Framework to Detecting the Density of mosquitoes at Dumpyard

Under the guidance of

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Associative Professor

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TABLE OF CONTENTS

Contribution of the candidate

Project Associate (PA)	Problem Formulation	Design	Implementation	Testing	Deployment	Project Report Writing
19K61A1223	Yes	Yes	Yes	Yes	Yes	Yes
19K61A1252	Yes	Yes	Yes	Yes	Yes	Yes
19K61A1242	Yes	Yes	Yes	Yes	Yes	Yes
19K61A1234	Yes	Yes	Yes	Yes	Yes	Yes

ABSTRACT

Mosquitoes are one of the most significant vectors for transmitting diseases like malaria, dengue, and chikungunya, among others. One of the primary breeding grounds for mosquitoes is a landfill or dump yard, where organic waste materials create the perfect environment for mosquito larvae to thrive. It is important to raise awareness about proliferation by monitoring its incidence, especially in poor regions. In order to avoid the mosquitoes, people use chemical repellents which act the environment adversely. Use of mosquito Repeller skin creams can cause skin problems. We proposed system is iot sensor such as acoustic sensor to identify mosquito species density by using mosquito frequency it automatically spray the pesticides. The proposed mosquito Repeller system consumes low power with an adequate at roadability, availability, and versatility. The designed system can be effectively used in lawns and environment parks to repel the mosquitoes.

INTRODUCTION

- According to the World Health Organization (WHO)mosquito bites result in the deaths of more than one million people every year with the majority of these deaths due to malaria. The WHO estimates that between 300 and 500 million cases of malaria occur each year and a child dies from malaria every 30 seconds. Around the world, malaria transmission occurs in 97 countries.
- The poorest segments of society and least-developed countries are the most affected. People from poor communities with little access to healthcare and clean water sources are also at risk.
- Countries affected by malaria turn to control rather than eradication. Vector control means decreasing contact between humans and disease carriers on an area-by-area basis. It is therefore crucial to be able to detect the presence of mosquitoes in a specific area. This paper presents an approach Low-power, low-cost and without human intervention in resource-constrained area.

METHODOLOGY

Step1: Connect the Acoustic Sensor to the Arduino Uno: The acoustic sensor having a microphone to detecting the mosquitoes sound. It typically has three pins: VCC, GND, and OUT. Connect the VCC pin to the 5V pin of the Arduino Uno, the GND pin to the GND pin of the Arduino Uno, and the OUT pin to a digital pin of the Arduino Uno.

Step2:Connect the GSM module to the Arduino Uno: GSM mainly used for mobile communication for sending and receiving SMS messages.The GSM module is typically connected to the Arduino Uno via a serial communication interface using the TX and RX pins.

Step3:Connect the Relay to the Arduino Uno: The relay is used to control the pump based on the sound level, if mosquitoes sound is high then relay automatically ON the pump.

Step4:Connect the LCD to the Arduino Uno: The LCD is used to display the sound level and system status.

Step5:Connect the Pump to the Relay: The pump is used to spray the pesticides based on the sound level,if mosquitoes sound is high then pump will spray otherwise pump is OFF.

GANTT CHART

Duration in weeks ->	2	4	6	8	10	12	14	16
Problem Formulation								
Design								
Implementation								
Testing								
Deployment(a-model)								
Project Report Writing								

Number of Weeks

Literature Survey

Classifying mosquito wing beat sound tiny ml.

Abstract	Automatically identify mosquito species by their wingbeat frequency based on TINY ML devices.
Methodology	1.data acquition 2.data preprocessing 3.data preparation 4.feature generation 5.model design 6 model training 7 model traing
Alogorithm	acoustic method .

Literature Survey...

Classifying mosquito wing beat sound tiny ml

Results	The first is cost Another important parameter is power consumption. We have shown that power consumption for both inference and inference plus transmission allow for battery-operated devices for long periods of time. This means that the solutions are field-ready for our application. The third parameter to be considered is flexibility.
Conclusion	To optimize power consumption by developing our bare-bone embedded device to only measure audio signals and send results via LoRaWAN.

Literature Survey

Mosquito tracking, classification, and identification: A glance at the technologies available.

Abstract	In this research, we look at identifying mosquito species. The species of mosquitoes simply and quickly identified using recordings of their wing movements. Because each mosquito species'wingbeats are distinct, this is a solid approach for identifying them.
Methodology	Mosquito Species are Detecting through Wingbeat Frequency. Wingbeat frequency is the most widely used and most accurate method of mosquito identification.
Alogorithm	Acoustic Sensor Optoelectronic Sensor

Literature Survey...

