones present in the database .If the Authentication is Successful, the user is guided to the next Screen.

Login

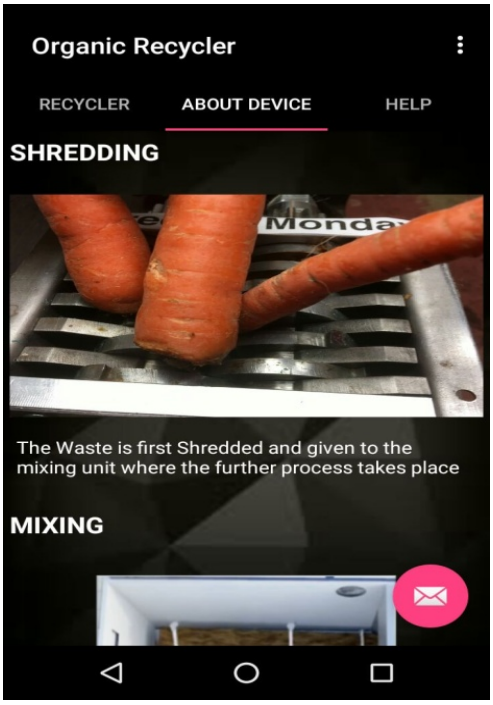


Switch the machine on

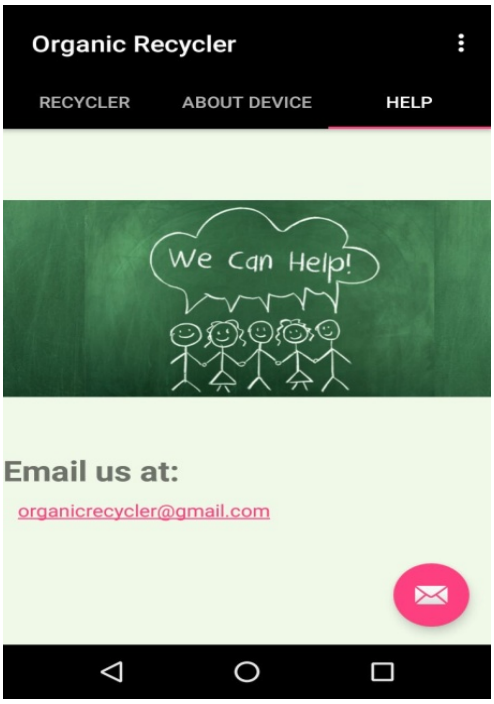
Progress Indicator



About the device



Help



The Final Product: