

**COMMUNITY SERVICE PROJECT ON**  
**SMART DUSTBIN FOR GARBAGE DISPOSAL**  
*A project report submitted in the partial fulfillment of*  
*Requirements for the award of the Degree of*  
**BACHELOR OF TECHNOLOGY IN**  
**COMPUTER SCIENCE AND ENGINEERING**

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Name of the College: **Prasad V. Potluri Siddhartha Institute of Technology**

Period of CSP: **6 weeks**      From: **28/11/2022** To : **21/01/2023**

**Under the Guidance of**  
**Ms. Manasa Yarrarapu, Assistant Professor.**



**Department of Computer Science and Engineering Prasad V.  
Potluri Siddhartha Institute of Technology**

(Permanently affiliated to JNTU: Kakinada, Approved by AICTE)

(An NBA & NAAC A+ accredited and ISO 9001:2015 certified Institution)

Kanuru, Vijayawada -520007

2022-2023

## CERTIFICATE FROM COMMUNITY OFFICIAL

This is to certify that the community service project entitled "**SMART DUSTBIN FOR GARBAGE DISPOSAL**" was submitted by **MOHAMMED FAIZUDDIN** (**21501A05B4**) from the Department of Computer Science and Engineering, Prasad V. Potluri Siddhartha Institute of Technology, who underwent community service in KANURU from November 28, 2022 to January 21, 2023.

The overall performance of the Community Service Volunteer during his/her community service is found to be Good. (Satisfactory/Good).

R. Syllabeshmi  
Authorized Signatory with Date and Seal  
Digital Assistant  
Ka Sachin Jave  
Penar... 18/01/2023  
Arishma Disc.

**PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF  
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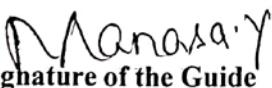
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**



**CERTIFICATE**

This is to certify that the community service project entitled “SMART DUSTBIN FOR GARBAGE DISPOSAL” is submitted by MOHAMMED FAIZUDDIN (21501A05B4), II B.Tech I semester in partial fulfillment of the requirement for the award of BACHELOR OF TECHNOLOGY in COMPUTER SCIENCE AND ENGINEERING and underwent community service in KANURU from 28/11/2022 to 21/01/2023 (6 Weeks) in the academic year 2022-2023.

The report submitted on: 28-01-2023.

  
Signature of the Guide

Ms. Manasa Yarrarapu,  
Assistant Professor,  
Dept. of CSE, PVPSIT.

  
Signature of the HOD

Dr. A. Jayalakshmi,  
Professor & HOD,  
Dept. of CSE, PVPSIT.

### **STUDENT'S DECLARATION**

I, **MOHAMMED FAIZUDDIN**, a student of B.Tech Program, Reg.No. **21501A05B4** of the Department of Computer Science and Engineering, Prasad V. Potluri Siddhartha Institute of Technology do hereby declare that I have completed the mandatory community service from **28/11/2022 to 21/01/2023** in **KANURU** under the guidance of **Ms. Manasa Yarrarapu**, Assistant Professor, Department of Computer Science and Engineering, PVPSIT.

*Md. Faizuddin*  
30-01-2023  
**Signature with Date**

**MOHAMMED**  
**FAIZUDDIN**  
**(21501A05B4)**

## **ACKNOWLEDGEMENT**

I would like to express my special appreciation and thanks to the **Government of Andhra Pradesh** and **JNTUK Kakinada** for initiation of the community service project.

I would especially like to thank **Ms. R. Sri Lakshmi** for advice, support and encouragement in completing the community service project work.

I wanted to take a moment to thank my beloved Principal, **Dr. K. Sivaji Babu** for arranging all the facilities and resources needed for the project work.

I feel elated to thank my Professor and Head of the Department, **Dr. A. Jayalakshmi** for all the support and encouragement you've shown me in completion of community service project work.

I am also thankful for my project in-charge **Mr. L.V Krishna Rao, Assistant Professor**, Computer Science & Engineering, for his constant encouragement and valuable recommendations throughout the course of the project work.

It is with the immense pleasure that I would like to express my indebted gratitude to my guide **Ms. Manasa Yarrarapu, Assistant Professor**, Computer Science & Engineering, who has guided and encouraged me a lot in every step of the project work.

I am very much grateful to all the staff and faculty of the department of CSE for their cooperation during the course of project work.

I would like to express my sincere thanks to each and every one of the college staff, who have contributed their help and guidance for the successful completion of the project.

At last, a special thanks to my family. Words cannot express how grateful I am to my family members for their support during my project work.

**ProjectAssociate**

**MOHAMMED**

**FAIZUDDIN**

**(21501A05B4)**

<b>CONTENT</b>	<b>Page No.</b>
<b>Certificate From Community Official</b>	ii
<b>Certificate</b>	iii
<b>Student's Declaration</b>	iv
<b>Acknowledgement</b>	v
<b>List of Figures</b>	vi
<b>Chapter 1 Executive Summary</b>	1
<b>Chapter 2 Overview of the Community</b>	2-3
<b>Chapter 3 Community Service Part</b>	4
<b>Chapter 4 Activity Log</b>	5-16
4.1 Activity Log of First Week	5
4.1.1 Detailed Weekly Report	6
4.2 Activity Log of Second Week	7
4.2.1 Detailed Weekly Report	8
4.3 Activity Log Of Third Week	9
4.3.1 Detailed Weekly Report	10
4.4 Activity Log of Fourth Week	11
4.4.1 Detailed Weekly Report	12
4.5 Activity Log of Fifth Week	13
4.5.1 Detailed Weekly Report	14
4.6 Activity Log of Sixth Week	15
4.6.1 Detailed Weekly Report	16
<b>Chapter 5: Outcomes Description</b>	17-20
Report of the Mini-Project Work Done in the Related Subject w.r.t the Habitation/Village	21-29
<b>Chapter 6: Recommendations and Conclusions of the Mini Project</b>	30
<b>Photos</b>	33-36

