SMART TRUCK FOR LITTER COLLECTION AND SEGREGATION

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IN

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CERTIFICATE

Certified that the project work entitled "**SMART TRUCK FOR LITTER COLLECTION AND SEGREGATION**" is a bonafide work carried out by Ms.Keerthana E [4VM16EC036],Ms. Ankitha A V [4VM16EC006],Ms. K S Prathiksha [4VM16EC034], Ms.Nanda Kamanaboodi [4VM16EC420] in the department of Electronics and Communication Engineering from **VIDYA VIKAS INSTITUTE OF ENGINEERING AND TECHNOLOGY** submitted in partial fulfilment for the award of **Bachelor of Engineering** in **Electronics and Communication Engineering** prescribed by the Visvesvaraya Technological University, Belagavi during the year 2019-2020. It is certified that all suggestions recommended for Internal Evaluation have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements with respect to Project work prescribed for the said Degree.

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ABSTRACT

The main aim of the project is Collecting and segregating the solid waste at the disposal level itself. Solid waste refers to the range of garbage arising from animal and human activities that are discarded as unwanted and useless. India poses serious threats with regard to the garbage management. Approximately 0.1 million tonnes of garbage is generated each day in India. Sadly 5% of the waste is recycled. One possible solution to achieve maximum recycling percentage could be segregating the waste at the disposal level itself. Uncontrolled dumping of waste on outskirts of towns and cities has created the overflowing of landfills which has serious environmental effects in terms of various pollutions and thus found to be a serious threat to humans and animals life. Developing a mechanized system to help save the lives of many, making of the world a cleaner and greener place and to make the better use of recyclable solid waste is the noble objective of our project.

In this project we are making use of Arduino UNO as a controller .The project involves two processes they are, Waste collection and segregation. We are aiming to achieve waste collection using an embedded arm/ mechanical part/ structure followed by a inclined belt conveyer. The waste will be made to fall onto the horizontal conveyer which we are using for the purpose of segregation. Waste will be made to fall onto horizontal conveyer using an intermediate funnel between inclined and horizontal conveyer. Funnel will control the flow of waste onto the conveyer. Segregation of waste can be done using series of electromechanical, electronic and electrical components they are: Electromagnet is Used to separate Iron and Magnetic waste. Inductive Proximity Sensor will detect the presence of metal wastes, This data will be used by a servomotor to separate them from the waste. Air Blower will be used to blow off light weight substances such as paper and plastics into a defined bin. Capacitive Proximity Sensor detects the presence of glass and wood materials. This data will be fed to servomotor to separate them. End of the conveyer contains a bin into which the remaining waste will be filled and this waste can probably be grouped under degradable, organic waste.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of a task would be incomplete without the mention of the people who made it possible.We wish to express our sincere and heartfelt gratitude to those who guided us to accomplish the assigned Project work.

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INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 Introduction

Technology is growing at an unimaginable rate! There are new products, facilities, and luxury elements that are developed every day. But the dark side is that this boon has always been accompanied by a tremendous production of waste. With rapid urbanisation, the country is facing massive waste management challenge. Over 377 million urban people live in 7,935 towns and cities and generate 62 million tonnes of municipal solid waste per annum. Only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites. Solid Waste Management (SWM) is one among the basic essential services provided by municipal authorities in the country to keep urban centres clean. However, almost all municipal authorities deposit solid waste at a dumpyard within or outside the city haphazardly. India is following a flawed system of waste collection, disposal and management [1].

Despite significant development in social, economic and environmental areas, SWM systems in India have remained relatively unchanged. The informal sector has a key role in extracting value from waste, with approximately 90% of residual waste currently dumped rather than properly landfilled. There is an urgent need to move to more sustainable SWM, and this requires new management systems and waste management facilities. Current SWM systems are inefficient, with waste having a negative impact on public health, the environment and the economy. The waste Management and Handling Rules in India were introduced by the Ministry of Environment and Forests (MoEF), although compliance is variable and limited [2].

The key to efficient waste management is to ensure proper collection and segregation of waste at source and to ensure that the waste goes through different streams of recycling and resource recovery. Then reduced final residue is then deposited scientifically in sanitary landfills. Sanitary landfills are the ultimate means of disposal for unutilised municipal solid

waste from waste processing facilities and other types of inorganic waste that cannot be reused or recycled. Major limitation of this method is the costly transportation of MSW to far away landfill sites. The situation calls for an efficient system that can collect and sort waste at the primary stage thus making waste management more efficacious and fruitful. Mechanizing such a system is of paramount importance. We have thus come up with a smart truck for litter collection and segregation that collects and categorizes the waste automatically. This will help in dealing with the situation in a clever manner. It will also improve the economy of our country and also helps to reduce the occupational hazard for waste workers.

CHAPTER 2
literature survey

CHAPTER 2

LITERATURE SURVEY

Literature review is the foundation for projects in their life cycle. An effective literature review analyses, synthesises and evaluates knowledge on a particular topic. It provides the context to projects. Moreover, it brings the reader up to date with the relevant area of interest. The purpose of this literature survey is to identify the relationship between previous research and our project and to criticise aspects of methodology or Formulate questions for further research. It increase our knowledge and background on the subject area and help to define and limit our study area to form a research question. We have surveyed related works and have made comparisons between them and our proposed methodology in this chapter.

For substantiate and extensive study of the project the following references were made and for betterment of the work few research papers are referred.

2.1 Literature Review

In the field of waste management many research workhave done. Some of the distinguished ones which are relevant and carry basic information for this project work have been highlighted briefly.

Aleena V.J., Kavya Balakrishnan, Rosmi T.B., Swathy Krishna K.J., Sreejith S, and T.D. Sudha have proposed a project Automatic Waste Segregator and Monitoring System, which makes use of open close mechanism, conveyer belt, inductive proximity sensor, geared DC motor, ultrasonic sensors, GSM Module, blower, robotic arm, electromagnet and monitoring systems to sort the waste into three main categories namely; metal, plastic and wet waste. This system is even capable of monitoring the solid waste collection process and management of the overall collection process. The open close mechanism in the inlet section was used to regulate the flow of waste on to the conveyer belt. Inductive proximity sensor detects the metallic waste. Blower was used to separate dry and wet waste. The timing and movement of the conveyer belt was controlled by Arduino Uno.

M.K.Pushpa, Aayushi Gupta, Shariq Mohammed Shaikh, Stuti Jha, Suchitra V have done a project "Microcontroller Based Automatic Waste Segregator". This system makes use of 8051 Microcontroller .Inductive proximity sensor, conveyer belt, blower, slider, dustbin with magnets inside and ultrasonic sensor to segregate the waste into 3 main categories: metallic, plastic and wet waste.

"IoT Based Smart Garbage and Waste Collection Bin"by S.S.Navghane, M.S.Killedar, Dr.V.M.Rohokale is the dustbin which was interfaced with microcontroller based system having IR wireless systems along with central system showing current status of garbage, on mobile web browser with html page by Wi-Fi. Hence the status will be updated on to the html page.This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record will be sent to the higher authority.

