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Development of Iot based Smart Security and Monitoring Device using Digital Defence for Agriculture

K.P. Vijaya Kumar, G. Sai Teja, P. Akhil Teja

Abstract: ***The agricultural sector, which is the powerhouse of Indian financial system, needs protection. Safety, not only in terms of infrastructure as well as in terms of agricultural commodities, requires assistance and support at a very preliminary stage, such as protection from attacks by rats or pests in farms or seed stores. These problems could also be carefully considered. The convergence of conventional technology with all the latest technologies including the IOT (internet of things) and the Wireless Signal Systems will contribute to ecological modernization. Taking this system in mind, we are investigating a baseband processor on the' Internet of Things' that will be able to analyze the detected knowledge and then communicating it to the client. In our present system, we address the actual obstacle of farmers and the threat of endangered species and pest harm utilizing detectors. In the existing system, many peasants are afraid of pests reaching the fields and absolutely killing the crop. It creates a financial loss for peasants when anticipating a benefit.***

Keywords: Analyzing, Ecological modernization, Insects, Internet of things, detectors

I. INTRODUCTION

As the world is turning towards technological advances and modern applications, there is also a need for further growth in farming. A huge amount of work is being conducted in the area of irrigation. Many programs include the use of a wireless detector system, which gathers information from multiple detectors installed at different locations and sends it via a communication interface. The information obtained include details along the various economic variables involved. Intercepting external factors may not be the comprehensive solution to improve agricultural productivity. There have been a multitude of things that reduce efficiency to a larger degree. Automation of cultivation should thus be carried out in order to resolve these issues

In order to tackle all these issues, it is therefore necessary to establish an efficient system that will take better care among all factors that influence efficiency at each level. Moreover, because of certain problems, full modernization of cultivation was not accomplished.

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Although it is applied at the research level, it is still not offered to farmers as a commodity to gain from the raw materials. Therefore this paper deals with the growth of digital farming using IoT and provided to peasants.

II. LITERATURE SURVEY:

[1]Minoli et al proposed most of the technological benefits provided and the logistical challenges posed by the IoT in the modern construction environment.[2]Sivaraman et al proposed challenges are first demonstrated by the use of actual products commercially available. We then claim that, as more these apps appear, the threat vectors escalate and the data protection / surveillance of the home will become more and more difficult. We also recommend that hardware-level defenses be improved by system-level security tools that can track internet activity to prevent unusual activity. [3]Ntuli et al proposed "A Simple Security Architecture for Smart Water Management System". Computer and system stability is essential to the functioning of the application. Even though many IT security requirements have evolved over the last several years, they should not be used explicitly with the kind of restriction systems. This is because of their resource constraints and special specifications. Nevertheless, many of these methods may be modified and can be used with such parameter systems. The report suggested governance structure for smart water monitoring systems, as well as the architecture utilizes current security technologies and layout trends. [4]Suma et al proposed a wide range of technologies such as Bluetooth-based network connectivity, humidity & weather sensing, scarring trespassers, protection, leaves wetness and adequate agricultural equipment. This allows constant use of cellular sensor networks to determine surface resources and external factors. [5]Verdouw et al proposed centers on detecting and tracking, whereas operation and remote control are far less discussed. The results suggest how IoT was still in its beginnings in agricultural development. Frameworks are often difficult to interpret, lack of better integration and, in particular, more sophisticated approaches are at the conceptual stage of evolution. [6]Baranwal et al proposed reflects on the approaches used to address issues including the detection of pests, the hazard to plants and the distribution of actual-time alerts on the basis of knowledge collection and retrieval avoiding human interference.

[7]Elijah et al proposed the IoT environment as well as how the integration of IoT & DA makes smart cultivation possible. These offer free emerging trends and prospects that are classified as technological developments, product situations, industry and brand recognition. [8]Gondchawar et al proposed render farming efficient using optimization and IoT techniques. The highlights of this design provide a sophisticated GPS-based remote operated device to perform menial tasks such as sorting, watering, humidity detecting, bird and insect scarring, surveillance, etc. Secondly, efficient agriculture with predictive monitoring and wise decision-making centered on reliable actual-time existing data.

[9]Stočes et al proposed chosen elements of the Wearable technology (IoT) in particular and its specific purposes in farming, which was one of the fields where IoT is widely utilized.

[10]Ray et al proposed different possible IoT implementations and the relevant issues and risks that come with IoT implementation for better agriculture. In order to focus on the specific needs of sensors and wireless transmission systems connected with IoT in industrial and technological implementations, a thorough review is carried out.

III. PROPOSED SYSTEM:

In the proposed system, inference from the existing system that agriculture control and defense towards loss is dependent on raspberry pi. Here, we use live broadcasting dependent cameras so that the peasant can track his field regardless of the location. Any creature interference or animal-based danger to destruction could be tracked by the farm worker. Also, to optimize the operation, we use detectors like Infrared Detector to monitor rodents entering the field and causing harm.

If an infrared detector is identified, a warning notification is being sent to the peasant via GSM. They use an ultrasonic sensor to identify livestock dangers that consume crop seeds. The alarm is activated when the ultrasonic sensor is sensed.

