

DESIGN AND SIMULATION OF FARMER'S FRIEND DEVICE USING IoT

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Abstract: *Nativity, which enables the other objects to collect and exchange data. In this new era of urbanization, and interconnections, IoT applications are getting considerable attention because of their capabilities to integrate the latest technologies into one big system. Here, we are trying to create a project to protect the farm and monitoring System for plants system with some well-known new technologies. We will be integrating technologies like automation, object detection and upload our data of all activity on internet object detection method is made with Infra red sensors which detect the object (animal) and alert the farmers using IoT and blynk application and in monitoring system we send the data of temperature and moisture content of plants roots to farmers.*

Keywords - Automation, Database Management, IoT, Web Application

1. INTRODUCTION

Internet of things (IOT) applications utilize the advanced communication technologies between devices for granting a better gamut of accessibility features to the end users who live in connected areas. Nowadays, We have a read in the newspapers many days about the loss of the farmer and the farmers often worked the maturity and suspicion of crop production See you will not have to worry about the temperature, the water level and simply terrible weather conditions for farmers so in our project The main objective of our project is to protect plants from animal damage and diversion an animal and monitoring the atmosphere of plant [1-5]. An animal detection program is designed to detect the presence of an animal and provide a warning. In this project we used PIR and ultrasonic sensors to detect the movement of the animal and send a signal to the controller. Does the animal by producing sound and signal continuously, this signal is transmitted to Arduino and provides a warning to farmers and the forest department immediately here are we provide a better security to farmer and facility to used a fixed amount of fertilizers in farms according weather condition . This work reduces the cost of arming and helps to improving agriculture domain.

Our objectives of this project are there-

1. To design the security for farm protection,
2. restriction the entry of animal into the farm
3. Use Ir sensor and IoT technology for alerting us,
4. Design a system that sounds when animal tries to enter into the farm.

we gives details of temperature level and water levels, At the stage of reading “Design and Implementation of an Intelligent Security System for Farm Protection from Wild Animals “research paper we get to know that how to overcome fire accident during object detection because ”texes” paper fence wire is used which is biggest mistake for fire accident during high wind velocity in a field.

They used fence wire for object detection but we used different thing for detection here we used infrared sensor for detection of object when any animal try to enter in field then ir sensor will send “0” signal to arduino which control the buzzer and then buzzer generate the sound for animal protection and also we upload temperature and moisture data on server where framer can watch the data on blyank.

1.1 Arduino Uno

Arduino is a micro-controller board which used as controller it helps to perform the tasks like integration of sensors for reading/writing data, it helps in running and developing software's which is programmed by Arduino and also we can create a local host database in it. which can run when Arduino in offline condition [10-15].



Fig1.1: Arduino Uno

1.2 Moisture sensor

Soil moisture sensor made with of two conducting plates which work as a probe and acting as a variable resistor together. When the sensor is inserting into the water, the resistance will decrease form initial stage and get better conductivity between plates. First plate is connected to the +5Volt supply through series resistance of 10K ohm and second plate is connected directly to the ground. It simply acts as a voltage divider bias network, and output is taken directly from the first terminal of the sensor pin,

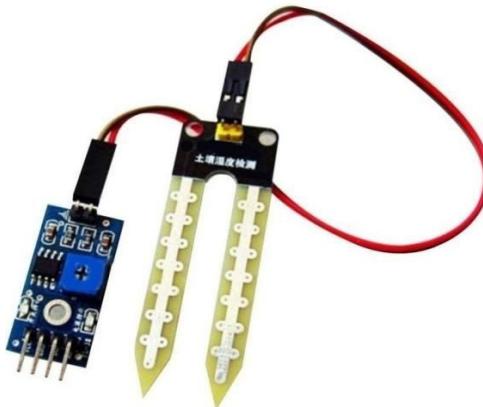


Fig1.2: Moisture sensor

1.3 IR Sensor

IR Sensor is an electronic device, which emits light in order to sense an obstacle in front of it. It can measure the heat of an object as well as can detect motion of that object.