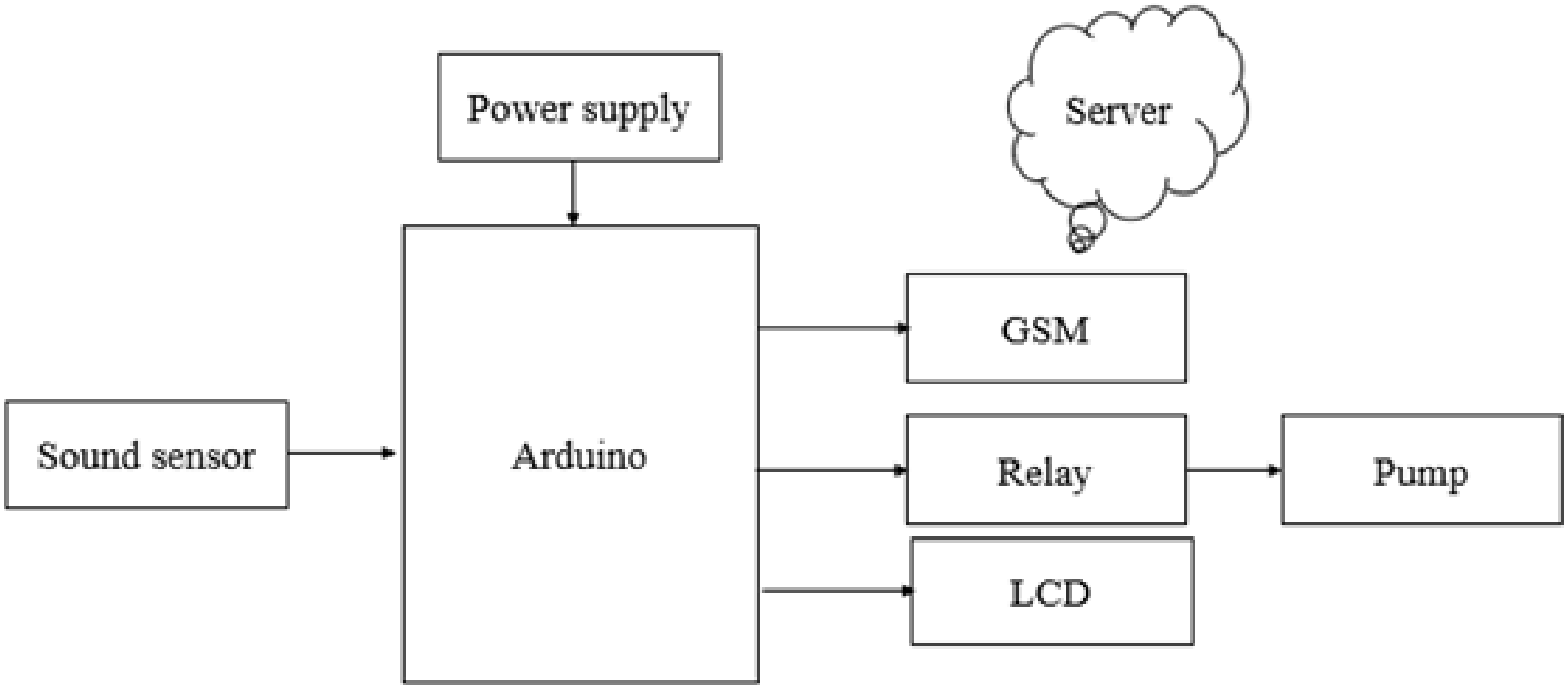
Mosquito tracking, classification, and identification: A glance at the technologies available.

Results	The gender of each mosquito is identified with 96.5 percent accuracy, whereas the species and gender is identified with 62.3 percent accuracy.The fundamental frequency of the female Aedes aegypti mosquito was discovered to be 664.3 Hz at 32.6°F ambient temperature.
Conclusion	Wingbeat frequency is an extensively used and highly accurate method of mosquito identification.