"Smart Waste Management using Wireless Sensor Network" by Tarandeep Singh, Rita Mahajan and Deepak Bagai and "Smart garbage collecting bin for municipal solid waste" by Arunkumar.G, Bhanu Priya.G, and Prof.R.Santhosh Kumar gives an insight into Detection, monitoring and management of urban wastes using wireless technology.

"Automation of Plastic,Metal and Glass Waste Materials Segregation using arduino in Scrap Industry" proposed by Mohammed Rafeeq, Ateequrahman, Sanjar Alam and Mikdad depicts Automation of Waste material Segregation in scrap industry. This method is solution of segregation of three types of wastes glass, metal and plastic.The Method uses inductive sensors, metallic items, and capacitive sensors to distinguish between and dry waste. Experimental results show that the segregation of waste into metallic, plastic and glass waste has been successfully implemented using the Automation of material segregation (AMS) method.

2.2 Outcome of Literature Survey

From the literature review the conclusion obtained is that there are several works which are focusing on waste management. Each work follow different methods to add to waste management processes. Segregation being the lifeline of waste management encompasses

sensors to detect types of waste to segregate them accordingly. Some of the sensors are: Inductive proximity sensor: used to detect metals, Ultrasonic sensor: plays role in detecting level of garbage in bins, capacitive sensor: can be used to detect glass materials. Other than sensors there are other Non-electronic components whose role in waste segregation is significant. Some of them are: Conveyer belt: used to carry the waste from start to end of the process, Blower: helps to separate dry waste from wet waste, Electromagnet: helps in detecting magnetic and iron materials and Funnel: this can be used to control the flow of garbage onto the conveyer.

From the survey it is evident that, the waste collection is under least focus. There are several automatic segregation projects in notice but no effective garbage collection is proposed. Much of the attention is in segregating organic wastes like plastic, glass, metals, etc but the importance of organic waste is neglected.

2.3 Problem Statement

A growing population and economy, which means increased volumes of waste generated. This puts pressure on waste management facilities, which are already in short supply. There is increase in complexity of waste stream because of urbanisation and industrialisation and problems caused on environment by these waste streams are also different. Safe and acceptable solid waste management practices are of serious concern from the public health point of view.

Present practice of waste management is not coping up with the need. They are impacting negatively on both human and environment. The manthras of waste management is 3R’s they are Reduce, Reuse and Recycle. Controlling of waste generation is impossible but the generated waste can be reused and recycled with proper management. Proper management involves frequent collection of waste. The collection is not ultimate instead they have to be treated properly and recycled. These two processes in our country are working inefficiently as there is lack of automation. Transferring waste from source to the processing unit is itself time consuming and costly process. Recyclable percentage in India is very less and poor segregation may be one of the major reasons.

Thus integrating waste collection and segregation into a vehicle and making these processes automatic can solve the problems like improper collection and recycling.

2.4 Motivation and Objectives

Countries could reap economic and environmental benefits by better collecting, recycling and disposing of trash, according to a report, which calculated that a third of the world's waste is instead dumped openly, with no treatment. The current waste management practice in India involves collecting wastes from source through a community collective bin system, after which it gets transported to a low-lying landfill system with intermediate processing of Municipal Solid Waste (MSW). This practice is leading to various problems. According to a CPCB report, in 2014-15, 91 per cent of solid waste was collected, of which, only 27 per cent was treated and the remaining 73 per cent was disposed at dump sites. A recent study indicates that India would need a landfill of 88 sq. km, nearly the size of Bengaluru, to dump all its waste by 2030.

The main objectives of this project is to help handling the waste generated properly by frequent collection of it without human intervention. The project addresses the reliable solution for effective segregation in the initial stage and reuse of that waste. Segregation of garbage should be encouraged at source, the new MSW rules do that. What we need is to build capacity at the initial level to enforce and implement source segregation.

CHAPTER 3
Hardware software requirements

CHAPTER 3

HARDWARE SOFTWARE REQUIREMENTS

3.1 Hardware specifications

Conveyer system: These are mechanical devices or assemblies that transport material with minimal effort. While there are many different kinds of conveyor systems, they usually consist of a frame that supports either rollers, wheels, or a belt, upon which materials move from one place to another. In this project we are using belt conveyer system. Conveyer work by using two pulleys that continually loop over the material that rotates over them. This is done with endless procession of hooks, gears, buckets, and a wide rubber belt. The belt is then supported by a series of rollers along the path Belt Conveyors are material handling systems that use continuous belts to convey products or material. The belt is extended in an endless loop between two end-pulleys. Usually, one or both ends have a roll underneath. The belts themselves can be made from numerous materials, which should correspond to the conditions under which the belt will be operating. Common conveyor belting materials include rubber, plastic, leather, fabric, and metal. Belt conveyors are typically powered and can be operated at various speeds depending on the throughput required. The conveyors can be operated horizontally or can be inclined as well. Belt conveyors can be troughed for bulk or large materials

Fig. 3.1 -conveyer belt

Electromagnet: An **electromagnet** is a type of magnet in which the magnetic field is produced by an electric current. Electromagnets usually consist of wire wound into a coil. A current through the wire creates a magnetic field which is concentrated in the hole, denoting the centre of the coil. The magnetic field disappears when the current is turned off. The wire turns are often wound around a magnetic core made from a ferromagnetic or ferrimagnetic material such as iron; the magnetic core concentrates the magnetic flux and makes a more powerful magnet.The main advantage of an electromagnet over a permanent magnet is that the magnetic field can be quickly changed by controlling the amount of electric current in the winding. However, unlike a permanent magnet that needs no power, an electromagnet requires a continuous supply of current to maintain the magnetic field.

Fig. 3.2- Electromagnet

Inductive proximity sensor: An inductive sensor is a device that uses the principle of electromagnetic induction to detect or measure objects. An inductor develops a magnetic field when a current flows through it; alternatively, a current will flow through a circuit containing an inductor when the magnetic field through it changes. This effect can be used to detect metallic objects that interact with a magnetic field. Non-metallic substances such as liquids or some kinds of dirt do not interact with the magnetic field, so an inductive sensor can operate in wet or dirty conditions.

