Smart Crop Protection System

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Crops in farms are many times damaged by animals like buffaloes, cows, goats, birds and wild elephants. This causes major losses for the farmers. Farmers cannot stay on the field for 24 hours and protect it. To overcome this problem, an animal detection system has been designed to detect the presence of animals and it offers a warning and divert the animal without any harm. The designed system will continuously check for any animal to enter the field. IR sensors and ultrasonic sensor are used in this project to detect animal movement and to give a signal to the controller. Further the animals are being diverted by generating sound and signals, and this signal is being transmitted to GSM and instantly give farmers warning, so the farmers will be aware of the difficulty and available to the spot just in case the animals do not show off by the alarm. The complete safety of crops was ensured by this system from animals thus protecting the farmer's loss.

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Agriculture is the primary occupation in our country for ages. But now due to migration of people from rural to urban there is hindrance in agriculture. So, to overcome this problem we go for smart agriculture techniques using IoT. This project includes various features like GPS based remote controlled monitoring, moisture & temperature sensing, intruders scaring, security, leaf wetness and proper irrigation facilities. It makes use of wireless sensor networks for noting the soil properties and environmental factors continuously. Various sensor nodes are deployed at different locations in the farm. Controlling these parameters are through any remote device or internet services and the operations are performed by interfacing sensors, Wi-Fi, camera with microcontroller. This concept is created as a product and given to the farmer's welfare.

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Agriculture is the backbone of the economy but because of animal interference in agricultural lands, there will be huge loss of crops. This article provides a comprehensive review of various methods adopted by farmers to protect their crops. The article also discusses use of modern technology in agriculture. Finally, this article reviews smart crop protection system using sensors, microcontroller, and gsm module.

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Internet of Things (IoT) technologies can greatly benefit from machine-learning techniques and artificial neural networks for data mining and vice versa. In the agricultural field, this con-vergence could result in the development of smart farming systems suitable for use as decision support systems by peasant farmers. This work presents the design of a smart farming system for crop production, which is based on low-cost IoT sensors and popular data storage services and data analytics services on the cloud. Moreover, a new data-mining method exploiting climate data along with crop-production data is proposed for the prediction of production volume from heterogeneous data sources. This method was initially validated using traditional machine-learning techniques and open historical data of the northeast region of the state of Puebla, Mexico, which were collected from data sources from the National Water Commission and the Agri-food Information Service of the Mexican Government.

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P. Rekha et al, proposed a system for preventing agricultural land from animal and automated irrigation system. By using arduino, GSM module, IR sensor and soil moisture sensor, senses the environmental data and send to arduino. This system makes the use of IR sensor for detection of animals and soil moisture sensor to find the moisture of soil and automatically control the water pump for auto irrigation system. But this system does not utilize advanced technologies for alerting the farmer and detection of animals in farm

Tejas Khare et al, proposed automated crop field surveillance using computer vision. In this system the long-range camera is placed at the corner of field or land with considering maximum field of view of camera. When animal is detected by the camera the distance between camera and speaker is calculated. The speaker nearest to the animal is identified. The object detection is carried out by pre-trained model YOLO V3 and COCO dataset. If animal is detected the speaker nearest to the animal makes sound. But this system doesn't work in different circumstances like in the night or dark (shadow).

Damini kalra et al, proposed a system for crop protection from insects, pests, locusts, small animals and automatic irrigation system by sensing moisture, humidity and temperature of soil. The crop protection is done based on sound technology and movement detection using

ultrasonic sensor. The main advantage of this system is this system works in different circumstances like in night and dark (shadow).

M Jaya Prabha et al, proposed a smart crop protection system from animals using Arduino UNO. The system is consisting of IR sensor for animal detection, ultrasonic sensor which rotates 360 degrees for detection of birds and a GSM module to send alert message to the farmer. It is a very simple system and cannot differentiate between human and animals. Stefano Giordano et al, this paper's motive is to design IOT based system to prevent animal intrusion in the crop field and providing weather conditions. Every year in Italy animal intrusion causes huge loss. The current systems for prevention of animal intrusion are cruel and large amount of installation and maintenance cost is required. This system is based on an ultrasounds generator, which is not harmful for anyone in any way. Repelling system consists of a low power state-of-the-art Cortex ARM M0+ microprocessor which handles frequency production and the networking operations. Passive Infrared Sensor (PIR) sensor generates signal only when an animal is detected. Device can be tuned according to the animal that is desired to be repelled. Open-source operating system called RIOT is used as it has features such as multi-threading, efficient network stack and memory allocation which are compatible for Real-Time use. One thread is used for the detection using a PIR and transmitting a multicast message to the gateway and the nodes. Another thread is used for receiving multicast messages from other nodes. Since our devices are producing data in real time, a Time-Series Database ' OpenTSDB' is selected and a column family database 'HBase' as a long period storage. Weather monitoring system includes the device and the back-end. The device is a solar powered ESP-8266 Ardunio based boardconnected to various sensors. it communicates over Wi-Fi to the back-end system. It provides a real-time weather condition via email notification. Main goal is to provide repelling and monitoring system.

Mr. P. Venkateswara Rao et al, the purpose of this system is to build a system to detect movement of animal and produce sound. Camera and microcontroller are used to detect the animal. System consists of Arduino, camera, GSM, and buzzer. Movement detected by camera module after detection of movement system produce sound to divert animals and by GSM model SMS is generated by the system to alert the owner. This system provides an early warning about possible intrusion and damage by animal. This system is not harmful for anyone in anyway. A camera is basic requirement for this project. The camera module is set in a location where the animals enter the farm. Prohibit the entry of the animal and give alert to owner of the farm. The main problem of crop vandalization by wild animal tried to solve in

this project. This system provides urgent attention and effective solution. System designed a smart embedded farmland protection which is low cost and consumes less energy. Such system will be helpful to the farmer in protecting their field and save them from significant losses. This system helps in achieving better crop yields thus leading to their economic wellbeing.