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Metal and Non Metal Segregator

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***Abstract**:*
Smart metal and non-metal segregators have applications in manufacturing and industrial settings to separate different types of metals and non-metals. We propose the design and development of a smart segregator that uses Arduino, a popular microcontroller platform, to sort metals and non-metals based on their physical properties. The segregator is equipped with sensors and machine learning algorithms that can recognize different materials and sort accordingly. We demonstrate the performance of the segregator in separating metals and non-metals from mixed streams, and discuss its potential applications in manufacturing and industrial processes. Our planet's resources are not infinite, so it is important to avoid wasting our planet's natural resources. so it is imperative that the metal be reused. Waste sorting is very important in today's modern society as the demand for minerals is increasing at a rapid rate. Landfills are full, it takes a lot of energy to extract minerals and produce minerals, so minerals should be used sparingly and recycled. With all these aspects in mind, we feel the urgent need to look for other ways to facilitate metal recycling. The most common way to sort waste in today's society is by hand. We're trying to make it automatic to get a higher percentage of the right kinds and to make it easier and faster for consumers to sort their waste. The purpose of this project is to build a prototype that will automatically classify both metallic and non-metallic waste.
With an inductive proximity sensor, the prototype will be able to tell if the object is made of metal. Using a stepper motor, two litter boxes, one for metallic objects and one for non-metallic objects, will rotate depending on whether or not the inductive proximity sensor gives a signal. Ultrasound sensors were used to detect if an object was present and needed to be labeled. Two ultrasonic sensors gave a 118% increase in accuracy compared to using a single ultrasonic sensor.
The purpose of the project has been achieved, resulting in automated waste sorting that is easy to use and can assist the user in the daily sorting of waste. However, this prototype is limited to objects with a diameter of less than 65 mm, and the prototype can be extended in future work.

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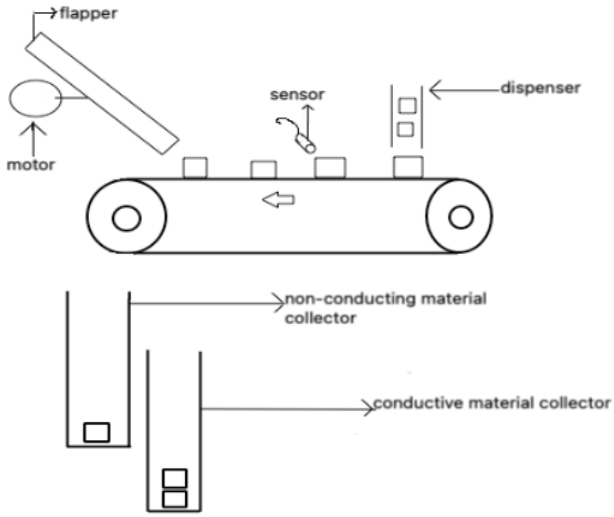
I. Introduction:

There are a large number of factories, mills, industries, mining plants, etc. all over the world. Here, raw materials are used to produce products for consumers and during manufacturing, there are materials that are wasted. They are called industrial waste or industrial waste. Metal is one of the most common industrial wastes that should be collected effectively and sent for recycling for reuse to avoid dumping it in landfills as they are dangerous. Previously, industrial waste separation was time-consuming. This can be avoided if the separation is done on site. Impure processed products can lead to permanent closure of the industry and are dangerous to the public. In general, not only in industries, in many places such as subway stations or airports different automated techniques to detect and separate the metallic.

The components are used inside the luggage, so the model we present in the form of a simple separate design using Arduino can effectively replace all these expensive techniques. The most important feature is that it not only recognizes or locates metal parts but also separates them.
Thus, it separates metallic and non-metallic objects from the rest.

II. Methodology:

The proposed segregator consists of a conveyor belt, sensors and an Arduino microcontroller. A conveyor belt is used to move a mixed stream of metals and non-metals, while sensors are used to identify different types of metals and non-metals.



The Arduino UNO microcontroller is used to control the conveyor belt and sensors. It receives sensor data and sends commands to the conveyor belt to sort the materials. The segregator is designed to sort different types of metals and non-metals such as aluminum, copper, steel, and plastic from a mixed stream.

III. Outcome:

The proposed segregator was tested using a mixed stream containing aluminum, copper, and steel. The segregator was able to accurately identify and sort each material, with an accuracy rate of over 95%. The segregator was also able to operate continuously for 8 hours without any fault or malfunction.

IV. Conclusion:

In this paper, we propose the design and development of a smart metal and non-metal segregator using Arduino.

ARDUINO UNO

The segregator uses sensors to identify and sort different types of metals and non-metals based on their physical properties. The proposed segregator offers an efficient and reliable solution for sorting metals and non-metals in construction and industrial settings.

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