Circuit Diagram:

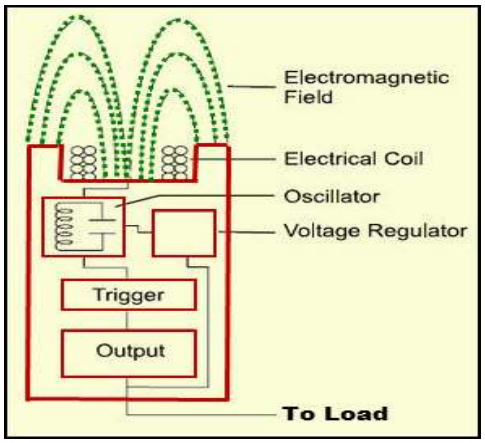


Fig.3.3-inductive proximity sensor circuit

The above proximity sensor circuit diagram represents the field produced by the coil, which is generated by providing a power supply. Whenever, this field is disturbed by detecting any metal object (as a metal object enters this field), then an eddy current will be generated that circulates within the target. Due to this, load will be caused on the sensor that decreases the electromagnetic field amplitude. If the metal object (called as target, as we discussed earlier in this article) is moved towards the proximity sensor, then the eddy current will increase accordingly. Thus, the load on the oscillator will increase, which decreases the field amplitude. The trigger block in the proximity sensor circuit is used to monitor the amplitude of the oscillator and at particular levels (predetermined levels) the trigger circuit switches on or off the sensor (which is in its normal condition). If the metal object or target is moved away from the proximity sensor, then the amplitude of the oscillator will increase.

Fig.3.4 -inductive proximity sensor

Infrared sensor: An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode that is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received. It gives the level of the garbage in the dustbin.

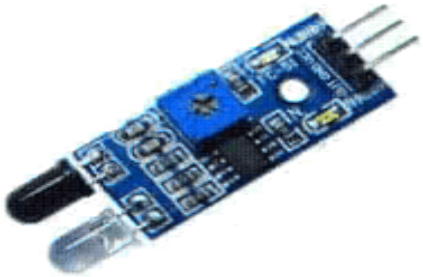


Fig.3.5-Infrared sensor

Capacitive proximity sensor: Capacitive sensors are most often used to measure the change in position of a conductive target. But capacitive sensors can be effective in measuring presence, density, thickness, and location of non-conductors as well. Non-conductive materials like plastic have a different dielectric constant than air. The dielectric constant determines how a non-conductive material affects capacitance between two conductors. In capacitive sensors, the two conduction plates (at different potentials) are housed in the sensing head and positioned to operate like an open capacitor. Air acts as an insulator; at rest there is little capacitance between the two plates. Like inductive sensors, these plates are linked to an oscillator, a Schmitt trigger, and an output amplifier. As a target enters the sensing zone the capacitance of the two plates increases, causing oscillator amplitude change, in turn changing the Schmitt trigger state, and creating an output signal.

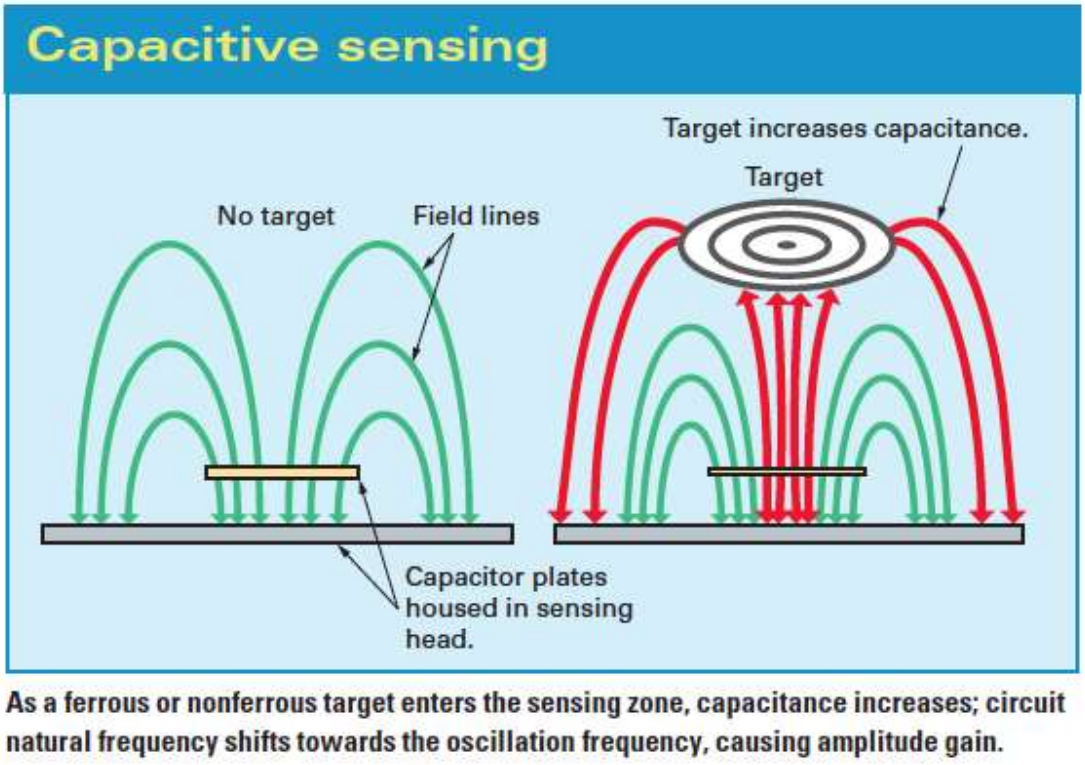


Fig.3.6-working principle of capacitive proximity sensor

Fig.3.7-capacitive proximity sensor

Servomotor: A servo motor is an electrical device which can push or rotate an object with great precision. It is a rotary actuator or a motor that allows for a precise control in terms of the angular position, acceleration, and velocity. Basically it has certain capabilities that a regular motor does not have. Consequently it makes use of a regular motor and pairs it with a

sensor for position feedback. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor.

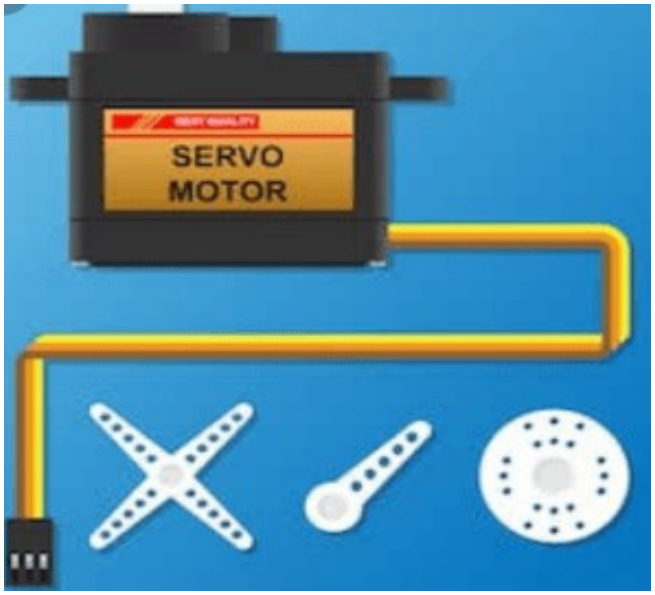


Fig.3.8-servomotor

Blower: An air blower is a machine used for generating a flow of air at substantial pressure. It is a plumbing equipment that rotates the fan with the force it receives from the engine, which transfers the air in the emitted environment at high flow or low pressure. The fan in the blowers rotates and vacuum the air in the suction section. The trapped air is then pushed into the outlet side. Blowers are often used to move air.