Fig1.3 IR Sensor

1.4 Servo Motor

A servomotor is a device that allows angular rotation. It is a rotary actuator. It consists of suitable motor coupled to a sensor for position feedback.



Fig1.4: Servo Motor

1.5 Temperature Sensor

DHT11 is the most widely used temperature and humidity sensor. The sensor comes with an NTC dedicated to measuring temperature and an 8-bit micro-controller to extract temperature and humidity values such as serial data. The sensor is also factory - based so it is easy to work with other micro-controllers. The sensor can measure temperatures from 0°C to 50°C and humidity from 20% to 90% with an accuracy of $\pm 1^{\circ}\text{C}$ and $\pm 1\%$. So if you look at the ratings in this list then this sensor might be the right choice for you.

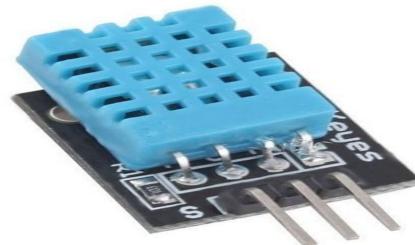


Fig1.5: DHT11 sensor

1.6 ESP 8266 module

This module help us to upload data on cloud for connection with internet and this devices is connected with Arduino and esp8266 comes with 8 pins RX VCC (+3.3 V;)can handle up to 3.6 V) GPIO 0 General- purpose I/O No. 0 RST, Reset CH_PD (Chip power- down) GPIO 2 General-purpose I/O No. TX GND 1 ESP8266 will be used as an external WiFi module in our project Several Libraries have been developed to use ESP8266 as a module for Arduino. Also there is a port of the Arduino IDE for programming the ESP Directly, see below [2-4].

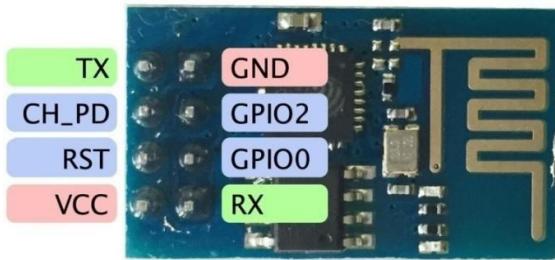


Fig1.6 DHT11sesnor

1.7 LCD display

The LCD represents a crystal display liquid that is used in various electronic projects and devices to display different values. LCDs use liquid crystals to produce a visual image. 16 x 2 liquid crystal display In this LCD module, there are two rows each line contains 16 numbers. For two rows in this module, there are sixteen rows. The VA dimensions of these modules (66 x 16) millimeters and dimensions are 13.2 millimeters. Its operating power consists of five volts or three voltages combined.

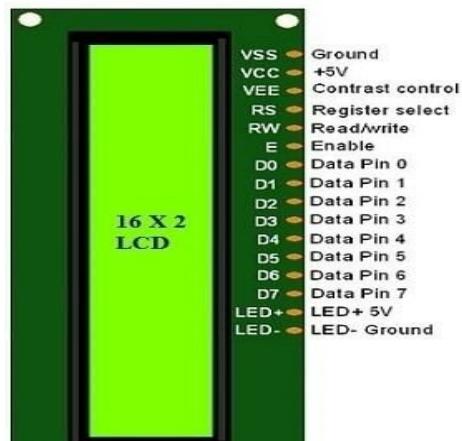


Fig1.7: 16 X 2 LCD Display

1.8 Relay module

This module helps us to control small volted input from Higher volt and used as electronic switch. The power transmission module is an electrical switch used by an electromagnet. The electromagnet is opened by a low- power signal that differs from a small controller. When activated, the electromagnet pulls on or off the electrical circuit.



