Smart Monkey Repellent Circuit using Arduino-UNO

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ABSTRACT

In this paper, an ultrasonic monkey repellent circuit is designed and testing of the device is implemented in the different areas like crops, fields, households and Institutions. It is an electronic device, which is intent to protect the crops in fields and to scare monkeys and to forbid them from entering Institutions. Due to the extended harm, which cant be counted, humans are facing many problems - both in terms of economical and psychical ways. Well so to rectify this problem, the developers have to use set of Micro-controllers to generate sweep in sound frequencies, and an machine consisting of remote access, audio power amplifier, speaker, for this purpose to get rid off monkeys. In these electronic device we have two operating methods, one is manual and another is remote such that this can operate in these modes and there are six channels in the device that it can able change different range of frequencies with different range of sound levels produced in the ultrasonic speakers. Hence the device is user friendly and harmless to human. Many devices came into existence to afraid monkey's but the proposed monkey repellent circuit using Aurdino-Uno has outperformed well compared to existing systems.

1. INTRODUCTION

Monkeys are very much smart like human beings.The monkey's DNA matches 90% with human's. The monkey brains work similarly like human being's. They are intelligent like human's. Now a days monkeys causing problems in schools, colleges, crops and various offices. The human beings are usually afraid of monkeys and they are facing lot of problems due to monkeys. South Africa developed a device which makes sound when monkey's come near to human survival areas. This sound is inaudible by human's. This method gave pain to monkeys and other wild life.

The chaos dispersed by wild animals by traveling the human limitations has being enhancing on an exponential rate. Monkeys are great endanger these days in cityfied areas. A lot of measures are being done to curb bit this endanger by way of many repellent devices or

circuits. Hence there is a need to provide a method or system for repelling the monkeys in citified areas, which is suitable, is highly prompt and does not likely threat to wildlife, pets and human beings. Such system should be lawfully valid and should beeconomic so that people can spend it. The main Objective is to discover a monkey repellent system which is eco- friendly and legal too. The device of the present design has been made to rectify the large problem caused by monkeys in the urban areas. The novelty of the present invention lies in developing a monkey repellent dummy device that is eco- friendly, does not use any ultrasonic waves to detect or repel the monkeys. The device is cheap and easy to manufacture and is environment friendly.

In order to improve our Monkey Repellent, we have seized many field experiments. From these experiments, theory and results continuously indicate that monkeys are expelled by the direct simulation on their central nerves, through the sonic/ultrasonic wave. The sonic/ultrasonic wave attacks the auditory and nervous system of pests causing pain and discomfort. Monkeys are impossible to stay. The only high-powered ultrasonic monkey repeller with special "Multiplex Modulated Sweeping Ultrasonic Sounds". These high intensity ultrasonic sound waves (10-65 KHz) are out of the range of hearing of humans and most household pets, except pests. These nerve-crushing sounds directly penetrate their brain and nervous systems and make them uneasy and act abnormally-such as frantic jumping, stampeding which result in the voluntary repulsion against ultrasonic wave areas and monkeys find it impossible to stay in such radiated areas. The monkey repeller device will get rid of monkey menace and nuisance effectively.

2. EXISITING SYSTEM

The inventors have carefully studied the state of common monkeys in urban areas. They decided that the only way to afraid these monkeys is to discover a dummy system which could repel monkeys without harming them physically [1]. Monkeys being clever enough, very easily detect that the device producing ultrasonic waves is just an electronic appliance. So they become unaffected to these gadgets and they don't respond.

Moreover such devices are injurious for the humans who are in that zone. So the only possibility of fearing away the monkeys is to develop a dummy of a Langoor or Colobine monkey of which monkeys are still afraid off. The dummy should have some features such as sound of a Langoor or Colobine monkey itself [2]. This can create a scene for the monkeys

that the Langoor or Colobine monkey is alive and thus producing sounds. The dummy of the present invention is equipped with sensor for detecting motion animals and producing sound to afraid the approaching animals. The system works on electricity, is easy to operate, is light weight and can be installed anywhere as per need. It is operated with the help solar panel charged AC/DC power supply. Volume can be controlled using a volume knob which is present on the backside of the dummy [3]. The dummy can be switched on or off manually with the help of the switch present on the backside of the dummy. The dummy can be operated manually or with the help of infrared motion sensor after switching on. The infrared sensor detects animal present within sensor s detection range. The monkey repellent dummy device of present discovery consists of an electronic circuit comprising of integrated circuits, resistors, amplifier, speakers, sensor, solar panel, power supply and other electronic components [4].

