



# **Innovative Approach to Detect Intruder in Coconut and Areca Nut Farmlands**

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*Abstract— The need for an effective and reliable intruder detection with an alarm system have become vital necessity because of the frequent and rampant cases of burglary. Now a days a gradual increase in stealing of areca nut, coconut along with tender coconut and animal destruction which affects crops and economy of the farmers. So, its highly essential to build advance technology to detect intruder and animal destruction. According to our work motion of an object, tilts of tree can be detected by measuring change in speed or vector of the coconut, areca nut along with rope of a tender coconut to the ground. Passive infrared sensor detects the motion of the person using person's body heat, Accelometer sensor can be used to read the tilted of the tree, sound sensor will be used to read the threshold of ground and rope of the objects and landmine switches allow us to power the circuit or make any particular connection only when we press the button. Once the coconut or areca nut theft is taken place in the farm, the alert will be sent to farmer through ESP8266 Generic WIFI module.*

*Keywords: Passive infrared sensor, ESP8266 Generic WIFI Module, intruder, microcontroller.*

## **I. INTRODUCTION**

In the world, the economy of so many countries is depending upon agriculture. In spite of the economic growth and development, agriculture is the backbone of all over the world. In India, agriculture is playing a major role. Nowadays More than 50% of Indians are depending on the agriculture. our farmers are facing many problems after growing crops. Such as stealing of coconut, stealing of areca nut also with tender coconut and animal destruction and crops destruction etc.,

Theft identification systems decrease cost and effort and enhance system flexibility. In cultivating framework there are many inter connected devices for controlling different functions within a place. Such as monitoring, capturing data, analyzing etc. Mobile devices are portable and it provides a user interface in Farming automation system. It provides better security system where there is high level of theft. This tends to the use of ESP8266 Module, mobile phone and electronics circuit to achieve an automated system which is programmed to work as a thinking device to accomplish this purpose.

In this paper motion sensors with low-power consumption are placed, where an intruder must pass under through. According to the sensor's signals received by microcontroller, a call will be sent to mobile station through an ESP8266GenericWIFI Module and thus warns the presence of unauthorized user in the farm to owner. In recent years theft has been seriously increased and there is no safety for Farmers and their property.

Security plays a vital role in monitoring a building in the absence or presence of people. Theft refers to the crime involving farmers property without their permission. Most of the theft happens by door break-ins. 75% of theft occurs during night time. The thief may take off the fuse, so they cannot be easily identified and if they caught, they can be easily escaped.

ESP8266 WIFI Generic Module is an impressive, low cost WIFI module suitable for adding WIFI functionality to an existing microcontroller project via a UART serial connection. This will also give alert to the owner through a mobile phone. In this world, stealing valuable and prosperous things has become a serious concern for police and common people. Theft may mentally affect the people because their hard work for years has been lost in a single day.

## II. LITERATURE SURVEY

According to Authors Blackmore S, Anjum A and Reddy S says, In the previous few centuries, new tendencies have occurred in farming subdivision. The perception of precision farming has remained round for some time currently. Precision well-defined is a widespread method intended to enhance farming making by prudently adapting crop and soil supervision to resemble exclusive circumstance to establish in each field though upholding ecological excellence [4][5]. Authors Aquino-Santos R., Gonzalez-Pates A., Edwards-Black A., Virgen-Ortiz R. and Akyildiz I.F., Kasimogluand says, Wireless-sensor-network is a leading expertise that energies the improvement of exactness agriculture. WSNs occasionally named wireless-sensor and actuator-networks (WSAN), defined as spatially disseminated independent devices to observe somatic or ecological circumstances, such as sound, pressure, heat etc. and to supportively permit their statistics over the system to a chief site. WSN solicitations growth in exactness farming has prepared it conceivable to upsurge competences, productivity and cost-effectiveness in several farming production schemes, thus diminishing inadvertent influences on environment and wild life [6][7].