Arduino Uno: The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

Microcontroller	ATmega328P – 8 bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage	7-12V
Input Voltage Limits	6-20V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA
Flash Memory	32 KB (0.5 KB is used for Bootloader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock Speed)	16 MHz

Table 3.1- Arduino Uno Technical Specifications

Pin Category	**Pin Name**	**Details**
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when using an

		external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA.GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Input/Output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

Table 3.2- Pin Description

3.2 Software specification

Arduino IDE

The **Arduino Integrated Development Environment (IDE)** is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.It is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing. Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike. Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

fig.3.9-arduino software

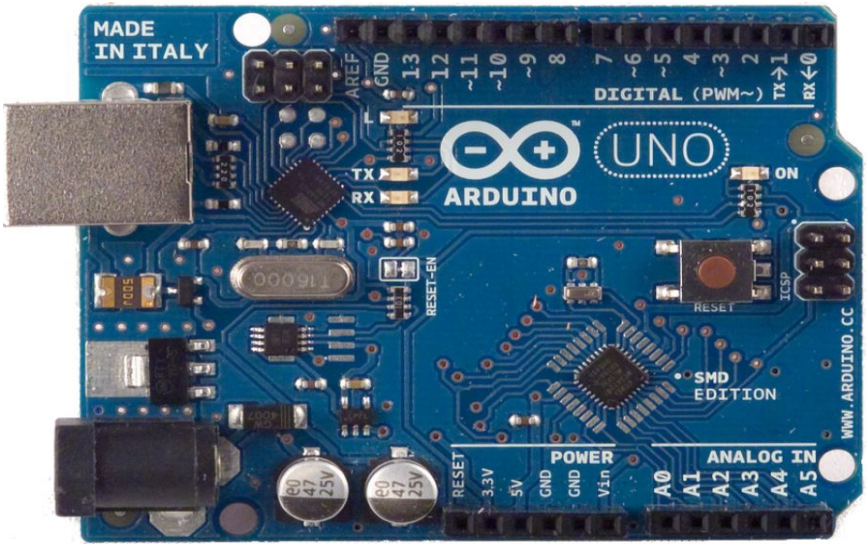


Fig.3.10-arduino kit

CHAPTER 4
Methodology and implementation

CHAPTER 4

METHODOLOGY AND IMPLEMENTATION

Properly defined and strictly followed logical integration of hardware and software listed in chapter 3 for achieving the proposed methodology is been defined in this chapter, chapter 4.

4.1 METHODOLOGY

4.1.1 ALGORITHM

STEP1: Start

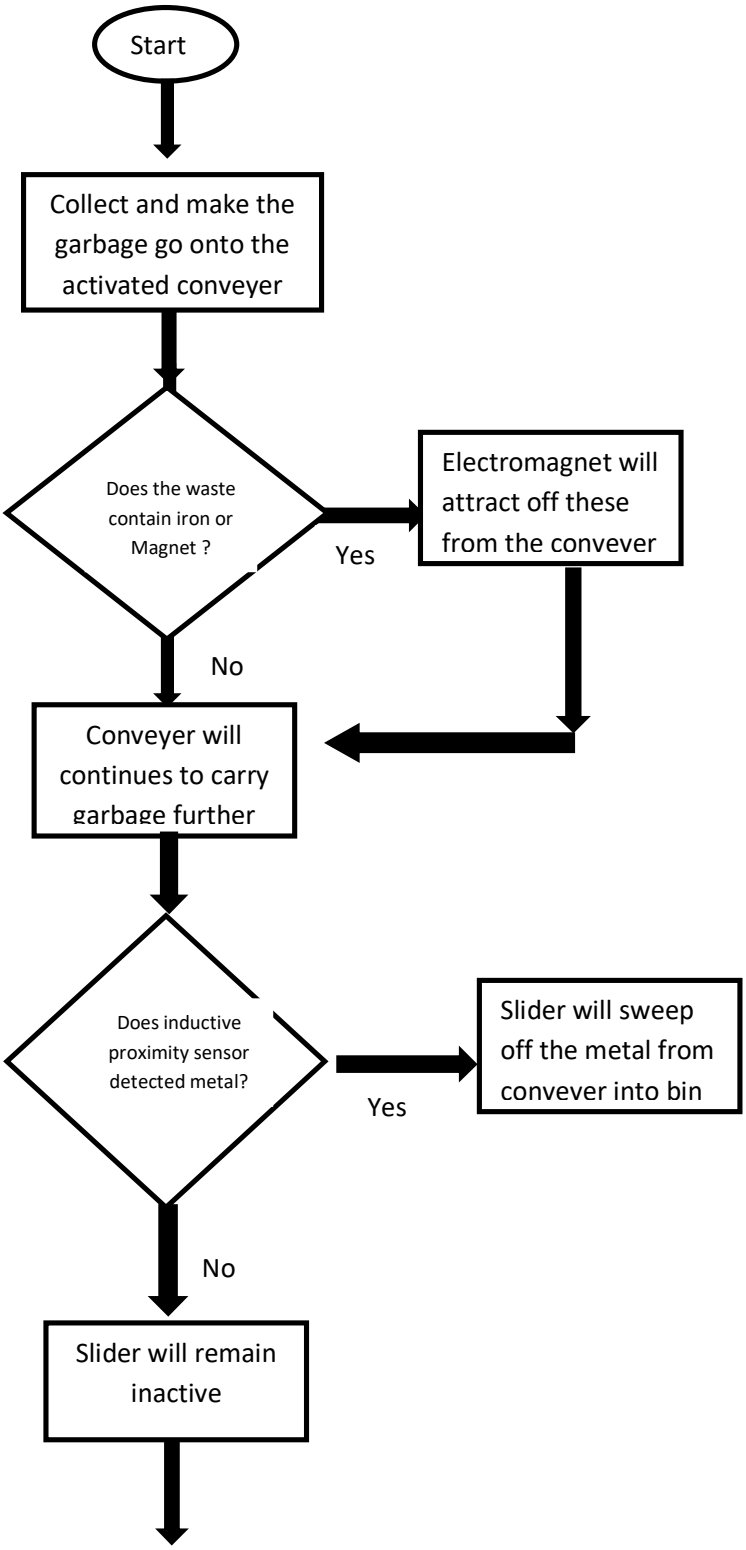
STEP 2: Build external supporting projection for collecting and lifting the waste into the vehicle.