<b>LIST OF FIGURES</b>	<b>Page No.</b>
Fig 2.1: Location of Kanuru	2
Fig 4.4.1: Circuit Diagram of System.	12
Fig 5.1: Smart dustbin	22
Fig 5.2: Arduino Uno	23
Fig 5.3: Ultrasonic sensor	24
Fig 5.4: servo motor	24
Fig 5.5: Buzzer	24
Fig 5.6: jumper wires	25
Fig 5.7: Working Principle	26
Fig 5.8 Block diagram	26
Fig 5.9 Circuit Diagram	27
Fig 5.10- 5.13 implemented prototype	29
Fig 6.1 -6.2 Survey in community	33
Fig 6.3- 6.4 Improper Garbage disposal in community	33
Fig 6.5- 6.6 Explaining about the seriousness of the	34
Fig 6.7- 6.8 demonstrating the model in Neighborhood	34
Fig 6.9- 6.11 demonstrating the model in Local Retail	35
Fig 6.12: demonstrating the model in the Sachivalayam,kanuru	36

## **CHAPTER 1: EXECUTIVE SUMMARY**

The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also eco-friendly. We are inspired from the Swachh Bharat Mission. Nowadays technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin. If dustbin is not maintained than these can cause an unhealthy environment and can cause pollution that affects our health. In this proposed technology we have designed a smart dustbin using ARDUINO UNO, along with ultrasonic sensors, a servo motor, a buzzer and jumper wires. After all hardware and software connections, the Smart Dustbin program will run smoothly.

Dustbin lid will be opened when someone comes nearer to it within some range and then waits for the user to put in the garbage and closes automatically. Socially, it will help towards the development health and hygiene, and for business purpose we tried to make it affordable to many classes of people as possible, so that everyone in the community can take the benefit from the project.

### **OBJECTIVES:**

- To understand and conduct survey in respective village.
- To get a brief statement about the village and their living style.
- To analyze the survey and their situations in the village.
- To get a basic problem statement through the issues.
- To get a solution and make a prototype on the problems.

### **OUTCOMES:**

- Understanding about the village and conducting survey.
- Briefing on the life style and economic condition.
- Analyzing the survey results and the situations in the village.
- Collecting various problems such that we can solve using technology.
- Gaining a problem statement in various problem.
- Creating a solution and recommending a prototype.

## CHAPTER 2: OVERVIEW OF THE COMMUNITY

**Kanuru** is a residential area of Vijayawada in Krishna District of the Indian State of Andhra Pradesh. It is located in Penamaluru mandal of Vuyyuru revenue division. As per the G.O. No. M.S.104 (dated:23-03-2017), Municipal Administration and Urban Development Department, it became a part of Vijayawada metropolitan area. It has population of 49,006 of which 26,574 are males while 22,432 are females as per report released by Census India 2011. Population of Children with age of 0-6 is 4401 which is 8.98 % of total population of Kanuru. In Kanuru Census Town, Female Sex Ratio is of 844 against state average of 993. Moreover Child Sex Ratio in Kanuru is around 958 compared to Andhra Pradesh state average of 939. Literacy rate of Kanuru city is 85.07 % higher than state average of 67.02 %. In Kanuru, Male literacy is around 88.71 % while female literacy rate is 80.71 %. Kanuru has total administration over 11,330 houses to which it supplies basic amenities like water and sewerage. It is also authorized to build roads within Census Town limits and impose taxes on properties coming under its jurisdiction.

Out of total population, 15,455 were engaged in work or business activity. Of this 12,484 were males while 2,971 were females. In census survey, worker is defined as person who does business, job, service, and cultivator and labour activity. Of total 15455 working population, 95.57 % were engaged in Main Work while 4.43 % of total workers were engaged in Marginal Work.

### **Agriculture:**

Kanuru's economy is based on agriculture, mainly rice and sugar cane. The land is very fertile, and irrigation canals which draw water from the Krishna River crisscross the area. The main canal in the town is Pulleru Canal. A small dam and bridge were constructed during the British period on the canal in the town in 1890. This bridge served the locals for more than a century. Until 1988 small boats used to ply in some regions to transport people across.



Fig: 2.1

### **Culture :**

Kanuru has many temples out of which the famous one is Sri Ramalingeswara Swamy Temple, one of the prominent temples of Lord Shiva. Every year in the month of November, Karthika masa Utsavalu are conducted in the temple, which attracts several pilgrims. It was started in the 16th Century during the Vijayanagara Empire. It has been continued and the tradition was became a famous ritual for hundreds of villages in and around and acts as traditional gathering and cultural cohesion . People from Kanuru and the surrounding villages celebrate this tradition in various forms like Sambaram, Jathara for about 15-20 days.

### **Transport:**

#### **Roadways:**

It is located on the National Highway 65. A four-lane road from Vijayawada to Machilipatnam passes through Kanuru. APSRTC operates buses from the Auto Nagar bus station which is nearest bus station to Kanuru, and it also has a bus depot. The government-owned bus stand and bus depot were constructed in 1987. The then chief minister of the state N. T. Rama Rao laid the foundation stone for the project. The town has a total road length of 64.14 km (39.85 mi). A bypass road was constructed in 1987 to divert traffic from main roads. This bypass connects Machilipatnam with Vijayawada, Hyderabad, and Pune. All heavy vehicles travel over this road to ease traffic through town. It has now been developed and transformed into a four-lane road and which is maintained by NHAI as the Machilipatnam-Pune Highway.

The most common buses travelling between Vijayawada and Kanuru are the route nos. 55, 31T & 7T. Vijayawada's major bus stand, the Pandit Nehru Bus Station is located at a distance of 10 km from Kanuru.

#### **Railways:**

There is no railway station in Kanuru. The major nearby railway stations are Gudivada Junction railway station (47 km) and Vijayawada Junction railway station (11 km). The nearest intermediate railway station is Ramavarappadu railway station (5 km)

#### **Airways:**

The nearest airport is Vijayawada International Airport which is at a distance of about 13.5 km.

#### **Educational Institutions:**

It has many prestigious Educational Institutions out of which the most significant ones are Prasad V. Potluri Siddhartha Institute of Technology( estd.1998) and Velagapudi Ramakrishna Siddhartha Engineering College( estd.1977).

## **CHAPTER 3: COMMUNITY SERVICE PART**

During our community service project, we visited the town of Kanuru and conducted a survey over a period of two days to collect feedback and identify the issues faced by the local residents. One of the major concerns that were raised during our survey was the increasing problem of garbage disposal. With the growing amount of waste being produced, it is crucial to implement efficient and effective methods of disposal. Dustbins are containers that collect and store items that are recyclable or non-recyclable, decomposable or non-decomposable. They are commonly used in homes, offices, and other public spaces, but when they become full, there is often no one available to clean them, and the garbage spills out. This not only creates an unsightly mess, but it also increases pollution levels in the surrounding area.