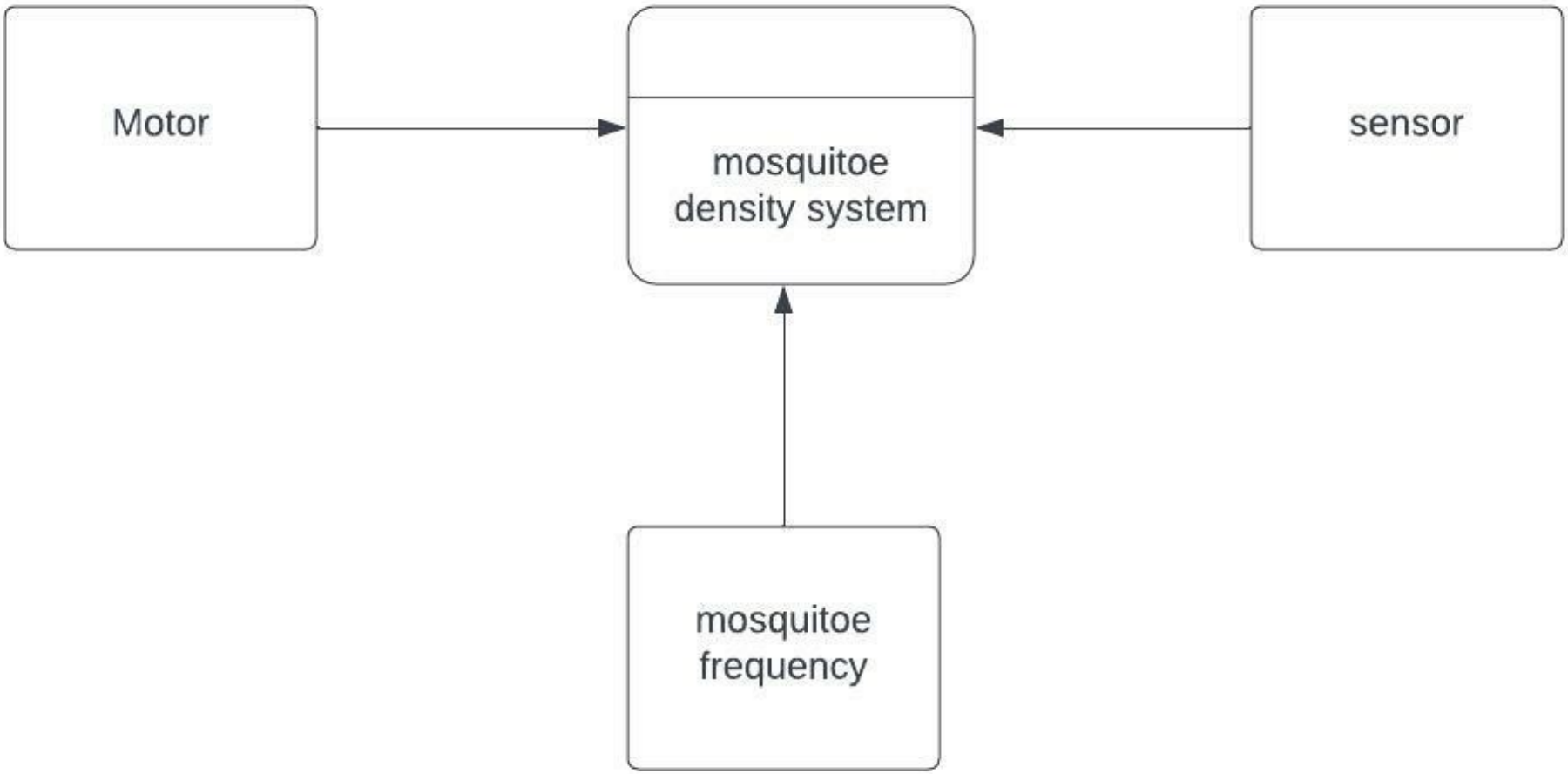
PROPOSED SYSTEM

In the proposed method we are using Sound sensor to detect the density of insects which is connected to the Arduino controller. Sound sensor will detect the sound of insects in decibels, when decibels increased then GSM will send the message and pump will automatically ON to spray the chemicals. The data of sound sensor will continuously upload to the server through GSM and data will display on LCD.