2.1 IMPLEMENTATION OF EXISTING SYSTEM

This system is made of LM 386 audio power amplifier circuit to design the system capable of producing sound in the frequency range of upto 80 kHz. A speaker of appropriate frequency range is used to transmit these sound waves [5]. A separate power module to power the system. The ATMEGA328P microcontroller programmed to produce the different patterns of frequencies which we require in our experimentations[6]. The ATMEGA328P microcontroller is programmed so that it generates the different patterns of frequency sweeps in its different modes. A remote is also provided in the system, so that any of these different modes can be selected by the user [7].

It is possible that monkeys are repelled by ultrasonic frequency in the range of 20 kHz to 65 kHz. Human beings can't hear these high-frequency sounds. The product repels monkeys by emitting pulse ultrasonic waves [8]. Using ultrasonic waves creates a noisy and hostile environment which repels monkeys, whilst remaining absolutely safe for humans and household animals. Thus to increase the effectiveness, frequency of ultrasonic oscillator has to be continuously varied between certain limits [9].

Frequency of emission of ultrasonic sound is continuously varied by our product in different patterns to repel monkeys. The Fig 2.1 shows the block diagram of existing method.
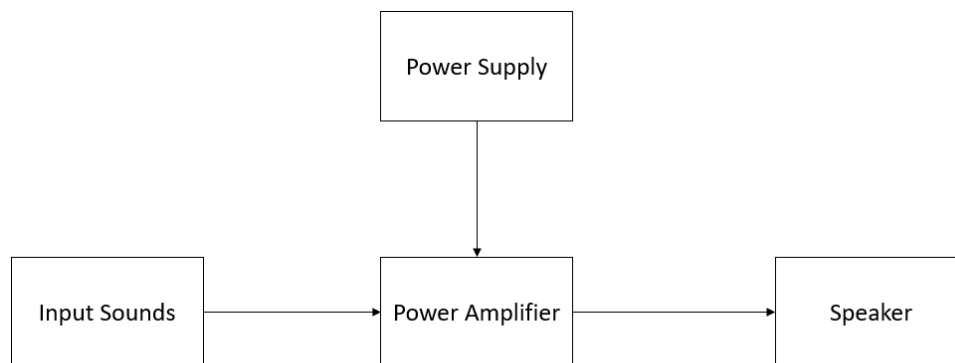
Figure 2.1: Block diagram of existing system

2.1.1 Arduino UNO

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 [10].

2.1.2 LM386

The LM386 is a low power audio frequency amplifier which is very commonly used in small audio amplifiers. The IC consumes very less power and hence can be operated using a 9V battery easily. It can easily drive an 8 ohm speaker with a variable gain of 20 to200.

2.1.3 Multiplexer:

An 8-to-1 multiplexer consists of eight data inputs D0 through D7, three input select lines S0 through S2 and a single output line Y. Depending on the select lines combinations, multiplexer selects the inputs.

2.1.4 Limitations of existing method

- It is simple, a sound emitting device in the shape of a dummy of a langoor.
- It is not possible to generate different range of frequencies.
- There is a possibility of monkey getting addicted to the sounds.

3. PROPOSED SYSTEM

The Proposed system can control monkeys due to ultrasonic speakers which releases the sweep sounds of designed frequency [11]. The Fig 3.1 depicts the block diagram for proposed system. Speakers with unequal sounds with various channels having the various

range frequencies. Each channel have the specific range of frequency from 20KHz to 65KHz, with the six channels in the microcontroller [12].

The sensor used is IR remote and Potentiometer sensor. The IR Remote sensor is quality sensor which is used to vary the channels in the Micro-controller to scare the monkeys to enter in the schools, Colleges hostels, Industries and fields [13]. The function of Potentiometer is to generate variable frequency in the system for the different range of frequencies sweep sound at the ultrasonic speaker.

