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AUTOMATIC SMART CROP PROTECTION SYSTEM FROM ANIMAL AND FIRE USING ARDUINO

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Abstract – Innovation assumes a focal part in our regular day to day existence. There has been a flood in the interest of Internet of Things (IoT) in numerous areas, which has drawn critical exploration consideration from both the scholarly community and the business. In the horticulture area alone, the sending of IoT has prompted savvy cultivating, exactness farming, just to specify a couple. This paper presents the advancement of Internet of Things application for crop insurance to forestall creature interruptions in the harvest field. A repulsing and a checking framework is given to forestall likely harms in Agriculture, both from wild creature assaults and climate conditions.

I. Introduction

Agriculture meets food demands of the population and additionallyprovides varied raw materials for industries. Interference ofanimals in agricultural lands causes an enormous loss of crops [1].Crop harm thanks to predatory wild animals has become amajor issue of concern these days. Animals like wild boars,macaques, porcupines, deer, monkeys and bears are extraordinarilydestructive and have additionally caused human casualties typically[2]. the full losses in crop yield are high for potato and wheatin villages [3]. little farmers lose up to forty to fifty % oftheir crop to wild animals and that they cannot take any harshmeasures thanks to the strict life laws [4]. Human-elephantconflict is rising intensely as elephants are a extremely conflictprone life species, particularly in Asian nation [5]. Thus, there'sneed for a system which might facilitate the farmers to movethese animals as before long as they find out about their intrusion.In this system there are 3 levels of alerts: low, moderateand high, in step with that the extent of danger obligatoryby the unwelcome person are often simply ascertained. The position ofthe Passive Infrared (PIR) detector is in such the simplest way that it offersa wider vary for detection [6]. Thus, the novelty of the paperlies within the accessibility of a skinny Field electronic transistor (TFT) showacting as a visible alarm which might be seen by the oppositevillagers furthermore and that they will shield the farm just in case there'sa delay within the arrival of the farmer. The picture element management featureof the TFT show offers the advantage of clearer photos asoutput.Global System for Mobile Communications (GSM) module isused for transmission of knowledge to farmer The planned methodology explains the operating of the systemin detail followed by the diagram and flow sheet thatgives USA a clearer plan regarding the system.

II. Research work

We have seen that every use different type of technology to protect the farm from the animals as well as thefts. Sometimes the famer gets harm

to the animals. Hence we have implemented a new idea for the famer to protect the farm without any use of physical power. We are use a audio voice of a very dangerous animal. While a animal or person cross the border of the farm then this audio voice is play till the movement detected.

III. Methodology

Components Required

1. Arduino UNO

The Uno R3 improvement Board is the low-charge variant of the renowned Uno R3 Arduino. it is amassed with the CH340 USB to Serial converter chip, in inclination to the utilization of an Atmega16U2 chip. This can assist with handling the sensor information of activities and show the activity on lcd show .We have utilized bunches of these low-charge Arduino sheets with CH340 chips, and have found them to compositions impeccably

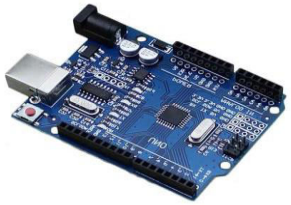

Fig 3.1:- Arduino Uno Board

The features of Arduino Uno are as follows.

- The operating voltage of Arduino is 5V.
- The recommended input voltage will range from 7v to 12V and The input voltage ranges from of Arduino is (6v to 20V)
- Digital input/output pins of Arduino are 14 from those Analog i/p pins are 6 and other are digital pins.
- It can be give dc Current50 mAon 3.3V Pin
- The memory available in ardiuno is Flash Memory is 32 KB,SRAM is 2 KB,EEPROM is 1 KB
- Arduino CLK Speed is 16 MHz.

2. NodeMcu

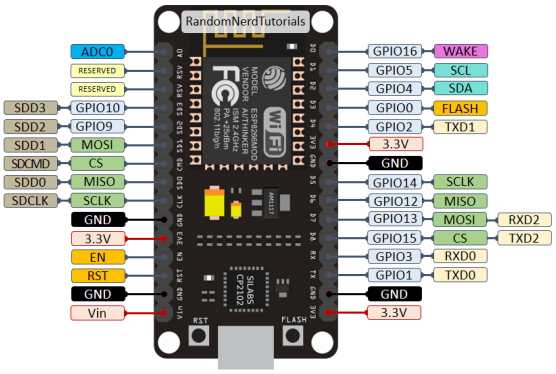

Fig 2.2: pin description of Nodemcu.