I started this project to solve these problems and provide relief from the problems in that area. I presented the project proposal to the municipal commissioner, and he was very impressed with the concept. He provided his support and encouragement to pursue the development of the project. Additionally, I also explained the project to the local residents and received positive feedback and cooperation from the community. They were excited about the potential benefits that the smart dustbin would bring to their community. Overall, the project has received strong support from the local government and community residents.

I have acquired some technical coding skills that have given me enough knowledge to write the code for the given project using the Arduino IDE and also acquired some non-technical skills while undertaking the project. Communication skills, coding skills, presentation skills, discussion skills, and time management skills have all been discovered in me during the course of the project. These are some of the skills that I have acquired during the duration of the project. This will also help me with my future project.

The smart dustbin is not only a useful tool for keeping homes and public spaces clean, but it is also an interesting and fun gadgets that can help maintain cleanliness in homes. It can be used for various types of waste, and the lid will only open when it is required. This not only helps to keep the surrounding area clean but also reduces the risk of disease caused by bacteria and viruses that can be produced by the pollution due to improper garbage disposal. Overall, the smart dustbin is a reliable source that can make a big difference in keeping our homes and public spaces clean.

## CHAPTER 4: ACTIVITY LOG

### ACTIVITY LOG FOR THE FIRST WEEK

Day & Date	Brief description of the daily Activity	Learning Outcome	Person In-Charge Signature
Day – 1 28.11.2022	Selection/Identification of historical profile of the village /community / habitation	Identifying the village with some problems, that can be solved by IoT.	
Day – 2 29.11.2022	Selection/Identification of historical profile of the village /community / habitation	Selected the Kanuru municipality as it has problems related to garbage disposal. Software methods can be opted for solution.	
Day – 3 30.11.2022	Identification of the problem(s)	The major problem of the village is lack of proper alternatives for garbage disposal, resulting in various health problems in the residents.	
Day – 4 01.12.2022	Data collection and statistics related to village /community / habitation	We have collected the details of the town with boundaries. Recognized the areas with major effect.	
Day – 5 02.12.2022	Solution to the problem	Can solve this problem by developing a smart dustbin for garbage disposal.	
Day –6 03.12.2022	Scope and significance of the work	We have contacted the local municipality for this.	

## WEEKLY REPORT

**WEEK – 1 (from 28/11/2022 to 03/12/2022)**

<b>Objective of the Activity Done: Problem identification and solution</b>
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<b>Detailed Report:</b>
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<p>I have identified the town near to me with critical problems faced by the people present in that area. I have selected Kanuru village to undertake a community service project over there. The major problem that most of the people pointed is that they are facing many problems with the garbage disposal in that area. This is mainly due to the lack of proper facilities which results in various health issues caused by the bacteria and viruses developed due to improper garbage disposal. The problem of this village can be solved by developing a prototype of a <b>smart dustbin</b> which facilitates for a proper garbage disposal in that area. This works with the sensor based circuitry. So this can be an initial step towards a smart and an efficient management of the garbage disposal.</p>
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## ACTIVITY LOG FOR THE SECOND WEEK

Day & Date	Brief description of the daily Activity	Learning Outcome	Person In-charge Signature
Day – 1 05.12.2022	Identification of different requirements.	Identified the requirement of software and hardware parts for the prototype implementation.	
Day – 2 06.12.2022	Identification of different requirements.	Identified the general requirements that is the wires and filters for the work.	
Day – 3 07.12.2022	Specifications of Hardware requirements	Arduino UNO plays a key role in the prototype.	
Day – 4 08.12.2022	Specifications of Hardware requirements	The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller.	
Day – 5 09.12.2022	Specifications of Functional/ Non-functional requirements	Servo motor can be used to operate the lid of the dustbin.	
Day –6 10.12.2022	Specifications of Functional/ Non-functional requirements	Ultrasonic sensor can be used to detect the motion of objects in front of the dustbin and also for the garbage level monitoring.	

## WEEKLY REPORT

**WEEK – 2 (from 05/12/2022 to 10/12/2022)**

<b>Objective of the Activity Done: Gathering of requirements</b>
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**Detailed Report:**

The **Ultrasonic sensor** is an electronic device that measures the distance of the target object by emitting ultrasonic sound waves and converts the reflected sound into an electric signal.

The sensor has a very low current consumption (20mA max, 11mA typical), and can be powered with up to 7VDC.

**Arduino** is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

**Servo motor** is a type of electrical motor that can rotate with great precision. It consists of a control circuit that provides a feedback on the current position of the motor shaft, this allows the servo motor to operate the lid of the smart dustbin.

A **Buzzer** is an audio signaling device that is used for producing a sound while monitoring the garbage levels in the dustbin by the Ultrasonic sensor placed inside the bin.

A **Jumper wire** is an electrical wire or a group of them in a cable, with a connector or pin at each end which is generally used to interconnect the components in a given circuit internally without soldering them.

### ACTIVITY LOG FOR THE THIRD WEEK

<b>Day &amp; Date</b>	<b>Brief description of the daily Activity</b>	<b>Learning Outcome</b>	<b>Person In- Charge Signature</b>
Day – 1 12.12.2022	Systemdesign/architecture/framework	To design a circuit for the smart dustbin prototype.	
Day – 2 13.12.2022	Design of Software modules.	Researching the required code for the project. Using Arduino IDE.	
Day – 3 14.12.2022	Design of Hardware modules.	Connecting the Ultrasonic sensor andthe Arduino UNO board for the hardware implementation.	
Day – 4 15.12.2022	Design of Hardware modules.	Combining both the hardware and software modules together to obtain a working model.	
Day – 5 16.12.2022	Methodology	The main methodology of the project is to reduce the human effort and simplify the garbage disposal process.	
Day –6 17.12.2022	Methodology	The working of this prototype is through the Ultrasonic sound transmission and other software integration.	