The role of potentiometer in the smart monkey repellent device is the voltage regulator actual work of potentiometer, coming to the device , it is used vary channels in the system in manual mode, such way that, the system can control through manually and remote control to change the frequency and sounds to produce and to scare the monkeys from the location [14].
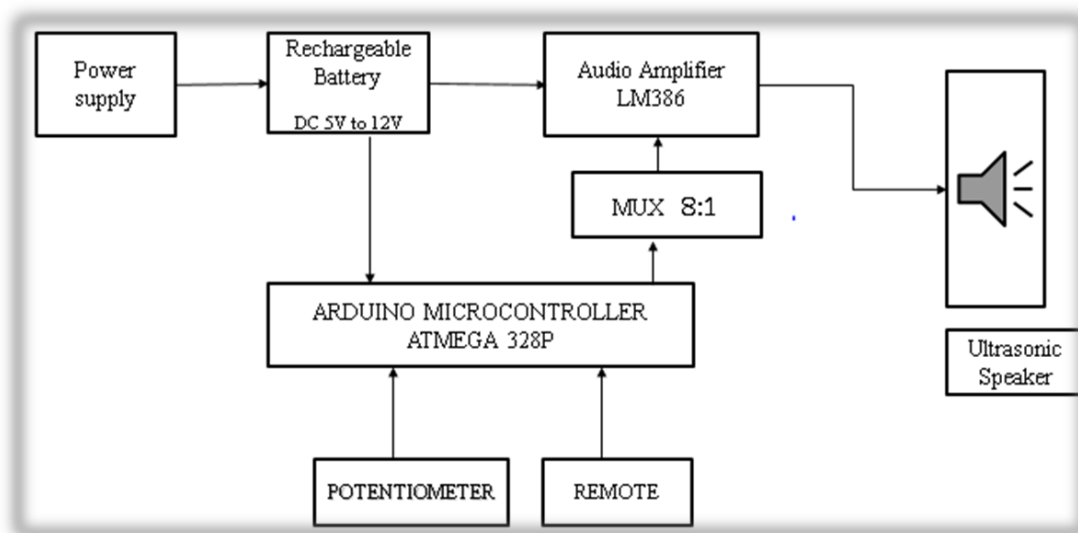

Figure: 3.1 Block diagram for the proposed system

3.1 HARDWARE REQUIREMENTS

3.1.1 Arduino UNO

The Arduino Uno is a microcontroller board based on the ATMEGA328P.The Arduino has14 digital input/output pins (of which 6 can be used as PWM outputs) and 6 analog inputs. It uses quartz crystal which generates 16 MHz frequency. It also consists of a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller. "UNO" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0.

The Uno board and version 1.0 of Arduino Software (IDE) were the reference version of Arduino, now evolved to newer releases. This board is the first in a series of USB Arduino boards.

3.1.2 Communication

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega8U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer [15]. The '8U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A Software Serial library allows for serial communication on any of the Uno's digital pins. The ATmega328 also supports I2C (TWI) and SPI communication [16]. The Arduino software includes a Wire library to simplify use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.

3.1.3 ATmega328 Microcontroller:

The Atmega 32 bit microcontroller is shown in Fig 3.2 combines 32 kilobyte ISP flash memory with read and write capabilities, 1 kilobyte EEPROM, 2 kilobyte SRAM, 23 general purpose input output lines, 32 general purpose working registers, 3 flexible timer/counters with compare modes, internal and external interrupts [17].
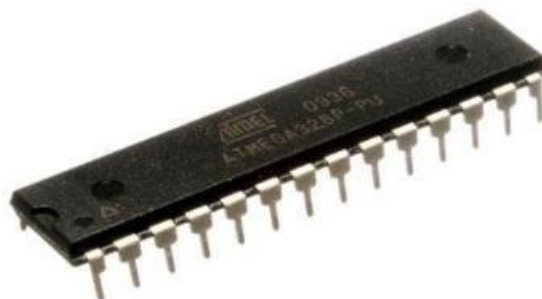