Nodemcu is a microcontroller-based wife module that makes it an excellent choice for Internet of Things (IoT) tasks of all kinds. This controller is used as an IoT device that can be used to send the warning message through the Blink app. 17 GPIO pins that can be programmed to assign functions such as I2C, I2S, ART, PWM, infrared remote management, soft LED and button. Any digitally enabled GPIO can be configured for internal pull-up or pull-down, or configured as over-impedance.

3. LCD display

Fig 3.3: LCD display16x2

This LCD diplay is used to show the status as well as sensor output. It has 16colum and two rows. And it is work with 5v dc power supply.

4. Flame sensor

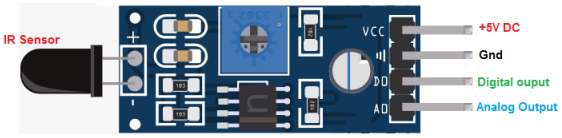

Fig3.4 : Flame sensor Module

Flame sensor is the most sensitive to regular mild that is why its reaction is normally used as flame alarm purposes. This module can come across flame or wavelength in 760 nm to 1100 nm range of light supply. Small plate output interface can and single chip can be at once related to the microcomputer IO port. The sensor and flame need to maintain a sure distance to keep away from high temperature damage

to the sensor. The shortest take a look at distance is eighty cm, if the flame is greater, test it with farther distance. The flame sensor detects the fire and via blink application send give alert massages to famer.

5. PIR sensor

Fig 3.5: PIR sensor module

Flame Sensors, Smoke Sensors, hearth Alarms and many others. Are parts of a safety equipment that help us in maintaining our homes, offices and stores safe from fire accidents. Nearly all modern-day houses, flats, malls, cinema halls, theatres, office buildings and stores are prepared with such protection system and it's miles obligatory in some regions to fireplace protection devices.

Flame Sensor has three pins (a few may additionally have 4 pins): VCC, GND and DO. join VCC and GND to 5V and GND of the strength supply (can be connected to Arduino's 5V). The DO (quick for digital Output) is connected to virtual I/O Pin of Arduino.

6. SD card Module

Fig 3.6 SD card module.

The Micro SD Card Module has SPI interface that is well matched with any sd card and it use5V or three.3V strength supply which is compatible with maximum micro controllers forums.SD module has diverse packages which include records logger, audio, video, pix. This module will significantly increase the capability an Arduino can do with their negative restricted memory.

Therefore the pins on an SD Card Module are as given below.

VCC, GND,MOSI – Master OUT Slave IN (Input),MISO – Master IN Slave OUT (Output),SCK – SPI Clock, CS–Chip Select (Input).

7. Solar panel

Fig 3.7: solar panel 12volt.

8. Solar charged converter (boost converter)

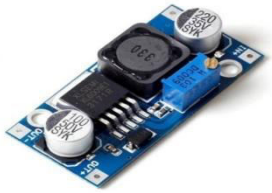

Fig 3.8: Boost Converter

This boost converter helps to provide constant voltage and appropriate current to battery to charge efficiently.