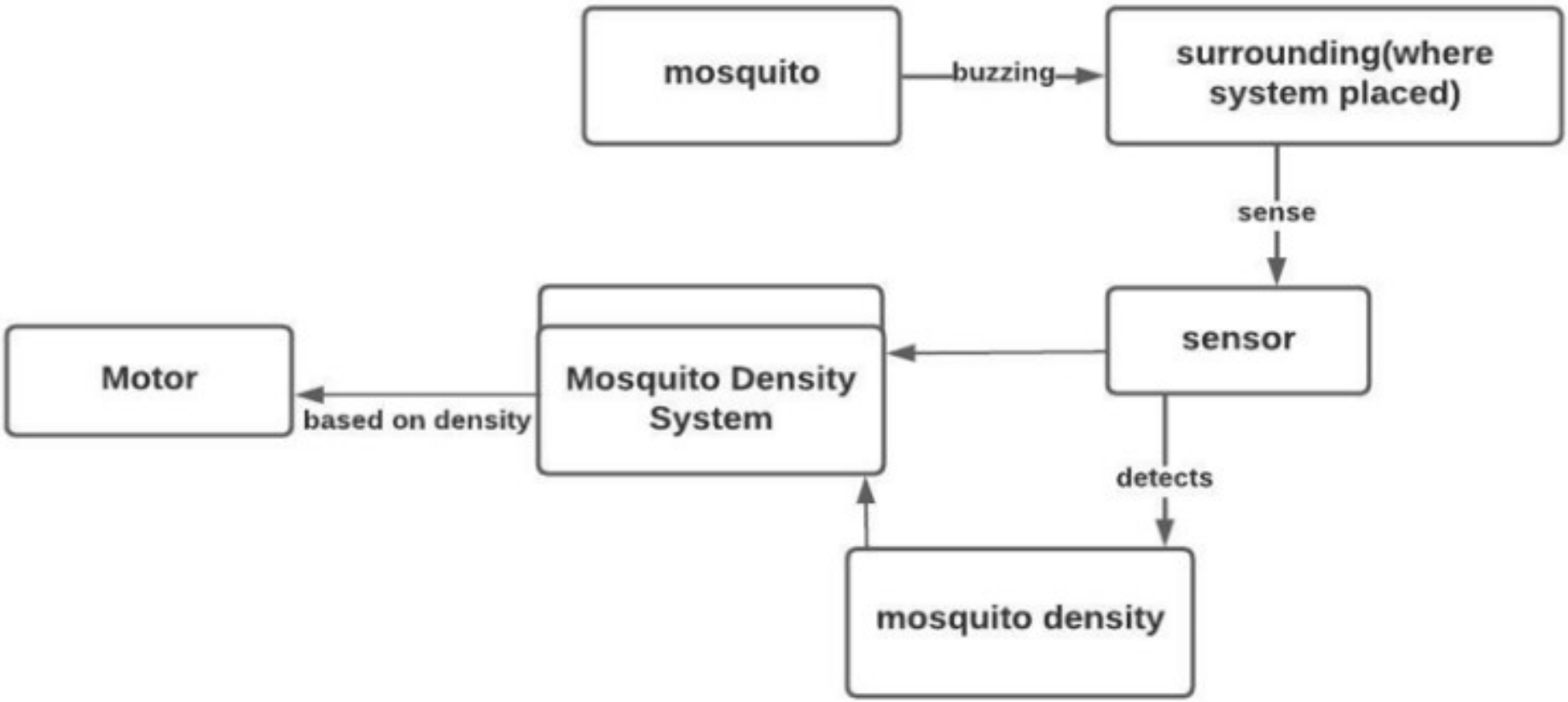
ARCHITECTURE DIAGRAM



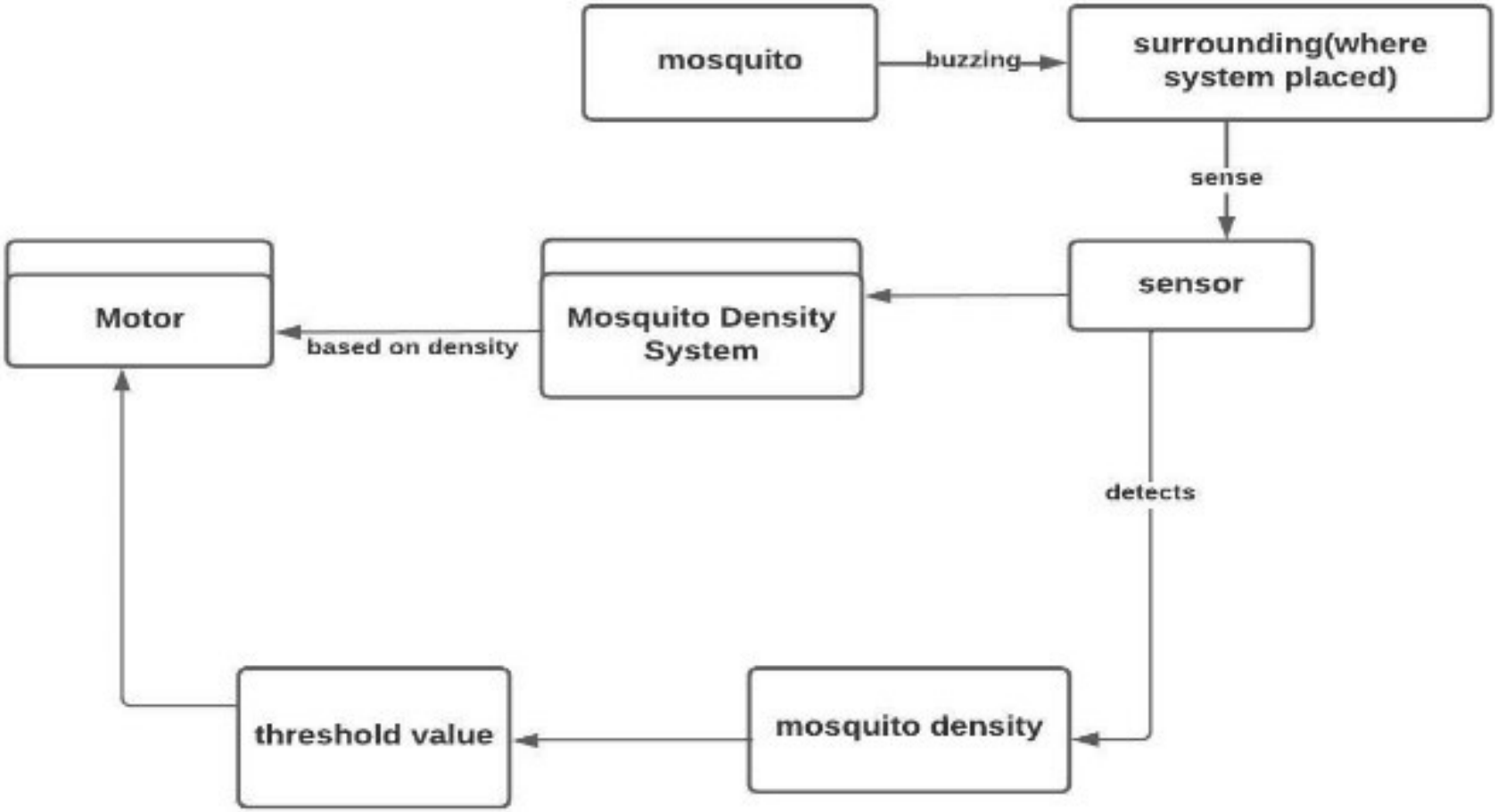
DFD level0


Motor
mosquitoe
density system
sensor
mosquitoe
frequency

DFD level1


mosquito
buzzing
surrounding(where system placed)
sense
sensor
Mosquito Density System
Motor
based on density
detects
mosquito density

DFD level 2


mosquito
buzzing
surrounding(where system placed)
sense
sensor
Mosquito Density System
based on density
Motor
detects
mosquito density
threshold value

REQUIREMENTS

- Arduino
- Acoustic Sound sensor
- GSM
- Relay
- LCD
- Pump
- Power supply

ARDUINO

- Arduino is an open-source electronics platform based on easy-to-use hardware and software.
- It also provides an IDE (Integrated Development Environment) project, which is based on the Processing Language to upload the code to the physical board.

