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Smart Crop Protection Agriculture System Using Internet of Things

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ABSTRACT

An intelligent crop protection system helps the farmers in protecting thecrop from the animals and birds which destroy the crop. This system also helps farmers to monitor the soil moisture levels in the field and also the temperature and humidity values near the field. The motors and sprinklers in the field can be controlled using the mobile application. Agriculture is the foundation of the economy, nevertheless would bring about gigantic harvest misfortune due to creature interruption in agricultural land. Elephants and other creatures entering into people's place of residence has bought adverse consequence in different ways ,for example ,crop annihilation, harm to food stores, water supply, homes and other properties, injury and human demise.

Index Terms *- SCPS, IOT, SD card module, flame sensor.*

1. INTRODUCTION

The Smart protection system defines that this project helps to farmer for the protection of a farm. We have designed this project for the only secure from animals but we this project has the provision to secure from the human begins also. This can achieve by the help of IOT device that we are discuss in this paper. The SCPS work on the battery so that this project can be easily portable and also we are adding solar panels and converter modules this can help the battery to charge from solar energy. The IOT device is used to indicate the farmer by a message while someone enter into the farm and we are used SD card module that helps to store a specified sound to fear the animals.

2. METHODOLOGY

This project is smart crop protection system for protect the farm from animals as well as unknown person. This projects contents Arduino UNO, NodeMCU, LCD display, PIR sensor,Flame sensor,SD card module, Solar

panel, Solar charges converter. This whole project is work on 12v dc supply from battery. We used solar panel to charge the battery. The other components used are as follows.

Components Required

1. **Arduino UNO**

The Uno R3 development Board is the low-fee version of the famous Uno R3 Arduino. it is assembled with the CH340 USB to Serial converter chip, in preference to the use of an Atmega16U2 chip.This can help to process the sensor data of projects and show the action on lcd display. We have used lots of these low-fee Arduino boards with CH340 chips, and have discovered them to paintings perfectly.

Fig 2.1: - 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 Current 50 mA on 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**

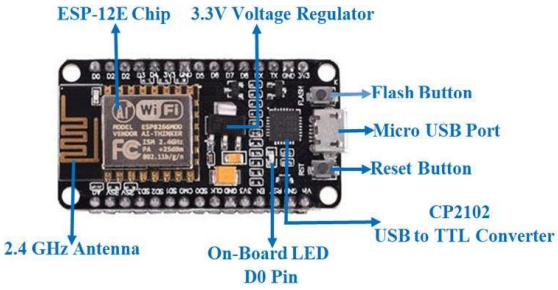

Fig 2.2: Pin Description of NodeMCU

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The NodeMCU is micro controller-based wife module that makes it a tremendous choice for the internet of things (IoT) tasks of all kinds. This controller is used as a IOT devices that help use to send the alert message via blink application.

NodeMCU/ESP8266 has 17 GPIO pins which may be assigned to features consisting of I2C, I2S, UART, PWM, IR remote manage, LED mild and Button programmatically. Each digital enabled GPIO may be configured to internal pull-up or pull-down or set to excessive impedance.

3. **LCD display**

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.

Problem Statement and Definition:

Problem Statement (PS)	I am (Customer)	I am trying to	But	Because	Which makes me feel
PS-1	Farmer	Monitoring the growing condition	It involves risk on related equipment and understand the use of technology	Requires more knowledge and skills	Irritated
PS-2	Farmer	Smart and precision irrigation	Climates changes to increased maintenance of channels	Purchasing and installing costs high	Suitable for mass crop protection

