The Magic Stick to Prevent Farmers from Harmful Snakes and Electrical Leaks

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***Abstract*-----**Snake-bits are well known veterinary emergencies in many parts of the world, especially in rural areas. It results in the death rate of farmers and many active animals those involved in farming. The death rate of farmers increasing day by day due to snake-bits and also due to electrical leaks. The system is designed to detect and repel the snake, and it can also be used to detect the leakage of electric current. The aim is to prevent the intrusion and increase of dangerous snakes/reptiles in the farm field. By this method, saves the valuable human life and increase the agricultural productivity. This system is highly adaptable at night duration because humans have poor vision at that particular time. To implement a system that recognizes the dangerous venomous animals. The device alerts the farmer about the dangerous species by creating an alarm or buzzer. The system repels the snakes by producing ultrasonic radiation by ultrasonic sensor. If the system identifies/detects leakage of electric current, it alerts the user by creating an alarm or buzzer.

Keywords—Ultrasonic Sensors, Moving objects detection using image processing, Electrical leaks detection.

I. INTRODUCTION

The history of Agriculture in India dates back to Indus Valley Civilization Era and even before that in some parts of Southern India. India ranks second worldwide in farm outputs. As per 2018, Agriculture employed 50% of the Indian work force and contributed 17-18% to country's GDP. India is the world's largest producer of pulses, rice, wheat, spices and spice products. India has many areas to choose for business such as dairy, meat, poultry, fisheries and food grains etc. Most of the Indians are directly or indirectly depending on the agriculture. Some are directly attached with the farming and some other people are involved in doing business with these goods. India has the capacity to produce the food grains which can make vast difference in Indian Economy. A farmer is a person engaged in agriculture, raising living organisms for food or raw materials. Snakes have provided a serious treat to primates throughout evolution. Furthermore, bites by venomous snakes still cause significant morbidity and mortality in tropical regions of the world. Snakebites are an occupational hazard for farmers where a majority of bites occur while they are working in the fields. An estimated 50,000 Indians die due to venomous snakebite every year. Snakes and small danger insects interaction can prove dangerous for both the productivity and farmers life, there is a need for an intelligent surveillance and alert system. Snake detecting stick is a device which can be carried by the user and it also detects other harmful animals which is nearby it. The stick produce ultrasonic radiation continuously, by this there will be a motion of snake or other species. Later if any movement of species occurs by this radiation, that will be detected by IP camera and alert buzzer will be generated. The stick can also sense leakage of current.

II. BACKGROUND AND RELATED WORK

The existing system consists of in which the system works just like a repeller that as to be placed in one particular place where with the usage of ultrasonic sensors it only repel the objects. The farmer one who uses this as to placed this system in a particular place and he cannot take the system along with him. this system only repel the objects but it will not detect the object. In this paper, the main aim of the system is to detect the harmful snakes in which the farmer will be in the motion along with the stick in the farm land and then repelling the harmful snakes. After the detection that detection will be known by the farmer just through the alarm or buzzer. This stick also detects the electrical leaks.

A. Repelling using Ultrasonic Sensors

Ultrasonic sensors use sound to determine the distance between the sensor and the closest object in its path. How do ultrasonic sensors do this? Ultrasonic sensors are essentially sound sensors, but they operate at a frequency above human hearing. The sensor sends out a sound wave at a specific frequency. It then listens for that specific sound wave to bounce off of an object and come back.The sensor keeps track of the time between sending the sound wave and the sound wave returning. If you know how fast something is going and how long it is traveling you can find the distance traveled with equation 1. Where equation 1=v x t.The ability of the sensor to detect an object also depends on the objects orientation to the sensor. If an object doesn't present a flat surface to the sensor then it is possible the sound wave will bounce off the object in a way that it does not return to the sensor.

By connected Arduino that is microcontroller board it is feasible to calculate the distance from the object by considering time interval between reception of echo and distribution of pulse.

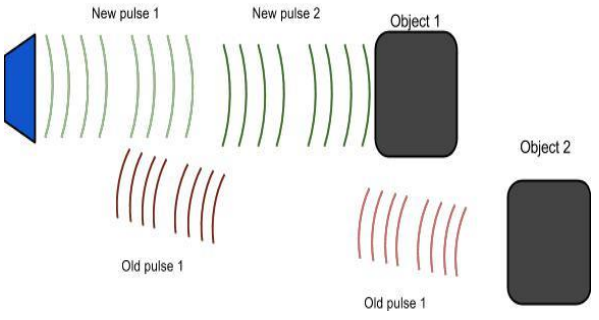

Figure 1

In Figure 1 a pulse was sent out. It bounced off of object 1 and returned to the sensor. The distance was recorded and then a new pulse was sent. There was another object farther away, so that when the new pulse reaches object 1, the first signal will reach the sensor. This will cause the sensor to think that there is an object closer than is actually true. The old pulse is smaller than the new pulse because it has grown weaker. The longer the pulse exists the weaker it grows until it is negligible. If multiple sensors are being used, the number of echos will increase along with the number of errors. There are two main ways to reduce the number of errors. The first is to provide shielding around the sensor. This prevents echos coming in from angle outside what the sensor should actually pick up. The second is to reduce the frequency at which pulses are sent out. This gives more time for the echos to dissipate.