## WEEKLY REPORT

### WEEK – 3 (from 12/12/2022 to 17/12/2022)

#### **Objective of the Activity Done: System Design**

##### **Detailed Report:**

An Arduino board is a microcontroller board that is based on the open-source Arduino platform. It includes a microcontroller chip, input/output pins, and various other components that allow it to interact with sensors, actuators, and other devices. Arduino IDE (Integrated Development Environment) is a software application that allows users to write, upload, and debug code for the Arduino platform.

**Ultrasonic Sensor,** This sensor is used in to locate the distance between the smart dustbin and hand/object come near to it. The principle behind finding distance of obstacle is sonar wave. It only detects obstacle when Triggerpin receive high pulse for the period more than 10 us. When this sensor verifies the presence of hand (obstacle) it starts to send eight cycles of ultrasonic burst at 40 KHz and then it waits for reflected ultrasonic signal. Ultrasonic sensor module has two drums. One of the drums is used for transmitting the pulse of ultrasonic and the second drums are for receiving the ultrasonic signal. When ultrasonic detect/sense object, the echo pin of module is set high. Waiting period of reflected pulse is completely dependent upon the location of obstacle. When the echo signal is obtained, we can calculate the distance.

## ACTIVITY LOG FOR THE FOURTH WEEK

<b>Day &amp; Date</b>	<b>Brief description of the daily activity</b>	<b>Learning Outcome</b>	<b>Person In-charge Signature</b>
Day – 1 19.12.2022	Implementation of software	To know how to install Arduino IDE and know how to use the software.	
Day – 2 20.12.2022	Implementation of software	To write a code for Arduino IDE for the project and how to dump the code in it.	
Day – 3 21.12.2022	Implementation of hardware/software	Dump the code in the Arduino UNO Board. To get the required output.	
Day – 4 22.12.2022	Implementation of hardware	To make the connection according to the circuit. Connecting Arduino UNO and the Ultrasonic sensor.	
Day – 5 23.12.2022	Implementation of hardware	Connecting the above circuit to the Servo motor and the Buzzer and giving the power supply needed.	
Day – 6 24.12.2022	Implementation of hardware/software	Combining both the software and hardware together to form a complete circuit for the project.	

## WEEKLY REPORT

**WEEK – 4 (from 19/12/2022 to 24/12/2022)**

### **Objective of the Activity Done: System Implementation Detailed Report**

The smart dustbin works on the principle of detection of an object using ultrasonic sensor. The ultrasonic sensor transmits the sound waves. These waves reflect backward when they come in contact with the target objects in the vicinity of the sensor. As a result, an electrical signal is generated and transmitted to the servo motor which helps to open the lid of the smart dustbin to dispose the waste. After sometime, the lid is closed automatically depending upon the predefined time specified in the source code.

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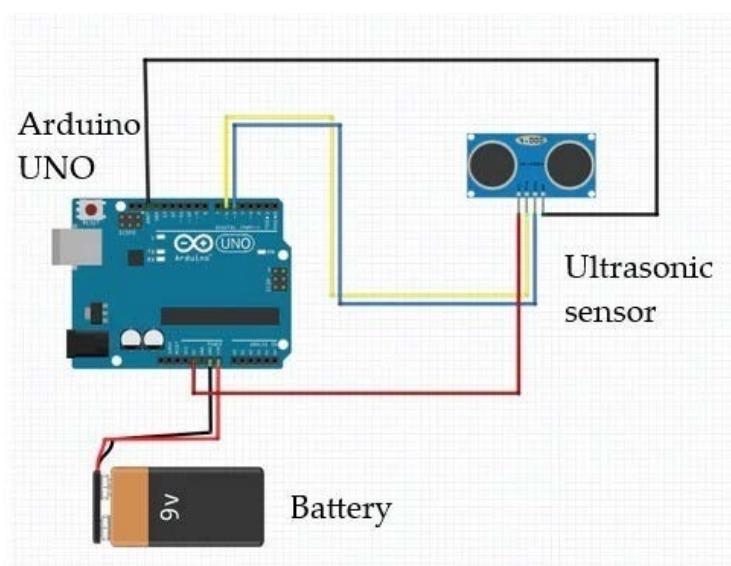


Fig:-4.4.1 Circuit Diagram of System.

## ACTIVITY LOG FOR THE FIFTH WEEK

<b>Day &amp; Date</b>	<b>Brief description of the daily activity</b>	<b>Learning Outcome</b>	<b>Person In-Charge Signature</b>
Day – 1 26.12.2022	Testing of project	After all the connections we went under validating the project result. Found there is a error in connections.	
Day – 2 27.12.2022	Solving of the errors in hardware	Checking the proper connection once again and solving the error.	
Day – 3 28.12.2022	Solving of the errors in software	Checking whether the implemented code is correct under various circumstances	
Day – 4 29.12.2022	Solving of the errors in software	There are some technical issues in the Arduino IDE. Installed some packages in the software and tested the code again.	
Day – 5 30.12.2022	Testing project results	All the test cases were executed fully with expected results .	
Day –6 31.12.2022	Validation of project results	Reported all the test cases for the project and project is ready after the testing.	

## WEEKLY REPORT

### WEEK – 5 (from 26/12/2022 to 31/12/2022)

<b>Objective of the Activity Done: Results testing and validation</b>
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**Detailed Report:**

Improper disposal of waste leads to the development of bacteria and viruses, which can cause harmful diseases. Smart can be an effective solution to address these issues.

The proposed system's framework is based on the IoT. The Internet of Things is a network of interconnected computing devices that can send and receive data without the need for human intervention. Micro-controllers, sensors, and communication devices make up the IoT ecosystem, which collects, sends, and acts on data collected from its surroundings. Our "IoT-Based Smart Dustbin for Garbage," a cost-effective andportable gadget, is an efficient solution for garbage disposal that utilises modern technology to improve the overall process and reduce human effort.

The proposed Smart Dustbin system consists of both hardware and software design. While the hardware employs ultrasonic sensors, an Arduino board is used to construct an integrated system capable of monitoring garbage levels within the bin and detecting the presence of an object outside the bin, which opens the lids via a servo motorconnected to an Arduino UNO board. The prototype was conceived, built, and tested. Results After all the connections, we went under the heading of validating the project result. There is an error in the connections. After all the above corrections, we went underthe gun again. All the cases were successfully executed. After running several test cases, Iinstalled some software packages and dumped the code into the Arduino IDE. All the testcases were fully executed with the expected results. Reported that all the test cases were successful and the project is ready.