Fig1.8: Relay Module

1.9 Blynk app (mobile application)

Mobile application is software which runs on a android with an active internet connection unlike the mobile application which run locally using an open source operating system. It performs its all programmed task on the internet without any requirement of a local data base because it takes the data from cloud.

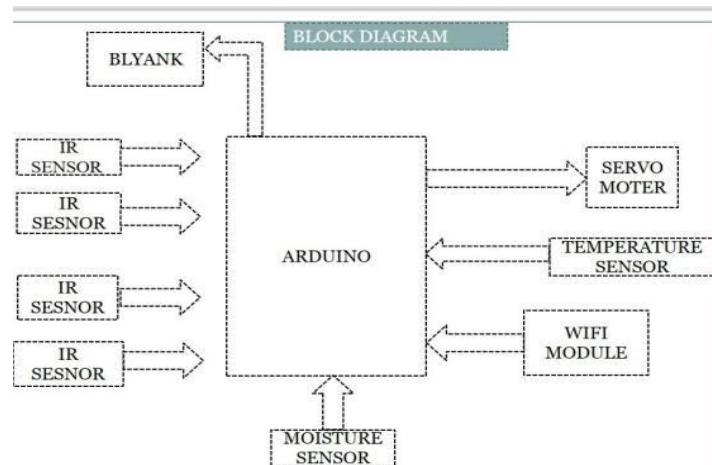


Fig1.9: Block Diagram Representation

Fig.2 explains the interrelationship of different sensors with each other. There are we used three sensors which we are used in this project.

2. PROJECT EXECUTION PLAN

Initially, information was collected and research was undertaken using various research papers which were available on the internet related to smart farming and animal protection system. Then a choice had to be made for the selection

of technologies to be chosen to made the project in a moderate amount of cost. There were many technologies available on the internet but the most impact full trends were taken by our team.

The arduino was used as Micro-controller and it can also connect different sensors which are needy for the project. Because in our project many sensors are presented After the Micro-controller was selected it was connected to the Ir sensor and was programmed using c++ A lot of libraries were executed because we take many type of sensor, and finally a program was created which can give a signal to Micro-controller when any object is presented between Ir sensor and then using Some algorithm to control all data of 4 IR sensors to find the data form all 4 direction and then we have to upload this all data on cloud so for this conduction we find that we need a some module which can upload the data on cloud after research we get esp8266 module which can make a interface between arduino and cloud so the farmer get to know that the weather animal is near the field or away from field

After completion of the animal protection part the next task was to find different sensors to read the atmosphere of field in nearby surrounding. For this System, Moisture sensors and temperature sensors were used. The all sensors is connected with Arduino analog pins because we know that temperature is analog in nature which should be used as digital in Arduino so we connect sensors to ADC pin of Arduino They were programmed in such a way that they became to give a error less data and the physically we place the all sensors on roots of plants for Optimized output. And we programmed each section in , its function. So we can reduce the syntax of out program which can readable for any one during project and easily changeable we used LCD also to display the data of our all data . we control our servo motor according to moisture data which comes from Arduino when moisture sensors send the data to Arduino .

Now after collecting all the data, a storage solution was to be solved by blynk app which is open source any one can use its freely available that could provide easy and fast access to the data at any point. For this we have to programmed according the blynk app in program we have to give token number which is generated though blynk app so finally we made our project which display all data on blynk app.

3. CIRCUIT DIAGRAM

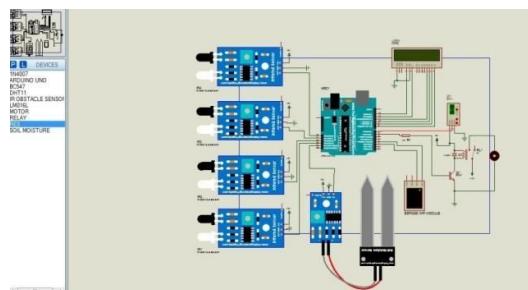


Fig.3 Circuit Diagram Representation

Fig.3 represents the circuit diagram which is created during the project. As there are limited GPIO pins on the Arduino we take the 5V VCC and GND pin common on the breadboard. All the VCC and GND of all the different sensors to the breadboard were connected with common GPIO pins for power. All the reading/writing connections of different sensors are connected individually to the GPIO pins 4 IR sensors were used for entry points in farms and exit points and also in 4 direction for give a proper amount of water we use servo motor.