B. Moving objects detection using image processing

Multiple consecutive frames from a video are compared by various methods to determine if any moving object is detected. To achieve this, consider a video is a structure built upon single frames, moving object detection is to find the foreground moving target, either in each video frame or only when the moving target show the first appearance in the video.

Temporal differencing method identifies the moving object by applying pixel-wise difference method with two or three consecutive frames.

Image processing is a method to perform some operation on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image. Analysis of object motion is one of the recent and popular research topics in digital image processing. In which the movement of objects is the important part of object detection and motion analysis. Videos are actually sequence of images, each of which called a frame, displayed in fast enough frequency so that human eyes can percept the continuity of its content. It is obvious that all image processing techniques can be applied to individual frames. Besides, the contents of two consecutive frames are usually closely related. Object detection in videos involves verifying the presence of an object in image sequences and possibly locating it precisely for recognition. Object tracking is the process of locating an object or multiple objects in a video file. In object detection and tracking we have to target object and track that object in consecutive frames of a video file.

In this proposed system, aims to detect and track the moving object in a given video. This project uses two methods, frame differencing and color differencing methods to detect and track the moving objects.The frame differencing method is use to detect the moving objects from the difference between the current frame and the reference frame. The frame difference method is commonly used method for detection of motion. This method adopts pixel by pixel based difference to find the moving objects. In morphological method first we divide the video into image frames. Then we consider two consecutive frames, one is reference frame and another one is current frame. In the resultant image (which is obtained after subtracting the image frame) objects which are in motion are highlighted in grey shades and rest all is black out. In the proposed system, extracting given video into image frames is the initial step. Then we take two consecutive frames and subtract the one from another. After subtraction we get some values that values undergoes a series of processing stages.

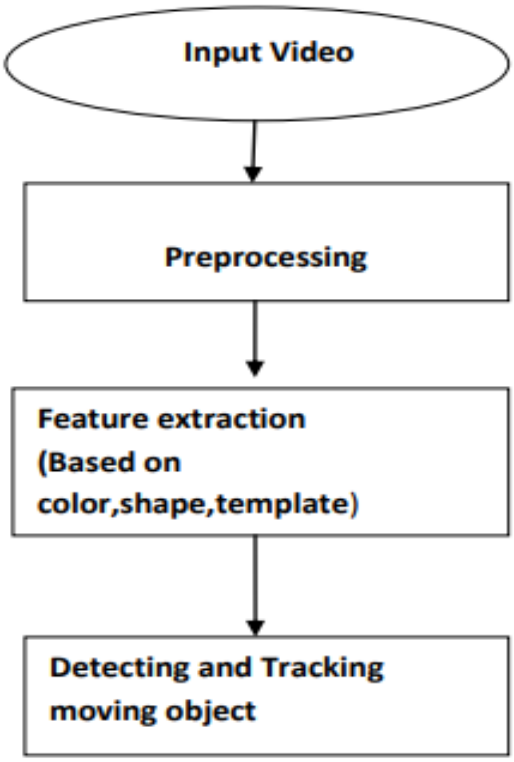

Figure 2 Architecture of object detection and tracking

In figure 2 there is a flow of objects detection takes place in which the steps are as fallows. User has to input the video first. Video can be read from webcam or use a prerecorded video. A video may contain different kinds of objects like human, animals or vehicles. Pre-processing is the term for operations on object in a given video. The ultimate goal of this step is to extract the features of an object in a video. This step is done before processing the major task of this work. Feature extraction is important stage in a detecting and tracking of moving objects through the video. Detection of moving objects in video streams is the first relevant step of information extraction in many computers vision applications. In object detection various features are extracted in ordered to track the moving objects.

After features are extracted then moving object is detected and tracked in a set of video database.

C. Electrical leaks detection

an electrical-fault detector comprising a power supply line, sensing means coupled to said power supply line for developing a signal dependent on the line current, said sensing means comprising a trans actor having a non-linear frequency response whereby to accentuate the magnitude of the high frequency components relative to the low frequency components of said signal, filter means for

separating the fundamental and low harmonic frequency components from said signal, control means responsive to the remaining part of said signal and operable to derive a control signal therefrom, and detector means operable in response to said control signal upon the magnitude thereof exceeding a predetermined value whereby to detect only such faults as produce a distorted line current having an appreciable content of harmonics of higher order than said low frequency component.

III. CONCLUSION

This system in which it can be carried by the farmer throughout the farm land in which with the usage of ultrasonic sensor we can repel the harmful snakes and not only repelling even the detection of the harmful snakes using camera with image processing technology this detection will be intimated to the farmers with an alarm or buzzer on the spot when the harmful snake is detected. Along with this even there is detection of electrical leaks when electrical leak is detected it alerts the users by creating an alarm. with the usage of this system we can protect the farmers from harmful snakes which leads to decrease of death rate of farmers in our country.

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