According to authors Arora A., Ramnath R., Ertin E., Sinha P., Bapat S., Naik V and Kulathumani V says, WSN have remained cast off for numerous requests in a variety of arenas like area observing that is a precise communal application region, others are ecological/earth recognizing, industrialized observing and health precaution observing. The WSN is constructed of “nodes” – as of little to numerous thousands, where every node is associated to individual (or occasionally numerous) sensor. Every device system node has characteristically five chief mechanisms, which is factor in scheming a WSN for distribution, they remain; micro-controller component, memory unit, radio transceiver, sensor component and energy foundation [8]. Author Abhinav says, developed an intelligent safety method for farmhouse safeguard from wild-animals. The arrangement is to forbid the admission of animals into farmhouse by scheming a scheme that noises when animals come into the farmhouse and a flashy light to emphasis on the zone. Also, customs a GSM unit for warning the agriculturalists once there is an interruption. It likewise has integral controls and predetermined genre to function timers for farm protection; four relays are castoff for motor motivating those are in frontward track by a relay which is straight associated to a regulator. The arrangement is composite for big scale management and battery is continuously a matter [9].

According to Author Maheshwari R proposed to develop an embedded arrangement for observing elephant interruption in forestry boundary zones by means of internet-of-things. The chief ambition is too attentive the publics in and round the forestry boundary ranges and to safeguard their breathes and farmhouse foodstuffs. Also, to progress an example classical for a real-time communication of elephant interruption in forest boundary expanses by manufacture use of Internet-of-Things (IoT). He remained seeing the problematic of noticing elephants in forestry boundary extents by means of IoT. Allowing the detecting and activating machineries using Raspberry Pi, the found data as of the quivering device is conducted successively to Raspberry Pi [3]. Author Won H. C. and Min S. J proposed to design an automatic farmhouse organization embedded organization using IoT. He enlightens the overall fitting technique, the effectiveness and in what way to usage the monitor and control organization in the mounting situation by means of WSN expertise. The paper delivers easy and suitable atmosphere for increasing plants by means of humidity sensor, temperature device, and luminance instrument and water smooth device. Humidity and Temperature are dignified by Humidity Device Unit and showed on LCD in real-time. As for the illuminance element, the maximum common CDS sensor was castoff and MCU panels the LED block with light strength facts of sensor. The liquid level sensor perceives the water level of carrier and it is presented on LCD. This arrangement is tranquil of water level measurement component, sensor unit, sensor network-processing unit and control unit [10]. Author Mohd F. O. and Khairunnisa S discuss WSN solicitations in the study of atmosphere observing. Each node contains of micro-controllers, transceiver and memory. The microcontrollers are castoff to implement task, data handling and contribution the functionality of other mechanisms in device node. For the remembrance, it is largely castoff for data storing though the transceiver acts as of grouping of receiver and trans-receiver purposes. They likewise deliberate the topical improvement in the solicitation areas of conservational observing arrangement in instruction to support persons in their occupation and decrease price and time. They witnessed that in instruction to instrument a good ecological checking organization, there are numerous necessities to be shadowed: flexibility, autonomy, reliability and robustness [11].

## III. EXISTING SYSTEM

Traditional normal fences are used to keep crops or animals in or out of an area. They can be made from a wide variety of materials, depending on terrain, location and animals to be confined. Most agricultural normal fencing averages about 4 feet (1.2m) high, and in some places, the height and construction of fences designed to hold livestock is mandated by law. Some of the disadvantages of normal fences are It has a limited life, usually between 5 to 10 years depending on the maintenance and Needs painting and maintenance on regular basis. Traditional electric fences have been helped to protect crops. However, that system has some disadvantages such as vulnerability to power outages, Appearances, it cannot notify the voltage which occasionally drops and the owners of the fence have to check the voltage but they cannot know it without going there. To overcome above disadvantages, we develop an electric fence management system uses wireless communication and it enables the owners to know the voltage , state of the electric fence and monitor it from remote locations safely.it describes a demonstrative experiment in a mountainous region and suggests an approach to resolve some problems.an electric fence system using wireless network technology has been developed. The system consists of several observers and a display, the farmers are

able to measure voltage at the fence, and have an ability to show it. the observers transmit the voltage with the direction of the voltage leak to the display. The display shows the received data and the owners can know the state of the electric fence. Hence, we are going to overcome this existing system.

#### IV. PROPOSED SYSTEM

Microcontroller system capable of detecting motion of an intruder in a restricted area and then triggering an alarm system, motion detector sensors, Sound sensors and accelerometer however passive infrared sensor detected the motion of the person using the person body heat. The passive infrared (PIR) sensor which is the motion detector used in this paper is attached to a microcontroller with ESP8266 Generic WIFI Module which actively send notification to farmer using WSN platform and any other attached output device to notify the farm owner. In addition, accelerometer sensor can be used to read the tilted of the tree, Sound sensors will be used to read the threshold of ground and any rope of the objects, the initial testing of the design shows that it worked as expected.

