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**Optimize and customize irrigation mechanism and
crops prevention from pests**

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Abstract

This model is basically about how we can increase growth of crops with the help of modern technology like Artificial Intelligence and IOT. This model has following advantages:-

- Help farmers to keep an eye on a large field from just one place.
- Helps to improve irrigation System.
- Helps to improve quality of crops by controlling pest.

Keywords: Irrigation, Pest protection, Artificial intelligence, Technology, Agriculture, Agrotechnology, IOT, Safe Agriculture

Introduction

Being the largest and most basic factor of everyone's life, it is really important to improve quality and production of food and it is of course better to use it without human power i.e. with technology. According to a survey 65% of the water on earth is used in irrigation only while according to another survey 70% of the damage in crops happens due to pests. This model is such a great solution to resolve all these issues. We are going to use IOT devices connected with an App. All these devices collect the data and send it to server from where an AI program filter all the data and send the useful information to the user. The app at the user end suggests the better option to the user while there will also be an automatic option with which the user can go to sleep and system will automatically take action from itself.

Materials and Methods

Currently **Conser Water** is a company which is working on the concept of saving water through controlling on irrigation with the help of AI. They are using Satellite data for the prediction of everything which is not accurate always. They collect data from NASA satellite and process that data but satellite does not collect data from the exact point but from a nearest location. Other than this it has limitation that it only helps in irrigation and not in other things.

Solution

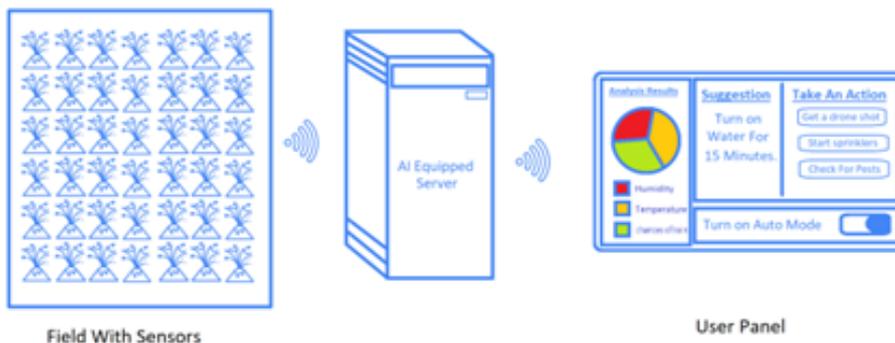
So to remove these problems I myself found a solution that can provide a large accuracy but will be a little costlier as hardware will get used in it. We will use many sensors such as Soil moisture sensor, drones with cameras, weather information of that location and AI to collect all data from field and provide it to the user in order to take appropriate actions.

Design of Project

It uses following equipment:-

- Soil Moisture Sensor
- Drone with Camera
- Sprinklers
- GPS(s)
- High Capacity Server
- Mobile/Tablet/PC

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Functionality of Project

The Soil Moisture Sensor, Drone Camera and GPS will act as Sensors while Sprinklers will act as Actuators. Both sensors and actuators will be IOT equipped. These sensors will sense the data and send it to a server they are connected with. The server with high processing speed and equipped with AI will process the data and will generate the useful information out of it. This useful information will be then send to user’s mobile on the basis of which combined with weather at that location, the app will generate suggestions and would ask the user to take appropriate action if not on auto mode else it would take the appropriate action from itself. The action taken will request server to process the action and hence server will send the action to be act to the actuators which are sprinklers in this case and hence sensors will be ON for some time suggested by the App. Coming on the second functionality, with the help of GPS(s), the app will calculate the boundaries of the field and will show them on a map. So that farmer can select any area or whole area with the help of app to be searched by drone. As soon as farmer will request, the server will ask drone to cover that area so drone will capture images of that area and will send it to server which then will be processed with deep learning and machine learning algorithms. On the basis of which the server found that there is any issue or not and will then send that image as well as processed data to the app so that the farmer can know that which part of his field needs pest control or if some other information he needs.

Working of Soil Moisture Sensor: Soil Moisture Sensor is an electronic circuit which operates on 5V. It works on principle of capacitor and produce output on the basis of dielectric permittivity of its surrounding.

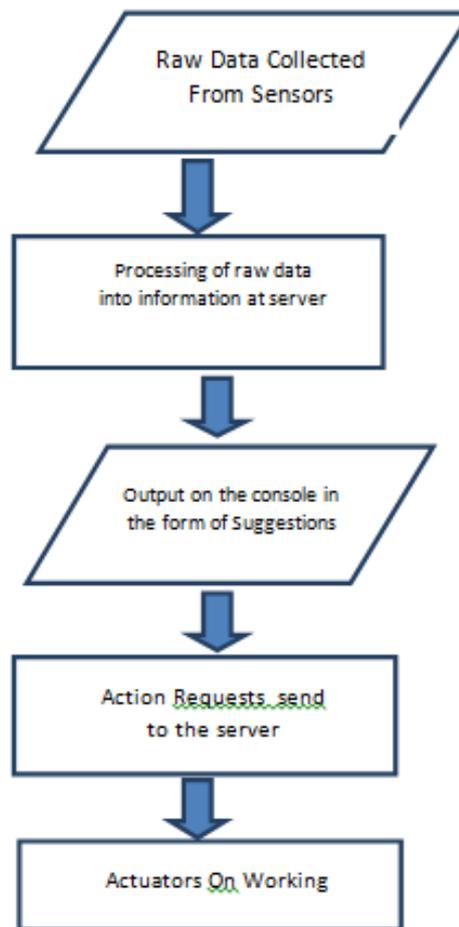
Working of Drone

Drone will consist of a HD camera, a microcontroller to help to connect through server.

Cost Estimation:-According to Amazon, following is the cost estimation of the model:-

Qty.	Item	Cost (In Rs.)
2	Soil Moisture Sensor(s)	2x200 = 400
2	Arduino Microcontroller(s)	2x500 = 1000
1	Automated Drone	1x7000 = 7000
	Server Cost per User	1x1000 = 1000
	Sprinklers	depends on size of field
	Total	10000-12000Rs

Flow Chart



Future Scope

This project may be very popular in future as every person is now connecting with technology very rapidly and everyone wants to earn profit more than others. After all the agriculture is the only field which is not going to end before the earth because food is the basic necessity of human and due to huge increase in population the production rate also needs to be high enough.

Proposed Work

There are some drawbacks of this model which we can solve in future:-

- Cost of the product can be decreased in future.
- The pest control can also be automated.

Conclusion

The final conclusion of this project is that it has following benefits:-

1. Helping Farmers to increase production.
2. Helps them to earn more profit.
3. Helps to increase the quality of food.

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