## ACTIVITY LOG FOR THE SIXTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day – 1 16.01.2023	Preparation of the project report	I completed a quick analysis of the executive summary then prepared the report for the required data.	
Day – 2 17.01.2023	Preparation of the project report	Looked for the required hardware, software, and functional and nonfunctional requirements, too.	
Day – 3 18.01.2023	Preparation of the project report	Implementation on hardware and software modules that are installed in the project.	
Day – 4 19.01.2023	Preparation of the project report	Validating and testing results for the report. Overcoming the failed test cases.	
Day – 5 20.01.2023	Preparation of the project report	Describe the problems you have identified in the community. To resolve the problems and write solutions for the problems.	
Day – 6 21.01.2023	Preparation of the project report	Upload the photos and video links in the project . To finalize the project report as per the guidelines	

## **WEEKLY REPORT**

**WEEK – 6 (from 16/01/2023 to 21/01/2023)**

<b>Objective of the Activity Done: Document preparation on Smart Dustbin</b>
<b>Detailed Report:</b>
I have prepared the report as per the instructions of the guide and the person who is in charge. The instructions are to prepare the report with a pleasant and detailed overview of the project. In the beginning of the report, there is a certificate that is initialed. or given by the community official or government officer, followed by the student's declaration and acknowledgement. These are crucial documents that are very important for the project. And then it is followed by the brief (i.e., overview) on the executive summary, and then the list of the required data is prepared. followed by required hardware, software, and functional and non-functional equipment too. followed by the implementation of the hardware and software modules that are installed in the project. Experimenting and checking the outputs of the project, solving the errors, re-doing the experiments, and checking the outputs The above report gives a detailed analysis of the problems that have been identified in the community. The solutions to the problems are also included in the report. We have also uploaded the photos that we have taken during the survey and included the project in the report. to the final report as per the given guidelines. This report is the final outline of the project's activities, which are meticulously documented in the final report. The report is finally completed.

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## CHAPTER 5: OUTCOMES DESCRIPTION

Details of the Socio-Economic Survey of the Village/Habitation Attach the questionnaire prepared for the survey.

**Kanru sanitation** and garbage collection have become problems for the residents on the city's outskirts. The density of population in nagara panchayats of Kanuru mandal has increased in recent years, as has the demand for rooms and PGs because of students studying at Prasad V. Potluri Siddhartha Institute of Technology and Velagapudi Ramakrishna Siddhartha Engineering College. But sanitation facilities and manpower at the local bodies have remained the same, which is creating problems.

Residents of these areas are facing problems with the poor sanitation and garbage management implemented by the panchayats. Garbage has become a big problem at Kanuru. Dumper bins were not available in the colony, and citizens were throwing waste on the streets. Despite our complaints, panchayat workers have not cleared the garbage for weeks. stinking smell is creating problems. "Starry pigs and dogs are creating problems for us." We are unable to leave our homes due to the foul odor. Vacant lands in the locality have become dump yards. The government should consider our problems and maintain sanitation.

"We don't have sufficient sanitation staff." We are working day and night to clear the garbage, but it has become an impossible task for us. "We hope the government will increase the staff considering the problems," says a panchayat official on condition of anonymity.

**QUESTIONNAIRE :**

- Q. What are the social impacts of waste disposal?
- Q. Is there any other way to get rid of garbage other than putting it in a landfill?
- Q. How frequently should the waste hauler be scheduled to pick up?
- Q. What are the appropriate locations for receptacles throughout your working environment?
- Q. Do you need receptacles for hazardous waste?
- Q. What are the factors to consider when placing the bins?

## **DESCRIBE THE PROBLEMS YOU HAVE IDENTIFIED IN THE COMMUNITY**

Garbage deposits can have a significant impact on public health, as they can facilitate the spread of disease. When garbage is not properly disposed of, it can attract pests such as rats and insects, which can carry diseases. Additionally, the accumulation of garbage can lead to unpleasant odors and unsanitary conditions, which can negatively impact the health of local residents.

Garbage deposits can also have a significant impact on the environment. They can lead to high clean-up costs, as local governments and organizations are often responsible for removing the garbage and cleaning up the area. Additionally, garbage deposits can have a detrimental effect on local wildlife, as they can attract animals and birds that may ingest or become entangled in the waste, leading to injury or death. Furthermore, garbage deposits can also lead to soil and water pollution, which can harm the local ecosystem and make it difficult for plants and animals to survive.

Garbage deposits can also negatively impact local tourism and the aesthetic value of an area. Tourists may be less likely to visit an area that is littered with garbage, and local residents may find it unpleasant to live in or visit an area that is dirty and unsanitary. In addition, garbage deposits can also act as breeding ground for insects and other pests, which can further add to the unsanitary conditions of an area. It's important for local communities and government to take action to address the problem of garbage deposits in order to protect public health and the environment, as well as maintain the aesthetic value and tourism industry of an area.

### **ANALYSIS:**

**Mix garbage:** In the existing system the garbage is thrown in the same dustbin i.e. the wet and dry waste is not disposed properly and so to avoid this smart dustbin system is prepared.

**Foul smell:** because of the improper disposal of waste the foul smell of the garbage is spread throughout and because of it many diseases occurs. And to avoid these smart dustbins are developed.

**No separation of wet and dry waste:** In the existing system both the waste means dry and wet waste is not disposed properly that means it is thrown in one dustbin and to avoid this smart dustbin system is developed.

**Spread diseases:** wet and dry waste is thrown in same dustbin and it can spread diseases, so this new technology which is being prepared will reduce the spreading of the disease.

**Short-Term And Long-Term Action Plan For Possible Solutions For The Problems identified And That Could Be Recommended To The Concerned Authorities For Implementation.**

**Short-term plans for the above project could include:**

- Conducting further surveys in the Kanuru town to gather more detailed information about the local garbage disposal issues and the feasibility of implementing the smart dustbin project.
- Building a prototype of the smart dustbin using Arduino UNO and ultrasonic sensor and testing it in a controlled environment to ensure that it functions as intended.
- Forming a partnership with a local organization or government agency to provide financial or logistical support for the project
- Developing a marketing strategy to raise awareness about the smart dustbin project among the local community and to generate support for its implementation.