ARDUINO UNO

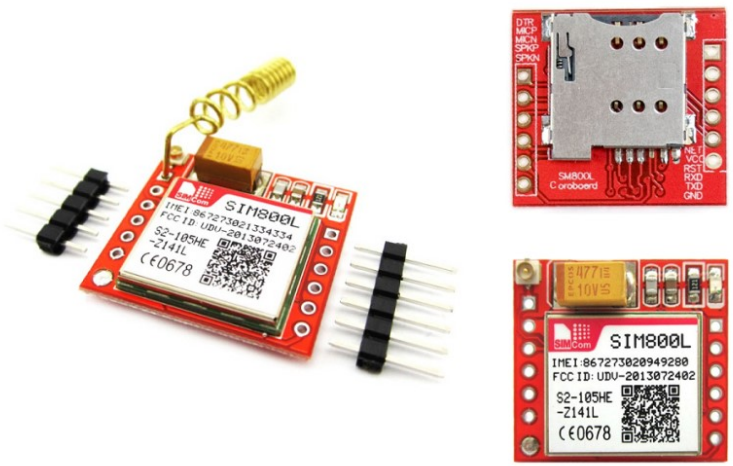
- The Arduino UNO is a standard board of Arduino.
- The Arduino UNO includes 6 analog pin inputs, 14 digital pins.
- The Arduino UNO board is used for an electronics project and mostly preferred by the beginners.
- It can be run on both online and offline platforms.

ACOUSTIC SENSOR

1. The sound sensor is one type of module used to notice the sound.
2. This module is used to detect the intensity of sound.
3. This sensor is capable to determine noise levels within DB's or decibels at 3 kHz 6 kHz frequencies approximately wherever the human ear is sensitive.

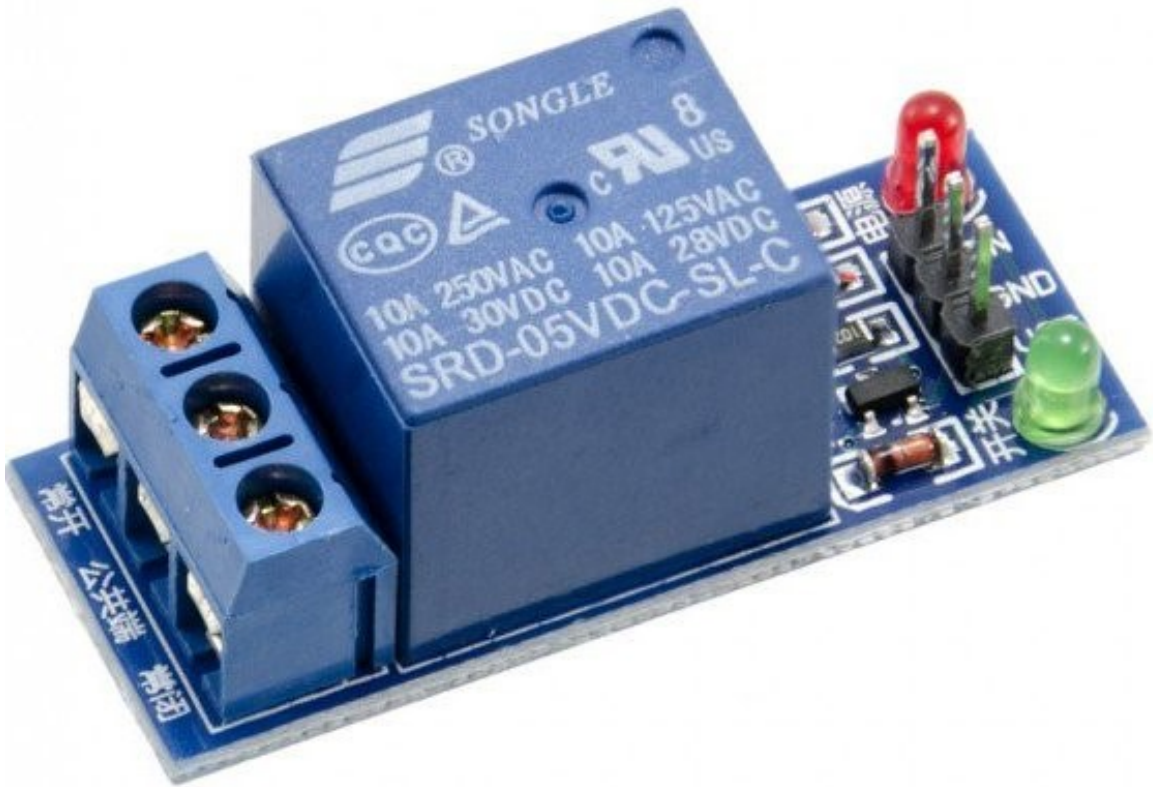
GSM

- GSM stands for Global System for Mobile Communication.
- It is a open digital cellular technology used for transmitting mobile voice and data services.
- GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot.
- It operates at either the 900 megahertz (MHz) or 1,800 MHz frequency band.



RELAY

Relays are electrically operated switches that open and close the circuits by receiving electrical signals from outside sources. They receive an electrical signal and send the signal to other equipment by turning the switch on and off.



LCD

The liquid crystal display (LCD) panel is designed to project on-screen information of a microcomputer onto a larger screen with the aid of a standard overhead projector, so that large audiences may view on-screen information without having to crowd around the TV monitor.