##### Advantages:

1. Power consumption is low
2. Low cost system
3. Friendly user interface
4. System is highly accurate
5. 24\*7 hours of functionality
6. Notify the security firm or the owner with the emergency and its type and notification is done through Iot cloud.

#### V. MAJOR MODULES

The brief details of the few major components used for the system design is be explained below.

##### A. ATmega328P Controller

The ATmega328P based controller module known as Generic-Uno R3 is been used in the system, the specifications given in table 1 below. We choose this controller because it consists of all the components required for the methodology. To turn on we just need to connect it to a computer with a USB cable, also can be connected to a battery or to any power supply with a simply AC-DC adaptor. The major difference of Uno with other controllers is that, it comes with a Atmega8U2 programmed USB, where as other controllers use FTDI driver chip.

##### PIR Sensor

An efficient low-cost sensor able to detect the presence or moment of an animal or human is Passive-Infrared (PIR) sensor. The pyro-electric crystal present in the sensor is used to detect the heat signatures of living organisms in addition the Fresnel lenses is used to increase the range of the sensor. In addition to this the sensor gives few features to adjust and control the sensor. As we said this the main sensor in detection and movement of the animals or human in the system.

##### B. LCD

Most of the embedded projects will use an LCD module as a default output module, the purpose actuality is cheap worth, obtainability and programmer responsive. We might have seen LCD in PCO or calculator in our everyday life. As the device consists of 16 columns and 2 rows the device is named as 16 cross 2 LCD. The device operates at a voltage of 4.7V to 5.3V, utilizes current of 1mA hence we prefer the device. A total of 16 characters can be shown in a 16X2 LCD display that will be more than two lines, with a pixel grid of 5X7.

##### C. Accelerometer Sensor

Acceleration is defined as the change in velocity of a body w.r.t time. A derelict weight is put on spring is the fundamental principle of accelerometer. Once acceleration is happening by device, the mass gets moved until the spring move easily with mass, the acceleration is sensed in same rate of mass movement.

The acceleration is measured finally based on the displacement of this mass. The sensor can also be used to measure acceleration in vehicles, car, building and machine vibrations. Also used to measure inclination, seismic activity, dynamic distance, speed.

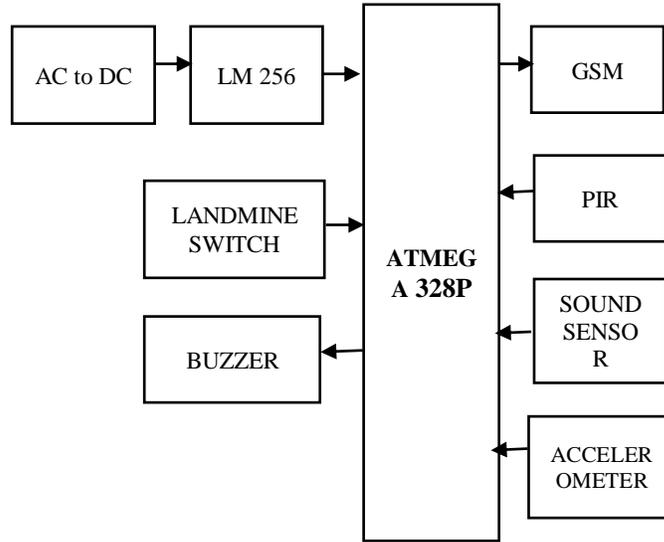
##### D. ESP8266 Generic WIFI MODULE

ESP8266 Generic WIFI Module is an impressive, low cost WIFI Module suitable for adding WIFI functionality to an existing microcontroller project via a UART serial connection. It provides unsurpassed ability to embed WIFI capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement. The module can be reprogrammed to act as a standalone Wi-Fi connected device-just add power. The feature list is impressive and includes:802.11 b/g/n protocol, WIFI Direct (P2P), soft-AP and Integrated TCP/IP protocol stack. Most of the application include Home

automation, Industrial wireless control and Sensor networks etc. Because of all these advantages we use this device to send and receive SMS in over system for easy and fast alerting of the farmers.