**Long-term plans for the above project could include:**

- Expanding the smart dustbin project to other areas in the Kanuru town, and eventually to other towns and cities in the region.
- Incorporating additional features into the smart dustbin, such as sensors that detect the type of waste being disposed of and sorting mechanisms that separate recyclable materials from non-recyclable materials.
- Developing a monitoring and maintenance system to ensure that the smart dustbins are functioning correctly and to address any issues that may arise.
- Conducting a study on the environmental impact of the smart dustbin project and using the findings to make improvements to the design and implementation of the project.

## **Report of The Mini-Project Work Done In The Related Subject W.R.T The Habitation/Village.**

### **Abstract:**

The project's main goal is to create a smart trash can that will help keep our environment clean and eco-friendly. We are inspired by the Swachh Bharat Mission. Nowadays, technologies are getting smarter day-by-day, so to clean the environment, we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on a microcontroller-based system that has ultrasonic sensors on the dustbin. If dustbins are not maintained, they can cause an unhealthy environment and pollute our air, which affects our health. In this proposed technology, we have designed a smart dustbin using the Arduino Uno, along with an ultrasonic sensor, servo motor, and battery jumper wire. After all hardware and software connections are made, the Smart Dustbin programme will be run. The dustbin lid will open when someone comes nearer, wait for the user to put garbage in it, and then close it. Whether it's properly running or not It will benefit health and hygiene in the social sector, and we will try to make it affordable to as many people as possible in the business sector. so that everyone, from normal people to rich people, can benefit from it

### **INTRODUCTION:**

Our country's population is rapidly growing, and we've also seen an increase in garbage, which has exacerbated environmental issues. A dustbin is a container used to collect garbage or to store items that are recyclable or non-recyclable, decompose or do not decompose. They are commonly used in homes, offices, and other public places, but when they become full, no one is available to clean it, and the garbage spills out. The surroundings of a dustbin are also conducive to increasing the pollution level. Dustbin air pollution can produce bacteria and viruses that can cause harmful diseases in humans. Therefore, we have designed a smart dustbin using an Arduino Uno and an ultrasonic sensor, which will sense the item to be thrown in the dustbin and open the lid with the help of the motor.

It is an IoT-based project that will introduce a new and smart cleaning method. It is a decent gadget to make your home clean, since practically all offspring of homes consistently make it grimy and spread litter to a great extent through electronics, rappers, and various other things. Since the smart dustbin is additionally intriguing and children make fun with it, it will help maintain cleanliness in the home. It will be applied to various types of waste. When someone or something comes within a certain range of the dustbin, it will open its lid, wait for a certain amount of time, and then close automatically. Here, the lid will close when you don't want to use it and only open when necessary.



Fig(5.1): Smart dustbin

## **METHODOLOGY:**

SMART DUSTBIN USING ARDUINO is an IOT based project. Here we are using arduino for code execution, for sensing we used ultrasonic sensor which will open lid and wait for few moment. It will bring drastic changes in term of cleanliness with the help of technology. Everything is getting with smart technology for the betterment of human being. So this help in maintaining the environment clean with the help of technology. It is a sensor based dustbin so it would be easy to access/use for any age group.

Our aim is also to make it cost effective so that many numbers of people can get the benefit from this. And it should be usable to anyone and helpful for them. To complete our project, we require some software as well as some hardware.

### **Required Software:**

1. ARDUINO IDE

### **Required Hardware:**

1. ARDUINO UNO
2. ULTRASONIC SENSOR
3. SERVO MOTO
4. DUSTBIN
5. BUZZER
6. JUMPER WIRES

### **Implementation and Use of The Major Components:**

#### **Arduino UNO:**

- It is a development board used to process all the operations Source code for the opening and closing mechanism of the lid is developed by using Arduino programming.



Fig(5.2): Arduino Uno

### **Ultrasonic sensor:**

- It is used as an object detecting sensor and it measures the distance between the object and the sensor.
- It is also used to monitor the garbage level in the Dustbin.



Fig(5.3): Ultrasonic sensor

### **Servo motor:**

- It is used to move the lid of the smart dustbin up and down.



Fig(5.4): servo motor

### **BUZZER:**

- A buzzer or beeper is an audio signaling device.
- It is used to send an audible signal when the dustbin is about be full.



Fig(5.5): Buzzer

### **JUMPER WIRES:**

- Used to connect different components in a circuit



Fig(5.6): JUMPER WIRES

### **3. WORKING:**

After wiring and attaching all the devices and setting up to the Smart Dustbin, now observe all the important setup whether they are well connected or something missed. After connection set up now next step is to submit/upload code in Arduino and supply power to the circuit. When system is powered ON, Arduino keeps monitoring for any things that come near the sensor at give range. When Ultrasonic sensor detect any object for example like hand or others, here Arduino calculates its distance and if it less than a certain predefines value than servo motor get activate first and with the support of the extended arm of the lid. Lid will open for a given time than it will automatically close.

The smart dustbin works on the principle of detection of an object using ultrasonic sensor. The ultrasonic sensor transmits the sound waves. These waves reflect backward when they come in contact with the target objects in the vicinity of the sensor.

As a result, an electrical signal is generated and transmitted to the servo motor which helps to open the lid of the smart dustbin to dispose the waste. After sometime, the lid is closed automatically depending upon the predefined time specified in the source code.