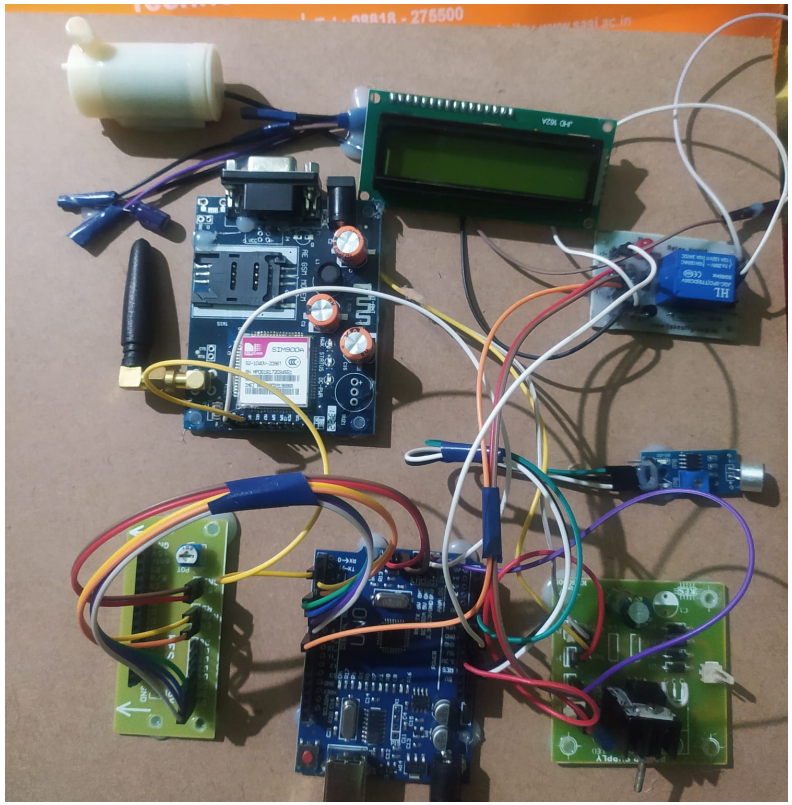
PUMP

DC powered pumps use direct current from motor, battery, or solar power to move fluid in a variety of ways. Motorized pumps typically operate on 6, 12, 24, or 32 volts of DC power. Solar-powered DC pumps use photovoltaic (PV) panels with solar cells that produce direct current when exposed to sunlight.

SOFTWARE IMPLEMENTATION

Step1: Install Ardunio IDE.
Step2: Complete all the Installation process.
Step3: And then select the Ardunio Board and Serial Port.
Step4: Then after write the source code which is related to the project.
Step5: Complete the Debugging and Compliation process.
Step6: And finally dump the code into Ardunio uno.

HARDWARE IMPLEMENTATION



HARDWARE IMPLEMENTATION(CONT)

Stage 1: Considering the problems of existing methods and giving solution to that problem by considering the basic requirements for our proposed system
Stage 2: Considering the hardware requirement for the proposed system For this we need to select the below components:

- Micro controller.
- Inputs for the proposed system (ex: sensors, drivers etc..,).
- Outputs (ex: relays, loads).

Stage 3: After considering hardware requirements, now we need to check out the software requirements. Based on the microcontroller we select there exists different software for coding, compiling, debugging. we need to write source code for that proposed system based on our requirements and compile, debug the code in that software . After completing all the requirements of software and hardware we need to bring both together to work our system. For this we need to burn our source code into microcontroller, after burning our source code to microcontroller then connect all input and output modules as per our requirement.