Our proposed scenario is therefore intended to keep agriculture secure from destroying crops.

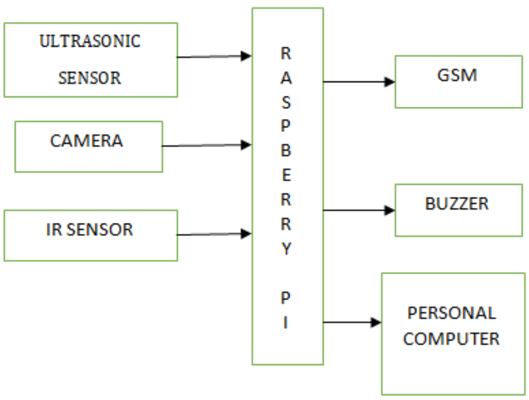

Figure 3.1 Refers square graph which explains Development of IOT Based smart security and monitoring device using digital defense for agriculture

IV. MODULES

Below mentioned modules play a key role in monitoring **the agricultural lands they are:**

A) Interfacing sensors
B) Programming microcontroller
C) GSM based alert
D) Buzzer

A) Interfacing Sensors:

IR SENSOR

Infrared radiation is produced by Infrared LED. It captures the inside of the LED board. The quantity of light emitted differs depends on the reflectance of the object. Such specular reflection occurs with the reversed IR detector. Depending on strength of incidence exposure, the sheer volume of electromagnetic-hole groups formed. When incidence beam strength differs, voltage fluctuates dynamically throughout the resistor.

Figure 5.1 represents an infrared sensor that generates some characteristics of the environment. An IR transmitter can both track and predict the temperature of an entity. Typically both artifacts refract electromagnetic radiation in the infrared range. Such forms of emission which could be recognized by an infrared sensor are opaque to our skin.

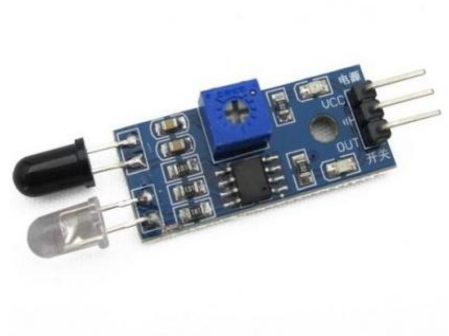

Figure 4.1 IR Sensor

Ultrasonic Sensor:

Ultrasonic receiver generated a high frequency signal in one dimension and initiated tracking when it was activated. Ultrasonic dispersed in the atmosphere and could respond directly after hitting barriers on the path. *Figure 5.2 represents the ultrasonic sensor which is used.*

At last, the Piezoelectric detector will avoid tracking when the replicated wave is received the range between the detector and the desired point is determined. It offers decent anti-contact range identification with great precision and reliable measurements in a simple-to-use kit. The process was not impaired by daylight or opaque stuff. The output impedance of the system is 5VDC.

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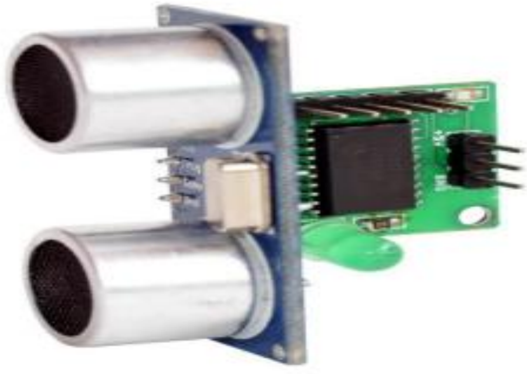

Figure 4.2 Ultrasonic Sensor

Programming Controller

Camera Module:

Figure 5.3 represents camera unit which is a Gpio device gateway to the raspberry pi unit. The frame rate is5-megapixel and yet still image size 2592x 1944, Maximum file transmission rate 1080p: 30fps, this Pi video unit is being used to capture the image and give the recorded image to the Raspberry pi device. Second, the video unit records 6 photos to establish an approved individual's repository as a train face, then next, to take the test face or actual recorded picture and match it with the traind information (data base).

Figure 4.3 *Raspberry PI Infrared IR Night Vision Surveillance Camera Module 500W Webcam*

Raspberry Pi Module:

The Raspberry Pi B3 component is a compact PC machine. The animation cel by the raspberry pi is referred to the own image portrait.
The very first moment we catch a picture to build a dataset, the raspberry pi unit collects six type of pictures to create a record on the device, and this database is linked to a real recorded file.

Figure 5.4 represents Raspberry pi which consists of a Free CV repository in which we can compose algorithms in JAVA, Python or C++. Upon contrasting both performance pictures, it is beneficial / pessimistic and then offers instructions to a mobile phone. The input from the Raspberry Pi charging cable is 5V 2A.