Figure 3.2: ATMEGA 328 Microcontroller

The complete set up of IR Remote with Arduino UNO is shown in Fig 3.3. Infrared (IR) communication is a widely used and easy to implement wireless technology that has

many useful applications. The most prominent examples in day to day life are TV/video remote controls, motion sensors, and infrared thermometers. There are plenty of interesting Arduino projects that use IR communication too. With a simple IR transmitter and receiver, you can make remote controlled robots, distance sensors, heart rate monitors, DSLR camera remote controls, TV remote controls, and lots more.
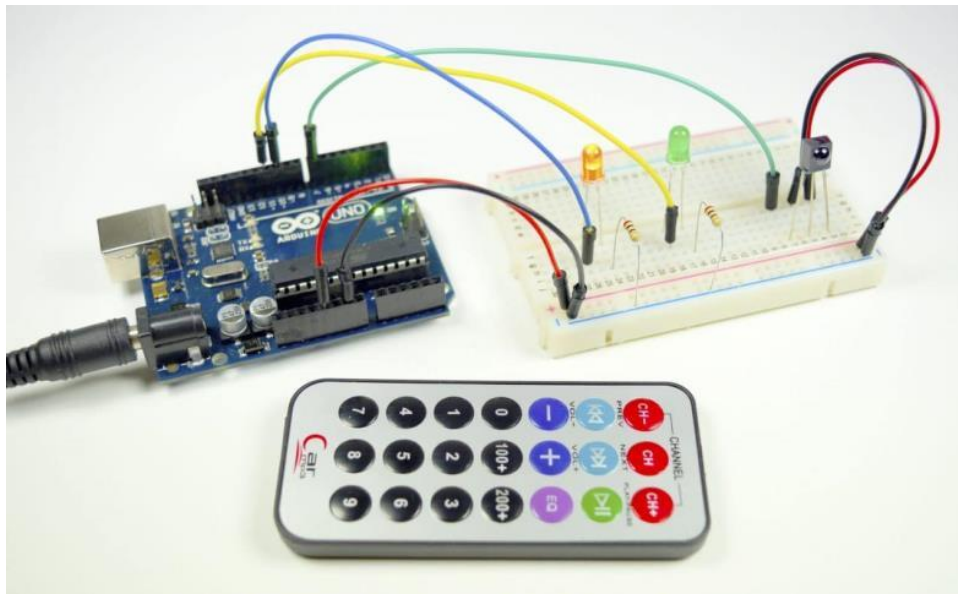

Figure 3.3: Set up of IR Remote with Arduino uno

4. RESULTS AND DISCUSSIONS

After creating the frequencies using the Arduino board the system project the sounds to annoy and make monkey's leave the surroundings without damaging any disturbance and trouble to human lifestyle. The frequencies that got generated does not cause any disturbance to the animals and humans, even to monkeys the device is just used to frighten the monkeys away from the environment. In order to make sure that monkeys not to get used to sounds the device generates the different range of frequencies. Also, the advantage of these frequencies is that they does not intervene with any electronicsystems that are present around us.In here we are also using a potentiometer to access the device manually.

This device can be used in households, hospitals, college hostels, schools etc where the humans are being intervened by the monkeys.The main purpose of this device is to prevent monkeys from interfering with people works.The disturbance caused by monkeys caused huge physical and mental problems to the people.