RESULTS

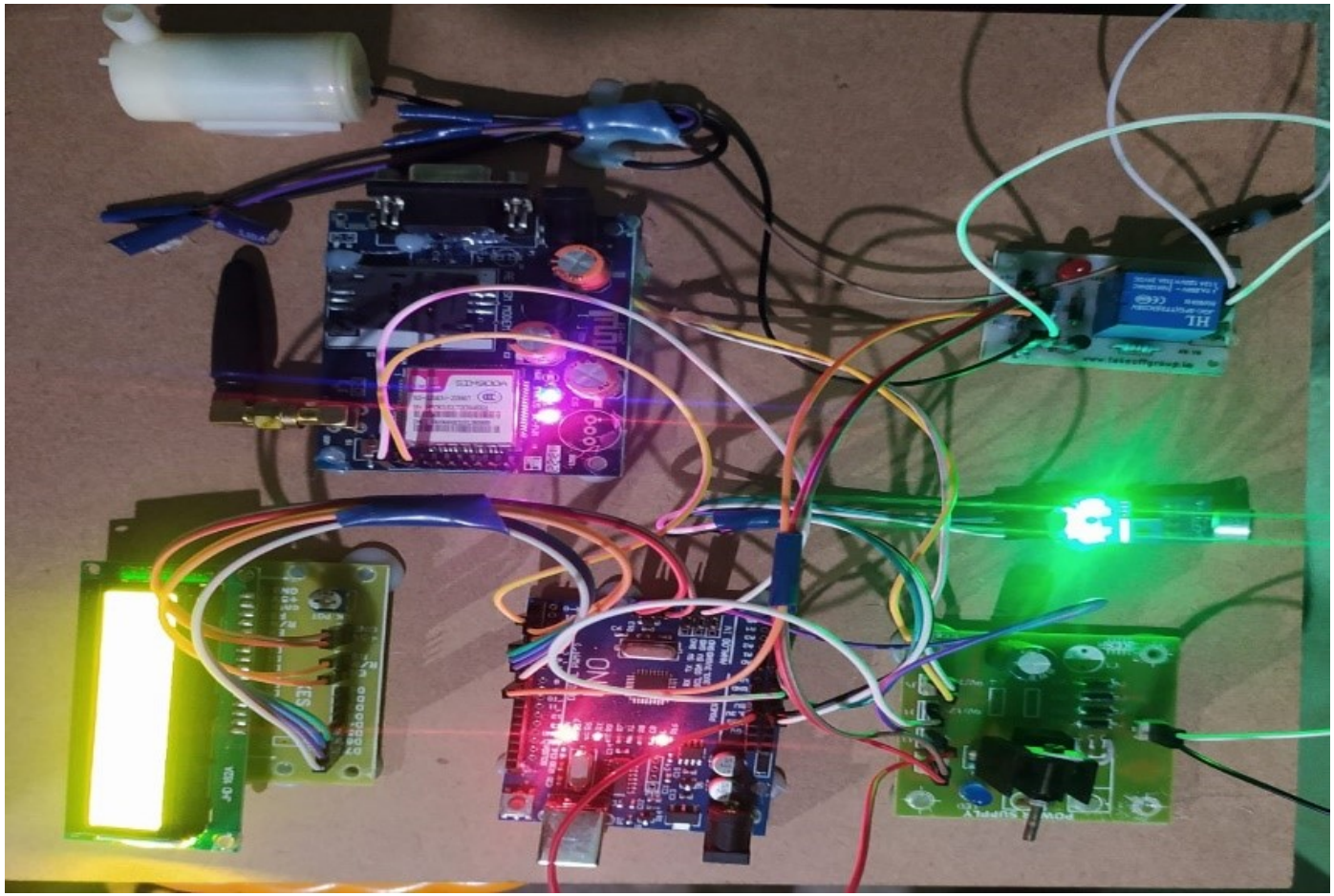


Figure: Arrangement of system

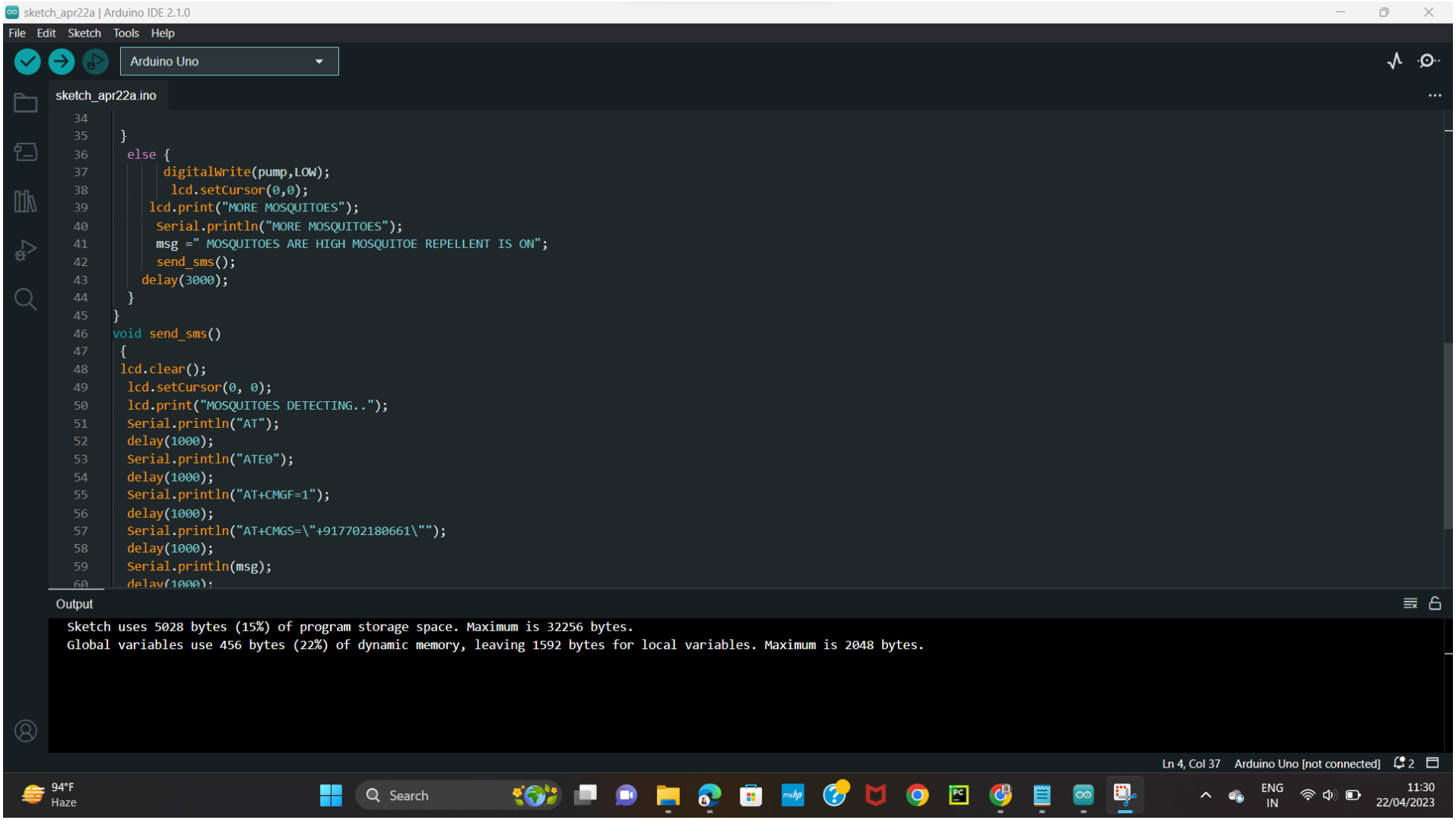


Figure: Code Implementation

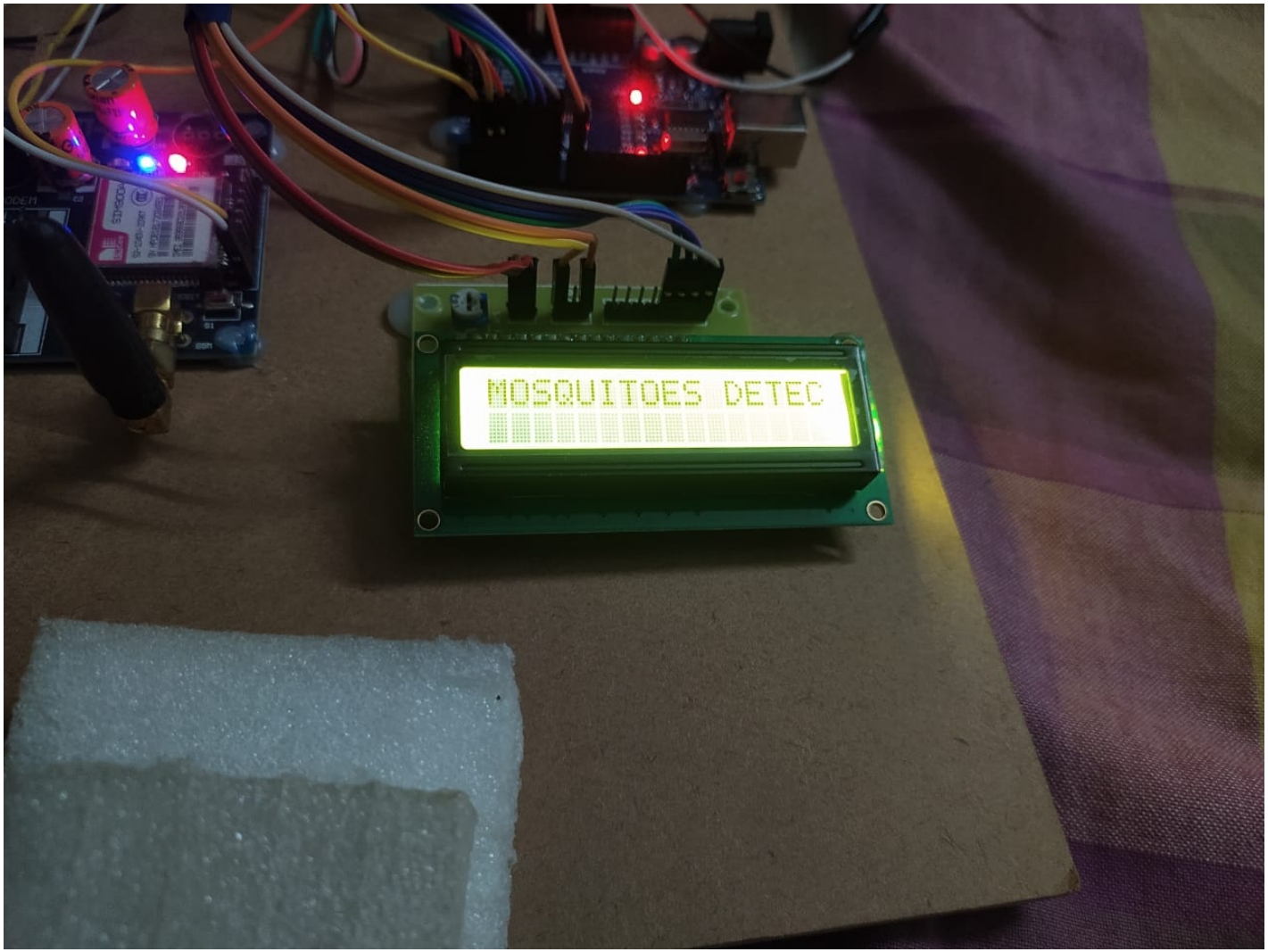


Figure: Message displayed on LCD

Figure: Pesticides Spraying

Conclusion

In this study ,we proposed an iot system that involves using acoustic sensor, GSM module, relay, and LCD screen, all controlled by an Arduino board. The acoustic sensor detects the sound frequency of the mosquitoes wings, the GSM module sends the data to a remote server for analysis, the relay controls a trap door, and the LCD screen displays the information.This framework provides an effective and automated method for monitoring and controlling the mosquito population at a dumpsite. The system consumes low power, low cost and without human intervention inresource constrained area.

Future scope

In the future, detecting the density of mosquitoes at dump yards can be improved through the integration of technology such as AI and ML, collaboration with local communities, mosquito-borne disease surveillance, ecosystem-based approaches, use of alternative control methods, and education and outreach. These efforts can help automate monitoring, improve community engagement, prioritize control efforts, manage the ecosystem, reduce harmful effects on the environment, and educate workers and local communities. Continued research and innovation in these areas will be crucial in improving mosquito control efforts at dump yards.

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Any Queries!

Thank you!