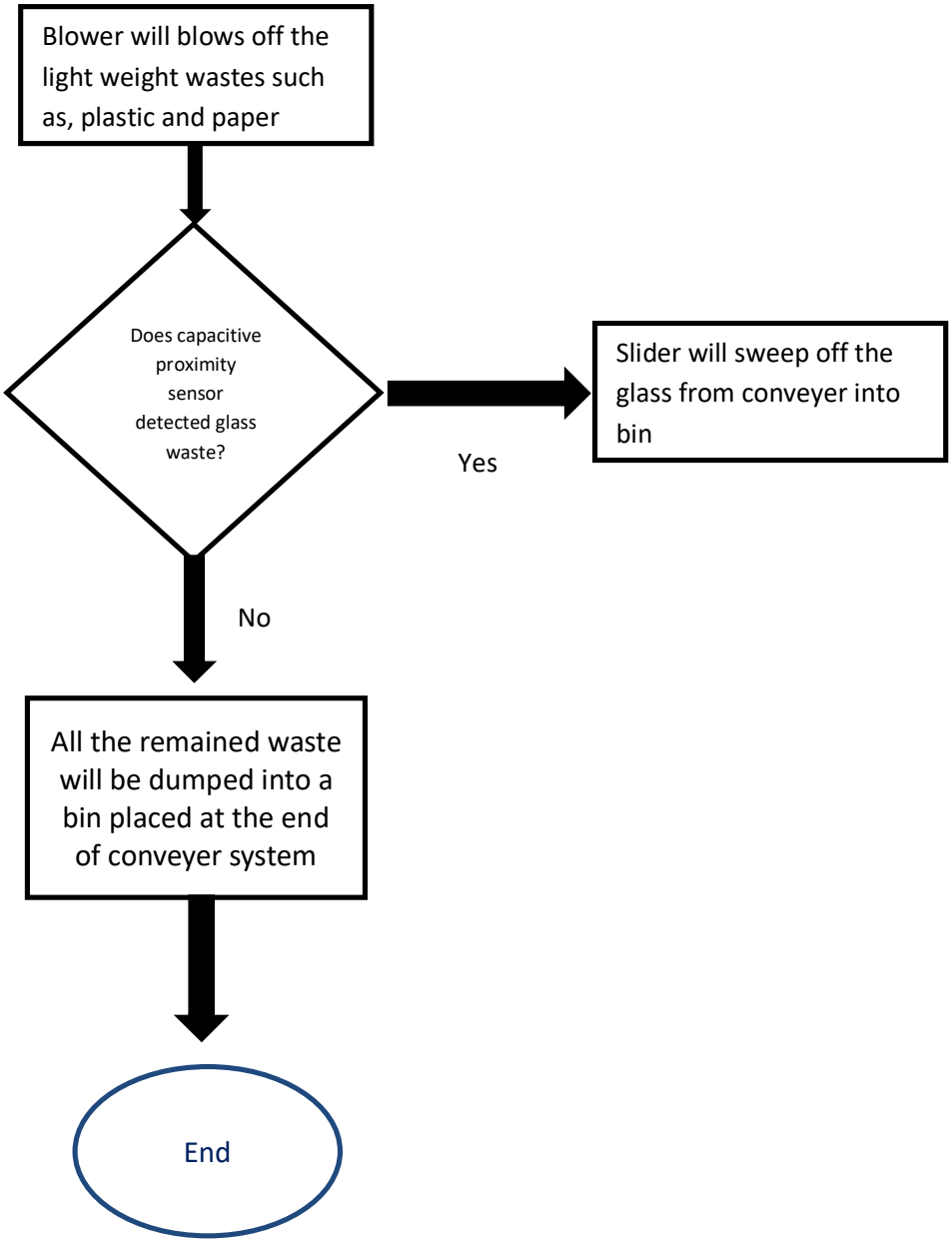
STEP 3: Build a tunnel to supply collected waste on to the segregation conveyer in a controlled manner.

STEP 4: Segregate the collected waste into different categories.

STEP 5: End

4.1.2 FLOW CHART OF THE PROCESS




Blower will blows off the light weight wastes such as, plastic and paper
Does capacitive proximity sensor detected glass waste?
Yes
Slider will sweep off the glass from conveyer into bin
No
All the remained waste will be dumped into a bin placed at the end of conveyer system
End