Figure 4.4 Raspberry PI

B) Gsm Board

SIMCom Cellular modems is a division of SIM Technology Company Ltd (Store Code: 2000. H.K). It is a quickly and smoothly-growing M2 M telecommunications company that creates and offers a wide range of cellular devices focused on GSM / GPRS / EDGE, WCDMA / HSDPA and TD-SCDMA technology frameworks Through collaborating with third parties, SIMCom Telecommunications delivers tailored innovative solutions for M2 M, WLL, Personal computing, GPS as well as other devices. SIMCom Communications also offers ODM products to customers. As per ABI Intelligence research, SIMCom Telecom Module was the world's leading two manufacturer of portable modules in 2008 with a 20% conquest of market capitalization.

Figure 4.5 *GSM*

C) Buzzer:

A buzzer is an auditory communication system that can be electronic, integrated circuits / piezo electric. Standard applications of buzzers as well as beepers involve warning systems,

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clocks and device feedback confirmations, such as clicks of the mouse or key strokes. Figure 5.5 represents Alarm which is an engineered system of electrical converters, DC power supply, commonly used in machines, scanners, copiers, monitors, electronic gadgets, industrial electrical equipment, mobile phones, detectors as well as other ambient techno equipment. Effective Buzzer 5V Certified control can be linked directly to consistent vibration, this portion designated detector extension unit and panel in collaboration will achieve a basic loop layout, plug and switch.

Figure 4.6 ***Buzzer***

V. RESULTS AND DISCUSSIONS

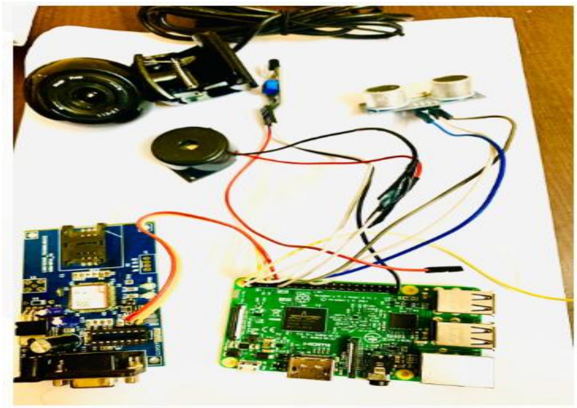

Figure 5.1

Figure 6.1 represents an entire set up of our experiment seen above and it consists of raspberry pi , Gsm ,Buzzer and usb type camera , whereas jumpers are used for connections.

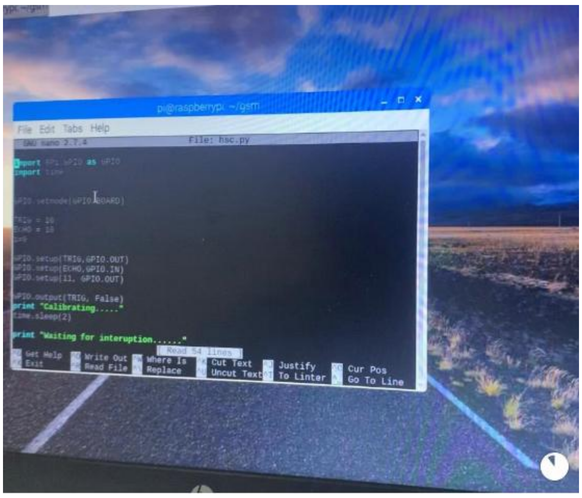

Figure 5.2

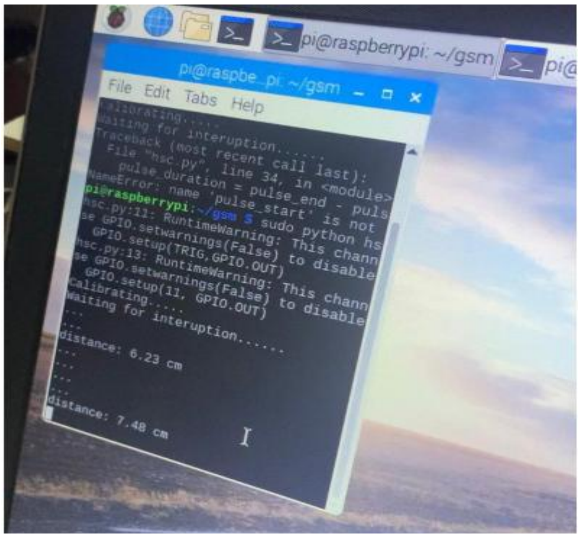

Figure 5.3

Figure 6.2 and Figure 6.3 gives us clear view about usage of ultrasonic sensor, By which we can calculate the distance of an animal or pests and it senses them by sounds made by animals or small tiny pests.

Figure 5.4

Figure 6.4 represents the final output of the experiment which is examined in 100 trails. that is as soon as animals or pests are detected ,alaram is activated and farmer receives sms as “Insect Detected”. The evaluation percentage is 96% which is our device has detected the pests 96 times out of 100 times.

VI. CONCLUSION

WSNs have the power to change agricultural protection in the farming sector of the any country. Incorporating WSNs with current services is indeed a opportunity for pioneering predictive cultivation. In this design, we suggest an agricultural farm surveillance and hedge system that relies on a detector. If an intruder is observed, an external warning is activated.

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