In this project four IR sensors are used, which will be placed in all 4 IR sensor of farms for each direction to each point of entry and also its create rectangular shape of area which is acts as security area where no permission is accessible.[4-7]. The IR sensor will give a zero signal when any animal want to enter in our filed because the circuit is incompatible upon this data we decide that some object try to enter in our farm, and the buzzer will be on when we get zero signal otherwise if all the IR sensors are blocked then the buzzer remain off.

The moisture sensor is also used to get the data of water content in roots of plants and we get all data from esp8266 module and Arduino which make connection between clouds and local database of Arduino these devices are connected for taking real time data of moisture content when the moisture content of roots will increase to cutoff condition then our servo motor start to provide the water content and then servo motor will be off when plants roots will get a proper amount of water the temperature of all plants will get from temperature sensor the temperature data is given to Arduino and Arduino sends this signal to esp8266ABOARD configuration has been used to program the project using c++. The OUT pins of the IR sensors are connected to Pin A1,A2,A3,A4 of the Arduino. The servomotor pin is connected to 5 pin of GPIO set. Resistors are also used to controllable connection to the ultrasonic sensors and to increase reliability.

4. Result and Conclusion

The main aim of this project is to make the agriculture work so simple and adorable we want to reduce the cost of farmers so we use animal protection system which helps to give a proper satisfaction to the farmer that his farms are fully secured but some issues are not solved as when any human comes in the contact with the IR sensor then the IR sensor will give the zero signal.[1-3].

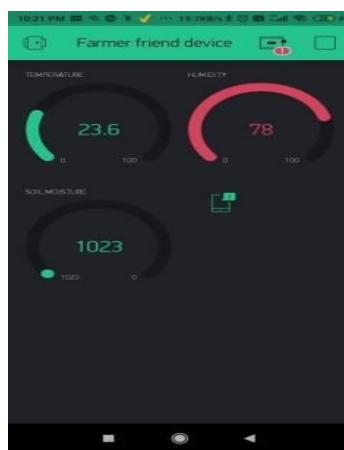


Fig.8: Response of app.

So we can't identify that whether the target object is human or animal so we can remove these issues with image sensor technology. because from this technology we know that the object is human or animal. and also some issues related with the internet because in some villages internet is not available which create a big issue for this project. so the application of this project is limited . This project includes the monitoring system of crops where we give all data of roots temperature and moisture content. which is beneficial In the terms of giving a piece of proper information for plants when the farmer gets all data then farmer use a fixed amount of fertilizers to optimize the result of his farming .