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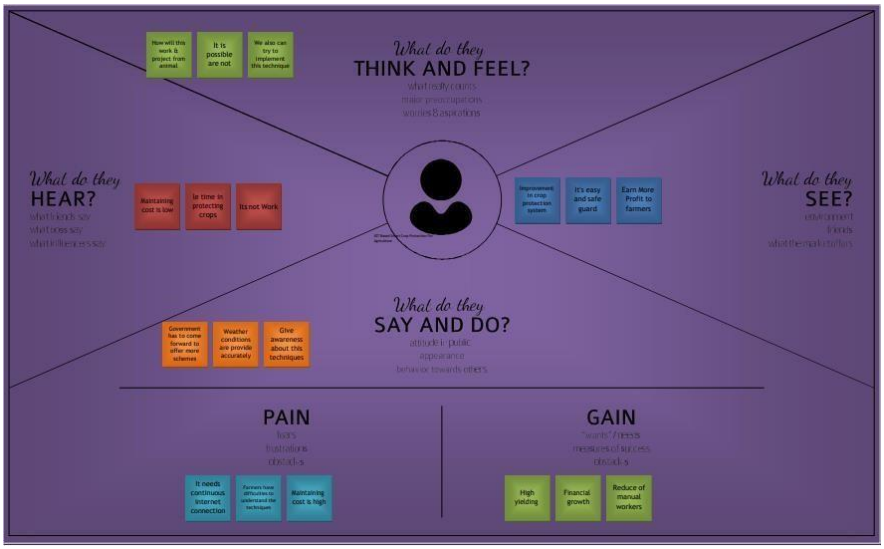
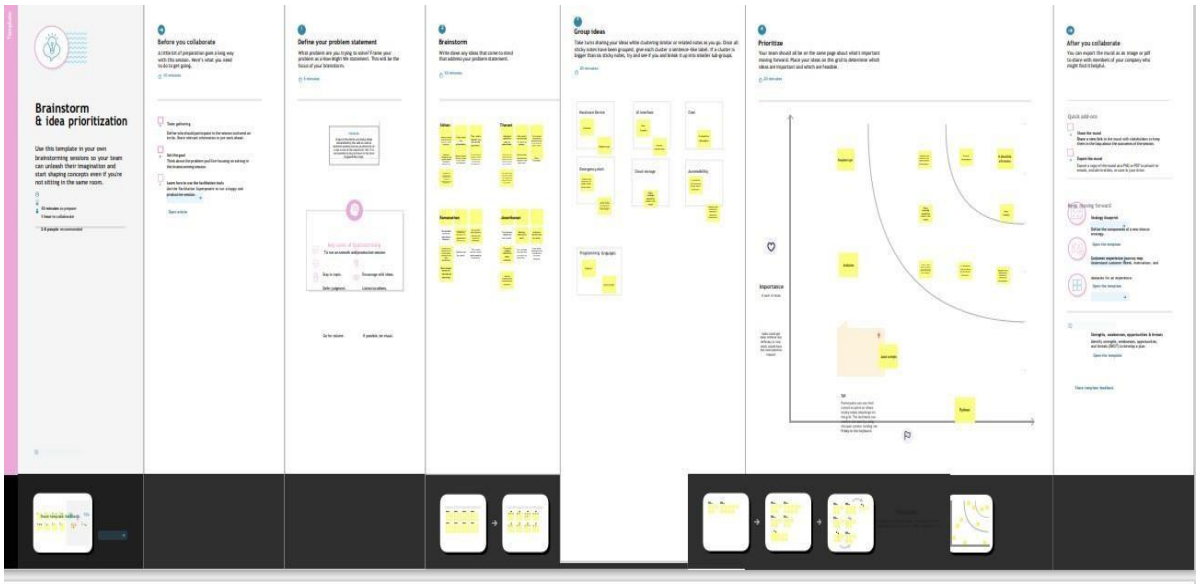
Ideation and Proposed Solution:

1. Empathy and Map canvas



2. Ideation and Brainstorming:



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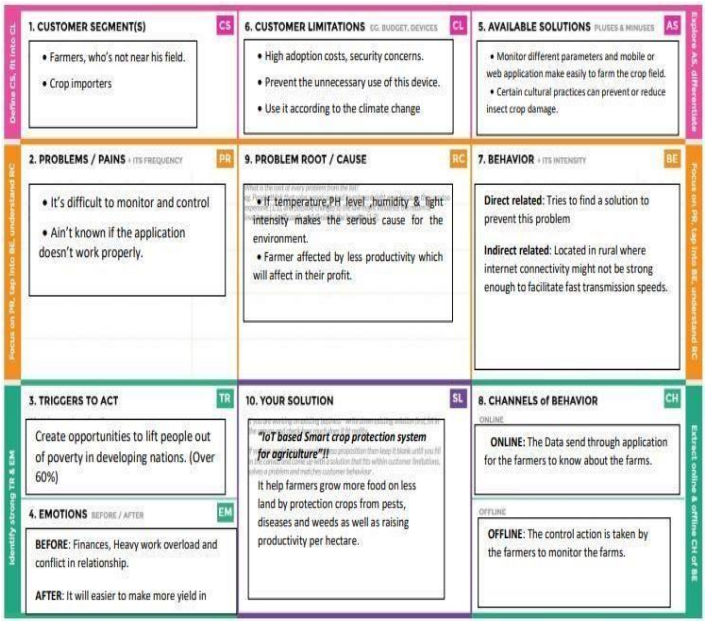
3. Proposed Solution:

S.No	Parameter	Description
1.	Problem Statement (Problemtobesolved)	Develop an efficient system & an application that can monitor and alert the users(farmers)
2.	Idea/Solution description	➢ This product helps the field in monitoring the animals other disturbance ➢ In several areas, the temperature sensors will be integrated to monitor the temperature & humidity ➢ If in any area feel dry or wetless is detected by admins, will be notified along with the location in the web application
3.	Novelty/Uniqueness	➢ Fastest alerts to the farmers ➢ The increasing demand for quality food ➢ User friendly
4.	Social Impact/Customer Satisfaction	➢ Easy installation and provide efficient results ➢ Can work with irrespective of fear
5.	Business Model(Revenue Model)	➢ As the product usage can be understood by everyone, it is easy for them to use it properly for their safest organization ➢ The product is advertised all over the platforms. Since it is economical, even helps small scale farming land from disasters.
6.	Scalability of the Solution	➢ Even when the interruption is more, the product sense the accurate location and alerts the farmers effectively

Problem Solution Fit:



Data Flow Diagram:

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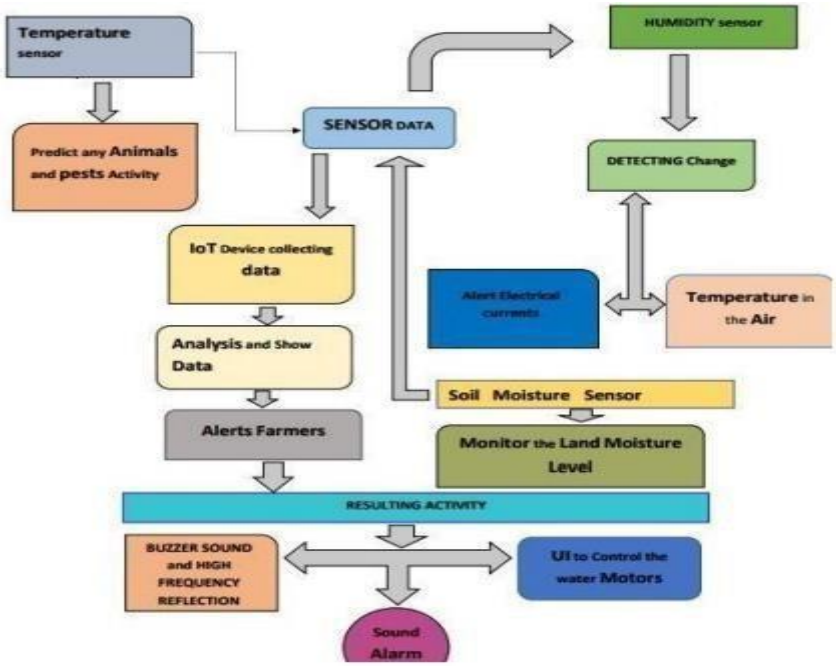
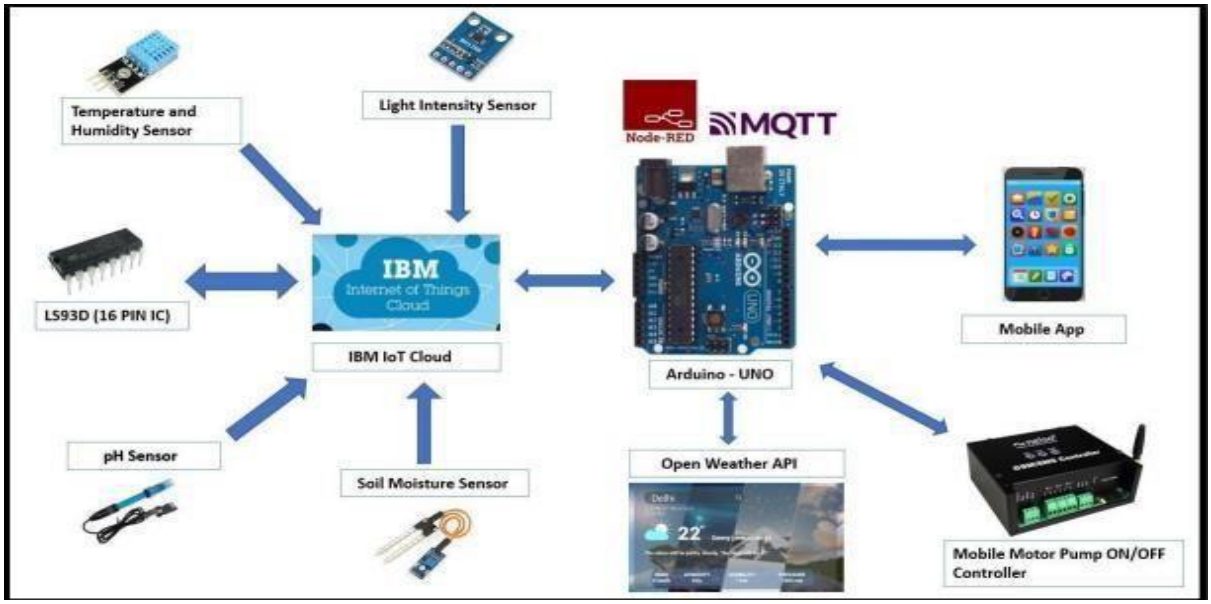


Solution Architecture:



FEATURES:

Feature 1: Detect the Temperature

Feature 2: Detect the Humidity

Feature 3: Detect the Moisture

Feature 4: Detect the Animals

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Result:

Advantages & Disadvantages :

Advantages:

1. Farmers can monitor the health of farm animals closely, even if they are physically distant.
2. Smart farming systems reduce waste, improve productivity and enable management of a greater number of resources through remote sensing.
3. High reliance.

Disadvantages:

1. Farms are located in remote areas and are far from access to the internet.
2. A farmer needs to have access to crop data reliably at any time from any location, so connection issues would cause an advanced monitoring system to be useless.
3. High Costequipment needed to implement IoT in agriculture is expensive

Conclusion:

The problem of crop vandalization by wild animals and fire has become a major social problem in current time. It requires urgent attention as no effective solution exists till date for this problem. Thus, this project carries a great social relevance as it aims to address this problem. This project will help farmers in protecting their orchards and fields and save them from significant financial losses and will save them from the unproductive

efforts that they endure for the protection their fields. This will also help them in achieving better crop yields thus leading to their economic well being.

Future Scope:

Study and analysis of the developed Crop protection systems for its cost effectiveness with the development of Arduino based variable frequency Ultrasonic bird deterrent circuit. outline of the crop damage caused by a particular Wild animal if the behavioral features of the With the reduced cost in the smart phones.

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