**E. Sound Sensor**

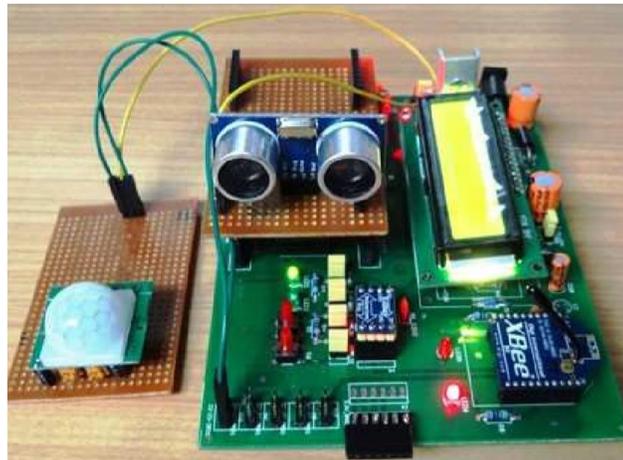
A simple microphone is been used a sound sensor here. The sound strength of the environment can be detected using the power supply amplifier LM386 and the microphone. Usually the potentiometer is been used to adjust the output value of the microphone sensor. We preferred this sensor because the device easy to program and interface with the controller.



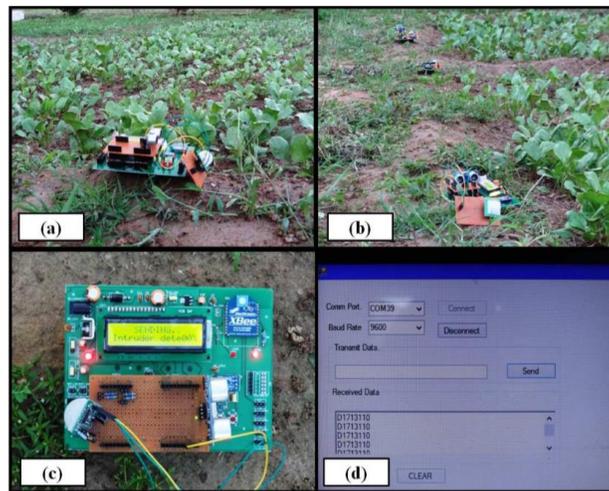
**Figure1. Proposed Method Block diagram**

**VI. RESULTS AND DISCUSSION**

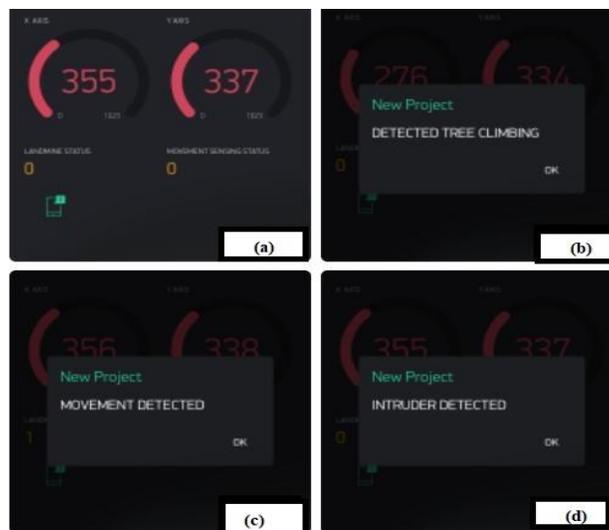
The section explains about the outcomes and the working procedure of the modules.



**Fig 2. Proposed Hardware Module**



**Fig 3. The system placed in Farmland**



**Fig 4. Sample alert messages sent to farmer**

The above figure 2 shows the complete hardware implementation of the module in a kit including all the required sensor and controller.

The fig 3 shows the placement of the module in real time farmland and the working condition of the system along with output displayed in the LCD.

As expected, fig 4 shows, when an intruder is been detected a message is been received to the respective farmer mobile and same is been displayed in the serial monitor screen at the same time the alarm is been raised to alert the farmer.

- (a)Threshold Frequency
- (b)Tree Climbing Detected
- (c)Movement Detected
- (d)Intruder Detected

## VII. CONCLUSION

The need for an effective and reliable intrusion detection with an alarm system have become vital necessity because of the frequent and rampant cases of burglary. Theft on areca nut and coconut etc. is on the increase. With the advancement in technology, motion can be detected by measuring change in speed or vector of an object in the farm. This can be achieved either by mechanical devices that physically interact with the field or by electronic device that quantifies and measures. The methodology is as effective as expected and results were very best. Though the testing of the module, the system is not required any more modification.

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