The implementation of hardware using potentiometer is depicted in Fig 4.1. The potentiometer used in here is to generate frequencies manually,the potentiometer is three pinned device with ground and vcc and the other pin given to one of the analog pins.The potentiometer is operated manually by changing the shaft we can generate different frequencies that are produced by the Arduino.
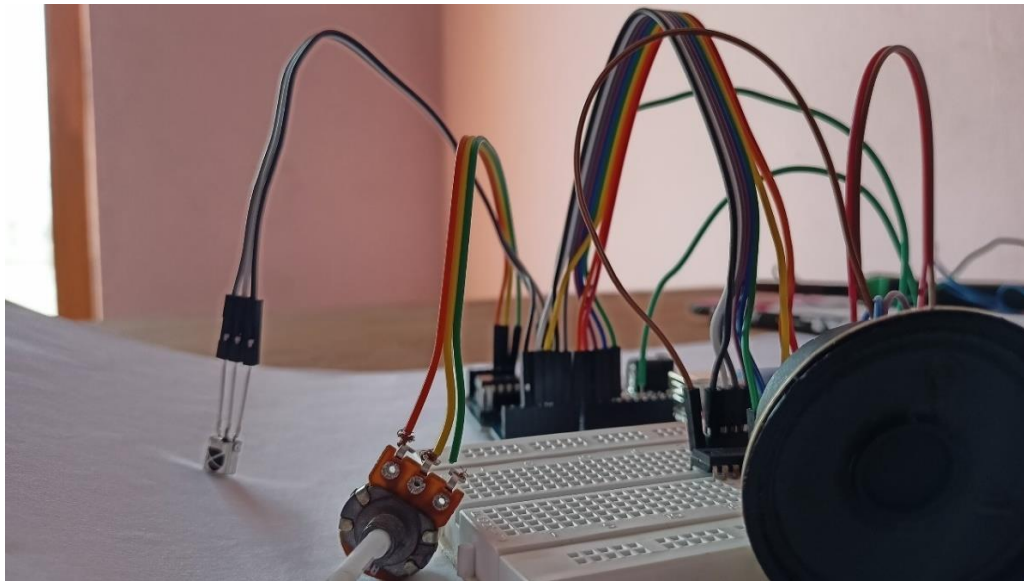
Figure 4.1: Hardware implementation using potentiometer

The implementation of hardware using IR sensor is depicted in Fig 4.2. After decoding the remote keys each key is assigned with particular frequencies using this remote we can access the frequencies easily without approaching the device personally. It is similar to accessing a tv remote. Here we are using a multiplexer each channel is given to each key by selecting any one of them different range of frequencies can be heard through the speaker.
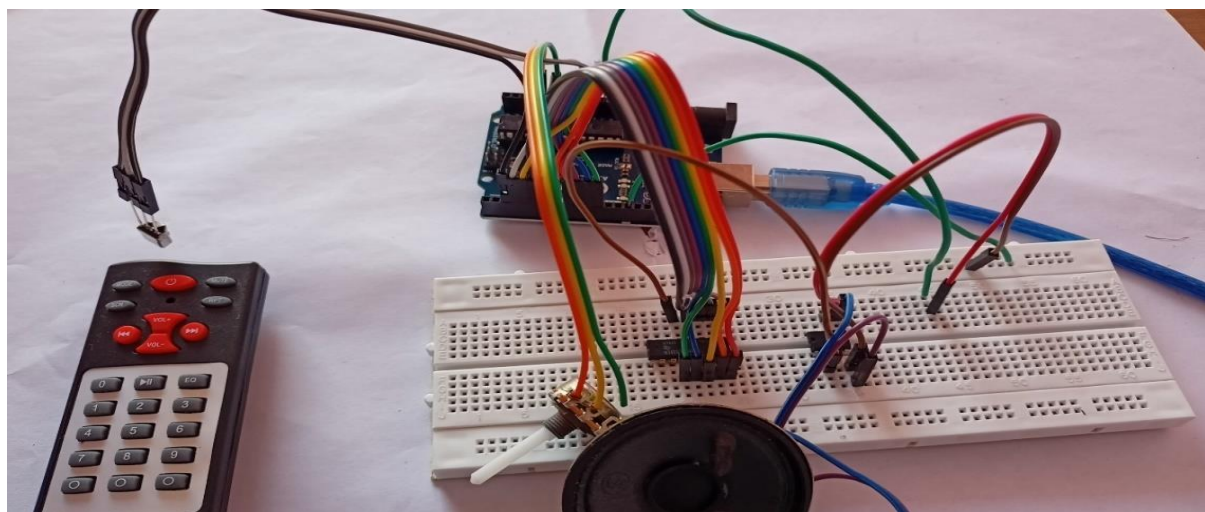
Figure 4.2: Hardware implementation using IR sensor