4.1.3 BLOCK DIAGRAM

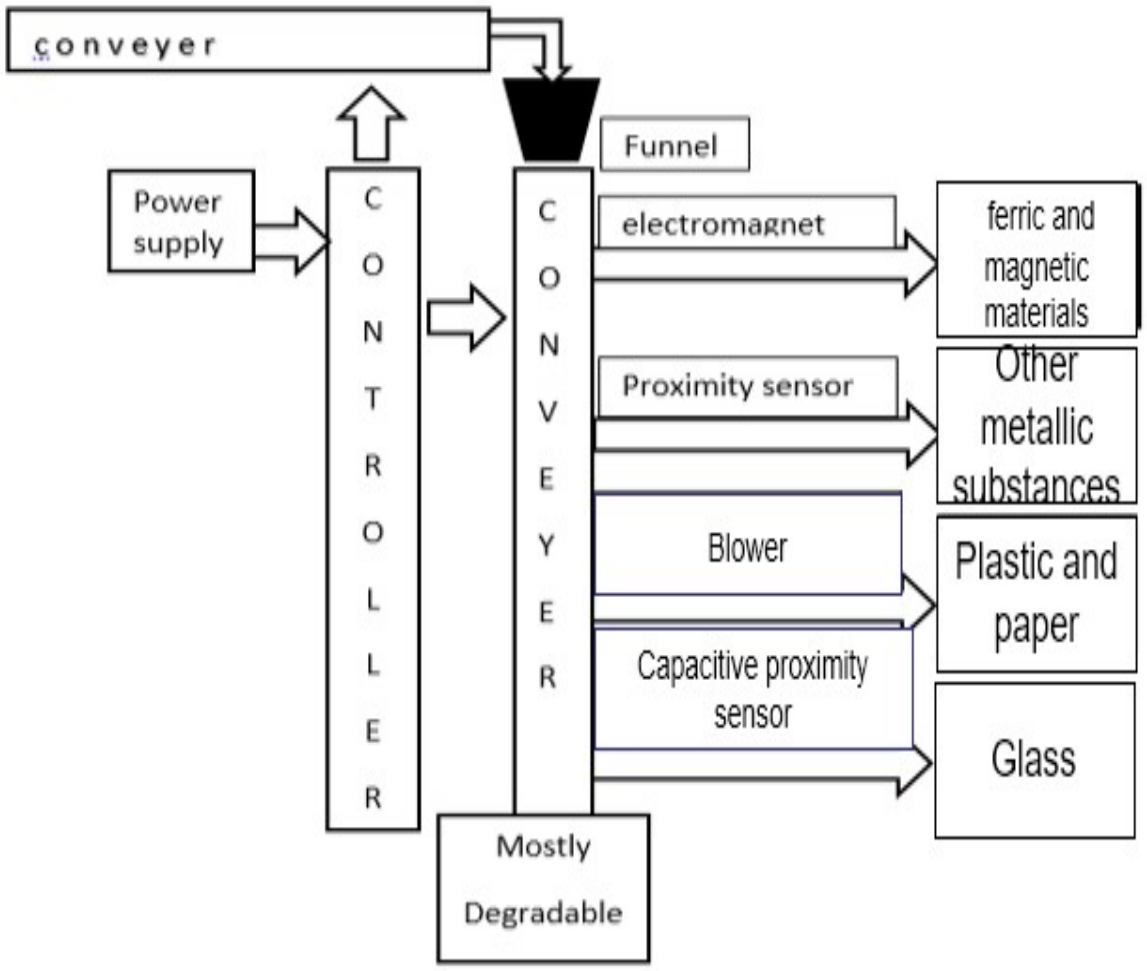


Fig.4.1-block diagram

In this project we are making use of Arduino UNO as a controller. The project involves two processes they are, Waste collection and segregation. We have achieved waste collection using an embedded arm/ mechanical part/ structure followed by an inclined belt conveyer. The waste will be made to fall onto the horizontal conveyer which we are using for the purpose of segregation. Waste will be made to fall onto horizontal conveyer using an intermediate funnel between inclined and horizontal conveyer. Funnel will control the flow of waste onto the conveyer. Segregation of waste is achieved using series of electromechanical, electronic and electrical components they are:

Electromagnet

Inductive Proximity Sensor

Blower

Capacitive Proximity Sensor

4.2 IMPLEMENTATION

The work done to meet the requirements of the scope of the project, to fulfil the charter and to make the vision into reality we have undergone to several stages. The logical conclusion after evaluation are written in this chapter below.

4.2.1 Waste Collection

Fig.4.2-waste flowing conveyer belt

Waste collection is the first part of our project where were aimed to collect the land waste which are spread on land. This aim is achieved using a system shown above where the front end is provided with an arm which helps to push the waste onto the inclined conveyer.A 60 rpm dual shaft bo motor of voltage range 2 to 9 v drives the necessary voltage and current to start and stop the conveyer. End of this collection system is connected to a Funnel.

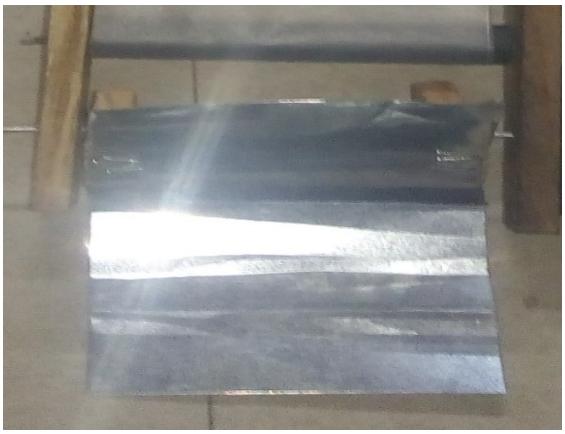


Fig.4.3-collecting arm

4.2.2 Funnel

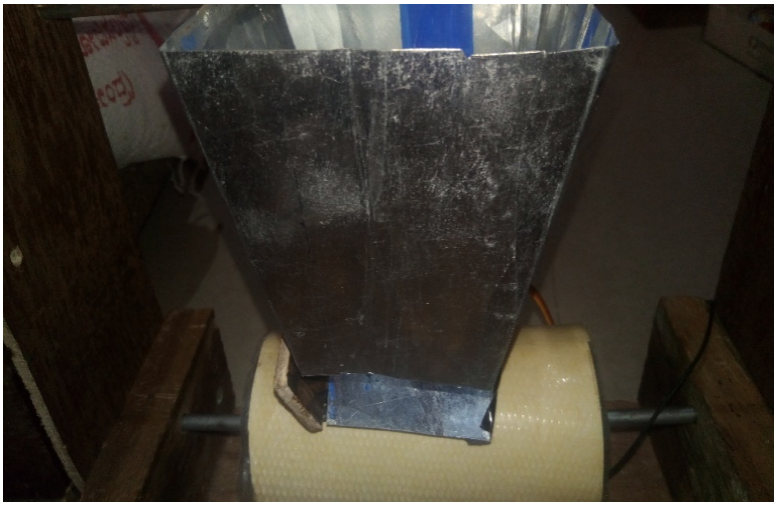


Fig.4.4-funnel

The open close mechanism acts as a regulator to control the waste that falls on the belt. A standard 4.8 volt servomotor receives inputs from microcontroller to monitor the clockwise and anticlockwise motion of the motor. As the motor rotates, the rotary motion is translated to linear motion using a rack and pinion arrangement. This mechanism is initiated only if the IR sensor detects the waste in its vicinity.

Fig.4.5-funnel with motor

4.2.3 Conveyer Belt Mechanism

A 12 v DC motor is used to move the belt. This high torque motor drives the necessary 12v and 2A current from a battery. This is the horizontal belt which is used to carry the garbage throughout the segregation process.

Fig.4.6-conveyer belt

4.2.4 Slider Section

As and when the Electromagnet, Inductive Proximity sensor and Capacitive Proximity sensor detects Magnetic, metallic and glass waste respectively, this slider movement will be initiated to push the respective waste into respective bins. A 4.8 servo motor is used to make the slider movement.

Fig.4.7-slider

4.2.5 Blower

Light weight material separation is achieved using blower. Due to the high density and weight heavy materials refuse to blown off even in the presence of a high speed blower.

4.2.6 Infrared sensor section

Infrared sensor is been placed to the edge of the bins. When the bin fill with garbage to certain level it will give indication by turning on the buzzer.

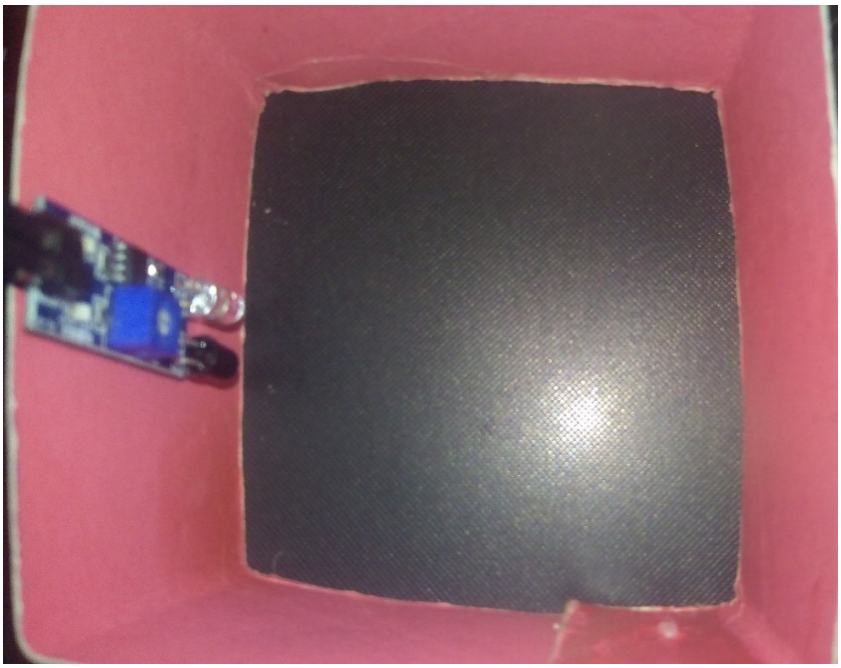


Fig.4.8-bins having infrared sensor

CHAPTER 5
Experiments and results

CHAPTER 5

5.1 EXPERIMENTS AND RESULTS

1. GLASS AND METALLIC WASTE SEGREGATION:

This method uses An inductive sensor. it is a device that works on principle of electromagnetic induction to detect or measure objects. simulation results shows that the segregation metallic and glass waste has been successfully implemented. when it detects waste, signal will be given to controller which in turn switch on the servomotor to push off the waste from the belt into respective bins