5. Acknowledgement

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REFERENCES

- [1] Sabah Al-Fedaghi, "Developing Web Applications," International Journal of Software Engineering and Its Applications Vol. 5 - No. 2, April 2011.
- [2] Sathishkumar1, S.Rajini "Smart Surveillance System Using PIR Sensor Network and GSM" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 4 Issue 1, January 2015].
- [3] Sivagamasundari, S. Janani, "Home surveillance system based on MCU and GSM", International journal of communications and engineering, 2014, \ volume 06- no .
- [4] Padmashree S. Dhake, Sumedha S. Borde, "Embedded Surveillance System Using PIR Sensor", International Journal of Advanced Technology in Engineering and Science, www.ijates.com Volume No.02, Issue No. 03, March 2014
- [5] Pramod P. J, S. V Srikanth, Vivek N, Mahesh U Patil, Sarat Chandra Babu N, "Intelligent Intrusion Detection System (In2DS) using Wireless Sensor Networks", Proceedings of the 2009 IEEE International Conference on Networking, Sensing and Control, Okayama, Japan, March 26-29, 2006
- [6] Fackelmeier A, Biebl E.M, "A Multistatic Raddar for Detecting Wild Animals" Tech University, Munich, ISBN 978-1-4244-4747-3.
- [7] Sumit Kumar Tatarave, Ashish Kumar Shrivatsava, "A Complete Safety For Wildlife Using Mobile Agents and Sensor Clouds in WSN" IJCSI International Journal of Computer Sciences, Vol 9, Issue 6, No 3, Nov 2012, ISBN 1694-081
- [8] Abhinav, V. D. 2016. Design and Implementation of an Intelligent Security System for Farm Protection from Wild Animals. International Journal of Science and Research (IJSR), Vol. 5 Issue 2, 2319-7064
- [9] Willig, A. and Karl, H. 2005. Protocols and the Architectures for Wireless Sensor Networks. John Wiley and Sons Ltd.
- [10] Maheswari R. 2016. Development of Embedded Based System to Monitor Elephant Intrusion in Forest Border Areas Using Internet Of Things. International Journal of Engineering Research, Vol.5, Issue 7, 594-598
- [11] Blackmore S. 1994. Precision Farming: An Introduction. Outlook on Agriculture Journal, Vol. 23, No.4, 275-280.
- [12] Anjum A. and Reddy S. 2013. Monitoring for Precision Agriculture using Wireless Sensor Network – A Review. Global Journals Inc. (USA) Vol. 13, Issue 7, Version 1.0.
- [13] Akyildiz I. F. and Kasimoglu I. H. 2004. Wireless Sensor and Actor Networks: Research Challenges. Ad Hoc Networks. 2 (4): 351–367.
- [14] Aquino-Santos R ., Gonza lez-Potes A., Edwards-Block A. and Virgen-Ortiz R. A. 2011. Developing a New Wireless Sensor Network Platform and Its Application in Precision Agriculture. Sensors, 11(1), 1192-1211.
- [15] Prof. Abhinav V. Deshpande"Design and Implementation of an Intelligent Security System for Farm Protection from Wild Animals"published by International Journal of Science and Research (2014)
- [16] Saumya Priya Basu , Saumya Das , Sanjita Das, Manas K Das; 'Effect of Methanoic Extract of the Leaves of Calotropis Gigantea R.BR. On Leukocyte and Neutrophil Migration',Volume No.2,Issue No.1,2013,PP.033-036,ISSN :2229-5828
- [17] Deepak Bhardwaj , S P Singh, VK Pandey; 'VHDL Implementation of Interleavers : Fundamental and Recent Developments for Wimax and Wlan',Volume No.2,Issue No.1,2013,PP.037-043,ISSN :2229-5828
- [18] Malviya, Ragini; 'Study and Simulation of the Unified Power Flow Controller(UPFC) In Power System',Volume No.2,Issue No.1,2013,PP.045-050,ISSN :2229-5828
- [19] Rajesh Lavania, Manu Pratap Singh; 'Performance Analysis For Multilayer Feed Forward Neural Network With Gradient Descent with Momentum & Adaptive Back Propagation and Bfgs QuasiNewton Back Propagation for Hand Written Hindi Characters of Swars',Volume No.2,Issue No.1,2013,PP.051-065,ISSN :2229-5828
- [20] Shweta Vishnoi , Rakesh Kumar, Sunder Pal & Beer Pal Singh; 'Study of Optical Character-ization of Pulse Laser Deposited Zno Thin Films',Volume No.2,Issue No.1,2013,PP.067-070,ISSN :2229-5828
- [21] Vinay Kumar ,Lalit Kumar, Gagan Deep; 'Study on the Curing Kinetics of Epoxy Resins Using Diorgano-tin Dichlorides',Volume No.2,Issue No.1,2013,PP.071-074,ISSN :2229-5828