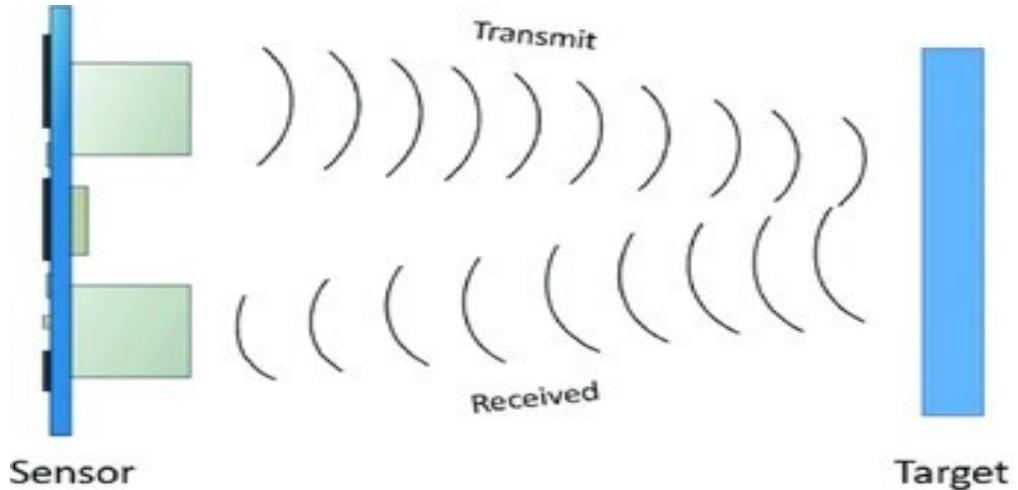


Fig:5.7

#### REQUIREMENTS:

Required software	Required Hardware
1. ARDUINO IDE	1. ARDUINO UNO
	2. ULTRASONIC SENSOR
	3. SERVO MOTOR
	4. BUZZER
	5. DUSTBIN
	6. JUMPER WIRES DEVELOPMENT BOARD

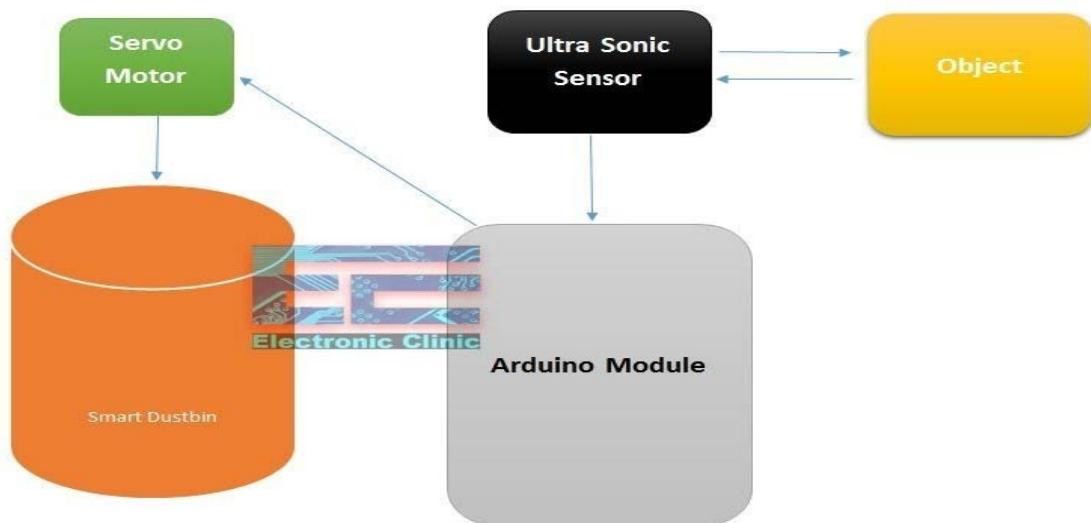


Fig: 5.8 Block diagram

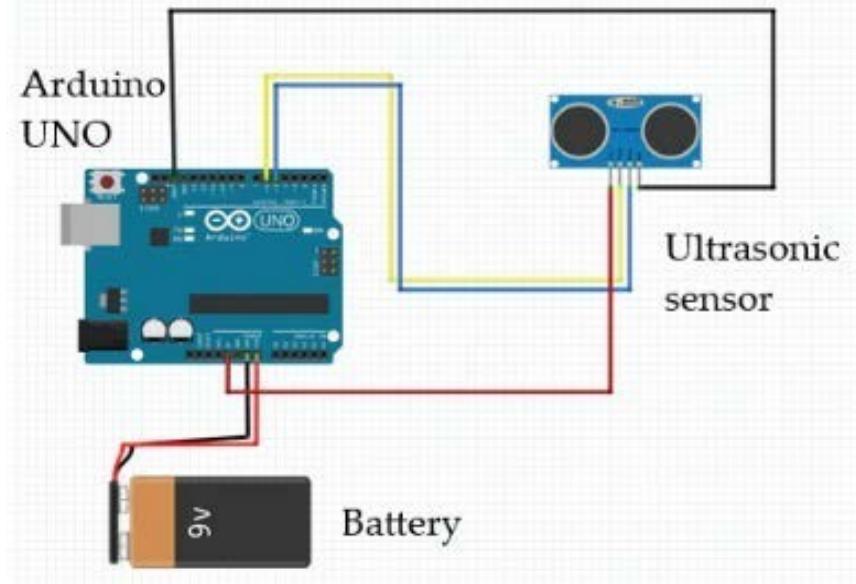


Fig: 5.9 Circuit Diagram

### SOURCE CODE:

```
#include <Servo.h>
Servo myservo;
#define tr1 7
#define ec1 6
#define tr2 9
#define ec2 8
int buz=13;
void setup() {
    Serial.begin(9600);
    pinMode(buz,OUTPUT);
    pinMode(ec1,INPUT);
    pinMode(ec2,INPUT);
    myservo.attach(11);
    pinMode(tr1,OUTPUT);
    pinMode(tr2,OUTPUT);
    delay(500);

}
void loop()
{
digitalWrite(tr1,1);
delay(0.001);
digitalWrite(tr1,0);
int dst1=pulseIn(ec1,1)/58.2;
digitalWrite(tr2,1);
delay(0.001);
digitalWrite(tr2,0);
int dst2=pulseIn(ec2,1)/58.2;
Serial.println("D1:");
}
```

```

Serial.println(dst1);
Serial.println("D2:");
Serial.println(dst2);
delay(1000);
if(dst1<8)
{
    digitalWrite(buz,1);
    delay(2000);
    digitalWrite(buz,0);
}
else
{
    digitalWrite(buz,0);
}
if(dst2<20)
{
    myservo.write(170);
}
else
{
    myservo.write(30);
}
}

```

## **ADVANTAGES:**

Following are the advantages of using Smart dustbin:

- A reduction in the number of waste collections needed by up to 80%, resulting in less manpower, emissions, fuel use and traffic congestion.
- A reduction in the number of waste bins needed.
- Maintain environment hygiene (i.e. no overflowing of waste and less unpleasant odor).
- It will help in bringing evolution by technology in term of cleanliness.