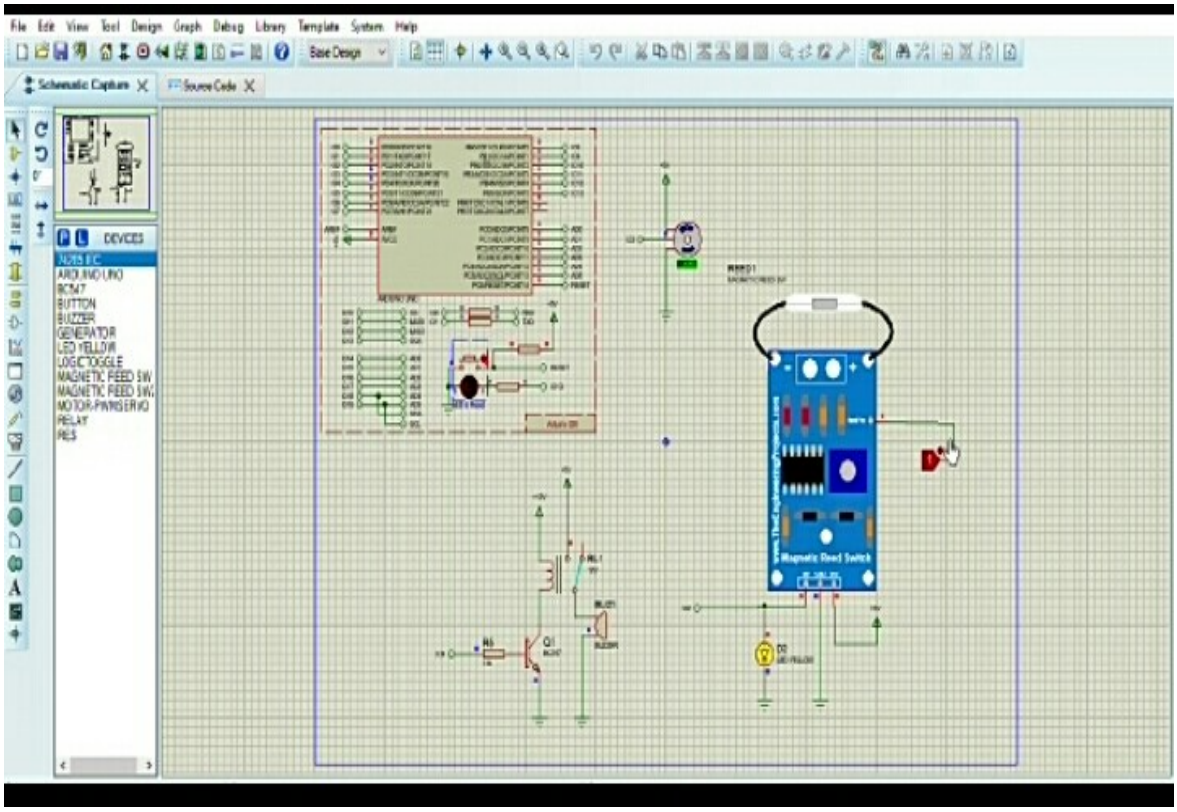


Fig.5.1(A) –results of glass and metallic waste segregation

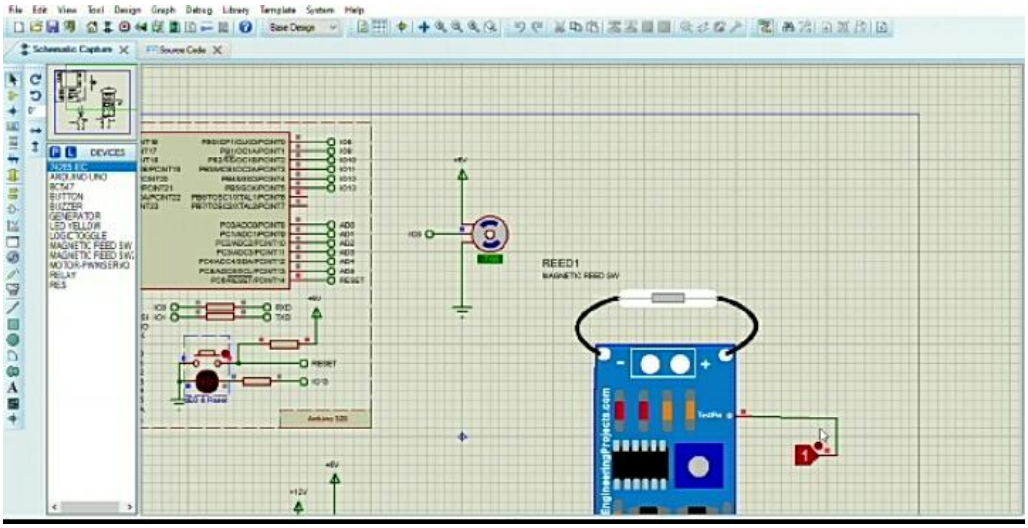


Fig.5.1(B) –results of glass and metallic waste segregation

2. PLASTIC AND PAPER WASTE SEGREGATION :

Degradable waste is successfully segregated from the other types of waste in this system. They do not get blown off by the blower. Hence as the belt continues to rotate forward, the waste fall at the end into to the degradable waste bin

Sl.no	Blower Section	True Acceptance	True Rejection	False Acceptance	False Rejection
1	Dry paper	100%			
2	Wet paper	50%	50 %		
3	Plastic bottels				100%
4	Polythene covers	100 %			
5	Thick plastics	70%			30%

Table 5.1 Table of acceptance and rejection of paper and plastic waste

CHAPTER 6
Conclusion

CHAPTER 6

6.1 CONCLUSION

- The waste segregator as the name suggests, segregates the waste into three major classes: plastic, organic, metallic.

- The proposed system would be able to monitor the solid waste collection process and management of the overall collection process.

- The inlet section is provided with open and close mechanism to regulate the flow of waste on to the conveyor.