The final implementation of device is depicted in Fig 4.3. The final implementation of the device consists of both the potentiometer and the remote which helps the device to work manually and through remote. If it is used in household area we can control it manually but if they are placed in high altitude places we have to access it through using the remote for comfortable operation. The frequencies that get generated scare away the monkeys which are causing havoc near crowded places without involvement of the human interface and causing no harm to each other. No one gets hurts using this device neither humans nor animals. Multiplier is used to select the particular frequency channel the output from the multiplier is given as input to the amplifier. Thus to increase the effectiveness of the device we are using an amplifier to amplify the sounds and to remove the noise for better hearing and also the sound that are generated in here does not give any sort of discomfort to the humans. We are using a 8ohm speaker to increase audibility of the sound. Using this device we can put an end to mischievous acts being played by the monkeys.
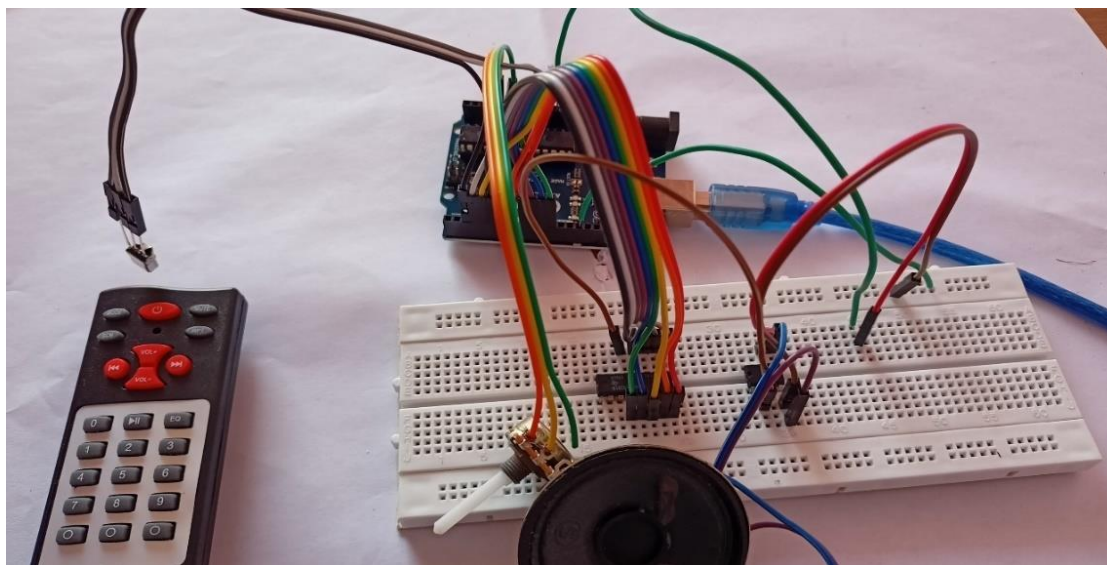

Figure 4.3: Final implementation of the device

5. CONCLUSION AND FUTURE SCOPE

The smart monkey repellent important for getting rid of monkeys from a particular location with causing no harm to them. Also, sensors have long life, easily available, less cost, easy to handle. The main objective of this project is to ensure monkeys cause no damage or disturbances to the people near institutions, hostels, hospitals and other crowded places accordingly. The proposed paper has certain limitations. This project does not interfere with any other electronic devices around us. So, it becomes very reliable and efficient for the

civilians to keep the monkeys away. The device might not help to drive away all the monkeys as of now since it's in very initial stage but it did demonstrate an optimistic result and we include a few upgrades in here.

The project is intended victimization structured modeling and is ready to supply the required results. It is with success enforced as a true Time system with bound modifications. Science is discovering or making major breakthrough in varied fields, and thus technology keeps dynamic from time to time. Going more, most of the units is fictional on one in conjunction with microcontroller so creating the system compact thereby creating the present system simpler. To make the system applicable for real time functions parts with larger vary must be enforced. Bigger speakers better suited in the ultrasonic range could have been used. In future we can add cameras to detect what type of animals have approached the device and can generate sounds according to it and scare them away. We can add many other features to this device ad make use of it for other animals and bird repellent devices.

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