IV. Software Use

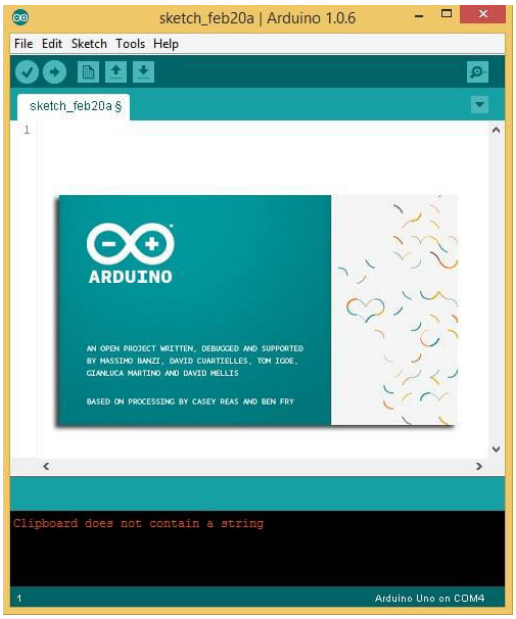

Fig. 4.1: Arduino IDE software

V. Architecture and Working Principle of Project

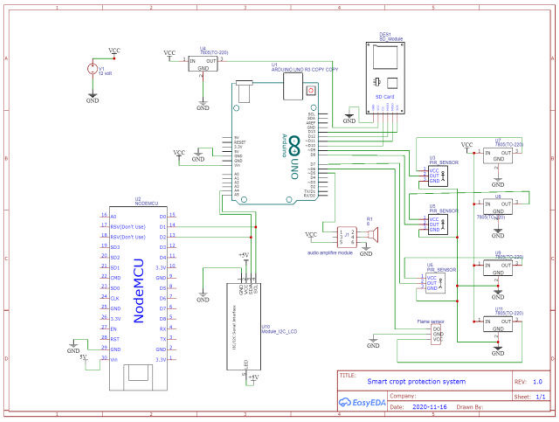

Fig. 5.1 Schematic of project

The above diagram show the block diagram details of the project which include Arduino UNO ,Nodemcu,PIR sensor, speaker, audio amplifier , LCD display with I2C, fire sensor, solar panels, buck boost converter, battery etc. by using those components we are redesigned this and we called it as smart crop protection system. The working of this project this very simple and easier. When the object or any kind of movement is detected by the PIR sensor then via a speaker lion sound or audio is play. And as per the research animals are scared from another animals sound .therefore we are save the voice of lion into the SD card and when the PIR sensor is detecting the motion then the Arduino is play this audio via speaker. And we are the Nodemcu as IOT device whose use is to connect this device to internet.

we are using a android application called blynk app this is a open source application for multiple application we are use this application as notifies to the authenticated farmer whose can receives the message on this app and check on which direction the motion is detected. we are also add a new feature on his project that is we know that sometimes there was chances of occurring fire on farm because weather condition. Hence we are implemented a fire sensor on farm. When fire is occur in farm then the framer receiving a fire detected on farm as notification.

VI. Result

Fig 6.1: Final set-up of SCPS

VII. Conclusion

From this research we can made smart crop protection system with a more flexibility and accuracy in term of detection of motion. In this we are save the farm from animals and animals life also.

References

[1] Krunal Mahajan1, Riya Parate2, Ekta Zade3, Shubham Khante4, Shishir Bagal5," REVIEW PAPER ON SMART CROP PROTECTION SYSTEM", International

Research Journal of Engineering and Technology (IRJET), Volume: 08, issue 02 Feb 2021.

[2] https://www.electronicshub.org/arduino-flame-sensor-interface/#:~:text=Flame%20Sensor%20has%20three%20pins,fire%2C%20a%20Buzzer%20is%20used.

[3] Stefano Giordano, IliasSeitanidis; Mike Oj, DavideAdami,FabioVignoli, "IoT solutions for crop protection against wild animal attacks", 2018 IEEE International Conference on Environmental Engineering (EE), 12-14 March 2018

[4] A. V. Deshpande, "Design and implementation of an intelligent security system for farm protection from wild animals," International Journal of Science and Research, ISSN (Online), pp. 2319–7064, 2016.

[5] S. Pandey and S. B. Bajracharya, "Crop protection and its effectiveness against wildlife: A case study of two villages of shivapuri national park, nepal," Nepal Journal of Science and Technology, vol. 16, no. 1, pp. 1– 10, 2015.

[6] K. Rao, R. Maikhuri, S. Nautiyal, and K. G. Saxena, "Crop damage and livestock depredation by wildlife: a case study from nandadevi biosphere reserve, india," Journal of Environmental Management, vol. 66, no. 3, pp. 317–327, 2002.

[7] V. Bavane, A. Raut, S. Sonune, A. Bawane, and P. Jawandhiya, "Protection of crops from wild animals using intelligent surveillance system."

[8]]R. Vigneshwar and R. Maheswari, "Development of embedded based system to monitor elephant intrusion in forest border areas using internet of things," International Journal of Engineering Research, vol. 5, no. 7, pp. 594–598, 2016.

[9] R. Bhardwaj, K. Bera, O. Jadhav, P. Gaikwad, and T. Gupta, "Intrusion detection through image processing and getting notified via sms and image," 2018.

[10]G. NaveenBalaji, V. Nandhini, S. Mithra, N. Priya , R. Naveena, "IOT based smart crop monitoring in farm land ",Imperial Journal of Interdisciplinary Research (IJIR), Volume 04, Issue 01 , Nov 2018.

[11]P.Rekha, T.Saranya, P.Preethi, L.Saraswathi, G.Shobana, "Smart AGRO Using ARDUINO and GSM", International Journal of Emerging Technologies in Engineering Research (IJETER) Volume 5, Issue 3, March 2017.

[12]TanmayBaranwal"Development of IOT based Smart Security and Monitoring Devices for Agriculture",Department of Computer Science Lovely Professional University Phagwara, Punjab, IEEE-2016.

[13]M. Sathishkumar1, S.Rajini "Smart Surveillance System Using PIR Sensor Network and GSM"InternationalJournal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume4 Issue 1, January 2015.