- Inductive proximity sensor is used to detect the metallic waste.

- A blower mechanism is used to segregate dry and wet waste.

- The timing and movement of the conveyor belt is controlled by Arduino Uno. Continuous and unnecessary operation of any particular section is thus avoided

CHAPTER 7
Future scope

CHAPTER 7

7.1 FUTURE SCOPE

- Inlet section can be incorporated with a crusher mechanism to reduce the size of incoming waste .

- Provisions can be made for on spot decomposition of Degradable waste (Biogas plant, organic fertilizers).

- Solar panels can be used as power supply.

- GSM contraption to intimate to the nearest industry to use the metals collected.

- Plastics can be segregated from the collected dry waste and also be processed based on their types, grades and colors. Thus further separation of dry waste can also be done.

CHAPTER 8
References

CHAPTER 8

8.1 REFERENCES

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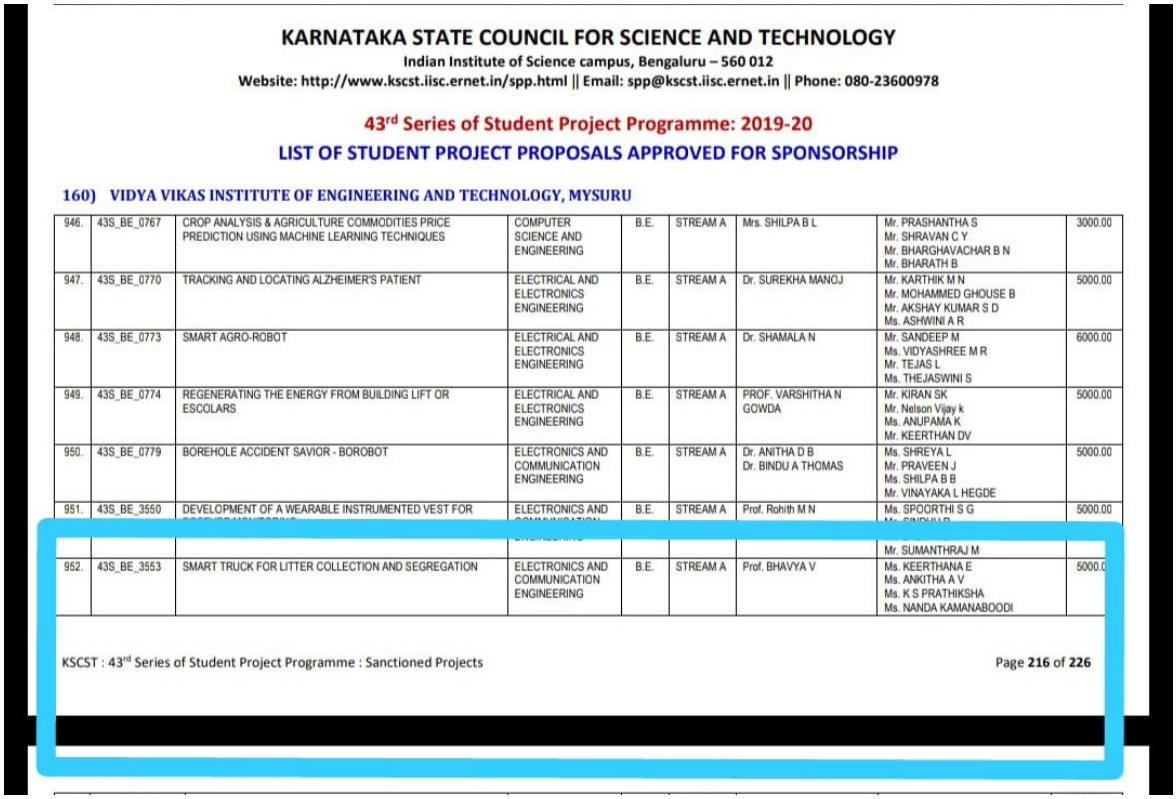
APPENDIX

A1.Sponsorship offered

"KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY" has approved for the sponsorship under 43rd series of student project programme 2019-2020



KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY
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43rd Series of Student Project Programme: 2019-20
LIST OF STUDENT PROJECT PROPOSALS APPROVED FOR SPONSORSHIP

160) VIDYA VIKAS INSTITUTE OF ENGINEERING AND TECHNOLOGY, MYSURU

946.	43S_BE_0767	CROP ANALYSIS & AGRICULTURE COMMODITIES PRICE PREDICTION USING MACHINE LEARNING TECHNIQUES	COMPUTER SCIENCE AND ENGINEERING	B.E.	STREAM A	Mrs. SHILPA B L	Mr. PRASHANTHA S Mr. SHRAVAN C Y Mr. BHARGHAVACHAR B N Mr. BHARATH B	3000.00
947.	43S_BE_0770	TRACKING AND LOCATING ALZHEIMER'S PATIENT	ELECTRICAL AND ELECTRONICS ENGINEERING	B.E.	STREAM A	Dr. SUREKHA MANOJ	Mr. KARTHIK M N Mr. MOHAMMED GHOUSE B Mr. AKSHAY KUMAR S D Ms. ASHWINI A R	5000.00
948.	43S_BE_0773	SMART AGRO-ROBOT	ELECTRICAL AND ELECTRONICS ENGINEERING	B.E.	STREAM A	Dr. SHAMALA N	Mr. SANDEEP M Ms. VIDYASHREE M R Mr. TEJAS L Ms. THEJASWINI S	6000.00
949.	43S_BE_0774	REGENERATING THE ENERGY FROM BUILDING LIFT OR ESCOLARS	ELECTRICAL AND ELECTRONICS ENGINEERING	B.E.	STREAM A	PROF. VARSHITHA N GOWDA	Mr. KIRAN SK Mr. Nelson Vijay k Ms. ANUPAMA K Mr. KEERTHAN DV	5000.00
950.	43S_BE_0779	BOREHOLE ACCIDENT SAVIOR - BOROBOT	ELECTRONICS AND COMMUNICATION ENGINEERING	B.E.	STREAM A	Dr. ANITHA D B Dr. BINDU A THOMAS	Ms. SHREYA L Mr. PRAVEEN J Ms. SHILPA B B Mr. VINAYAKA L HEGDE	5000.00
951.	43S_BE_3550	DEVELOPMENT OF A WEARABLE INSTRUMENTED VEST FOR	ELECTRONICS AND	B.E.	STREAM A	Prof. Rohith M N	Ms. SPOORTHI S G Mr. SUMANTHRAJ M	5000.00
952.	43S_BE_3553	SMART TRUCK FOR LITTER COLLECTION AND SEGREGATION	ELECTRONICS AND COMMUNICATION ENGINEERING	B.E.	STREAM A	Prof. BHAVYA V	Ms. KEERTHANA E Ms. ANKITHA A V Ms. K S PRATHIKSHA Ms. NANDA KAMANABOODI	5000.0

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