## **DISADVANTAGES:**

- Life span of the product may decrease if not maintained properly.
- More specifications are required for garbage segregation like wet and dry waste using this mechanism.

## EXPERIMENTAL RESULTS OF IMPLEMENTED PROTOTYPE:



Fig: 5.10



Fig: 5.11

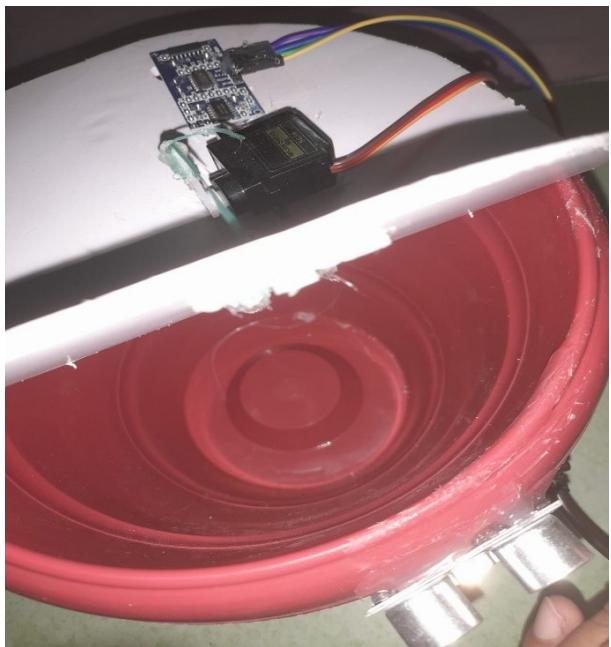


Fig: 5.12



Fig: 5.13

## **CHAPTER 6: RECOMMENDATIONS AND CONCLUSION**

### **RECOMMENDATIONS:**

For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it. Believe this will bring something changes in term of cleanliness as well technology. So our next work will be adding one more sensor which will sense whether our dustbin is full or not. And there will be a display will be added so that user can notify that dustbin is full or not.

As the people are throwing all types of wastes into the single dustbin is not correct so they must know how to use dustbins in a proper way and they must throw dry and wet wastes separately. This helps to recycle some wastes. people of the city must get this point and must be aware of using the dustbins in a good way

If there is any problem in the implemented bin that must be taken into the notice of municipality to sort it out.

### **CONCLUSION:**

Here we are going to make an evolution changes toward cleanliness. The combination of intelligent waste monitoring and trash compaction technologies,smart dustbins are better and shoulders above traditional garbage dustbin. It is equipped with smart devices like sensor Arduino etc.Lid of the dustbin will automatically open when an object comes near to the dustbin and after certain time period it will close the lid.

If the dustbin is filled to upto the certain level, the Ultrasonic sensor placed inside detects the garbage level and sends an electronic signal to the Buzzer, as a result the buzzer responds with a audible sound indicating the dustbin is full.

Therefore we demonstrated the Smart dustbin which works on sensor based circuitry. It reduces the human effort and plays a vital role in the smarter and easier management of waste disposal.

## Student Self-Evaluation for the Community Service Project

**Student Name: MOHAMMED FAIZUDDIN**

**Registration No: 201501A05B4**

**Period of CSP: From:28-11-2022 to  
21-01-2023**

**Date of Evaluation: 30-01-2023**

**Please rate your performance in the following areas:**

**Rating Scale:      Letter grade of CGPA calculation to be provided**

1	Oral communication	1	2	3	4	5
2	Written communication	1	2	3	4	5
3	Proactiveness	1	2	3	4	5
4	Interaction ability with community	1	2	3	4	5
5	Positive Attitude	1	2	3	4	5
6	Self-confidence	1	2	3	4	5
7	Ability to learn	1	2	3	4	5
8	Work Plan and organization	1	2	3	4	5
9	Professionalism	1	2	3	4	5
10	Creativity	1	2	3	4	5
11	Quality of work done	1	2	3	4	5
12	Time Management	1	2	3	4	5
13	Understanding the Community	1	2	3	4	5
14	Achievement of Desired Outcomes	1	2	3	4	5
15	<b>OVERALL PERFORMANCE</b>	1	2	3	4	5

*Md.Faizuddin*

**Date: 30 - 01 - 2023**

**Signature of the student**

Evaluation by the Person in-charge in the Community/Habitation

Please rate the student's performance in the following areas:

**Student Name: MOHAMMED FAIZUDDIN**

**Registration No: 21501A5B4**

**Period of CSP: from 28/11/2022 to 21/01/2023**

**Date of Evaluation: 30/01/2023**

**Name of the Person in-charge: Ms.Y.Manasa**

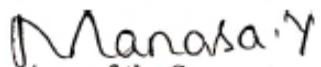
**Mobile NO: 7013752626**

**Please note that your evaluation shall be done independent of the Student's self-evaluation.**

**Rating Scale: Letter grade of CGPA calculation to be provided**

1	Oral communication	1	2	3	4	5
2	Written communication	1	2	3	4	5
3	Proactiveness	1	2	3	4	5
4	Interaction ability with community	1	2	3	4	5
5	Positive Attitude	1	2	3	4	5
6	Self-confidence	1	2	3	4	5
7	Ability to learn	1	2	3	4	5
8	Work Plan and organization	1	2	3	4	5
9	Professionalism	1	2	3	4	5
10	Creativity	1	2	3	4	5
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12	Time Management	1	2	3	4	5
13	Understanding the Community	1	2	3	4	5
14	Achievement of Desired Outcomes	1	2	3	4	5
15	<b>OVERALL PERFORMANCE</b>	1	2	3	4	5

Date: 30 - 01 - 2023

  
Signature of the Supervisor

## PHOTOS

### SURVEY:



Fig: 6.1



Fig: 6.2

### IMPROPER GARBAGE DISPOSAL IN THE COMMUNITY



Fig: 6.3



Fig: 6.4

EXPLAINING ABOUT THE SERIOUSNESS OF THE PROBLEM :



Fig: 6.5



Fig: 6.6

DEMONSTRATING THE DEVELOPED PROTOTYPE:



Fig: 6.7



Fig: 6.8



Figs: 6.9, 6.10, 6.11

**DEMONSTRATING IN SACHIVALAYAM, KANURU:**



Fig: 6.12