SMART FARMING USING IOT

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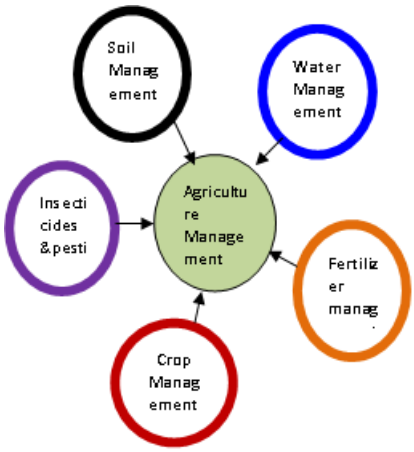
Abstract- *Previously 60% Indian economy was completely depends on agriculture but now a days due to global warming and natural calamities agriculture field is suffering from different natural calamities. Due to this traditional farmer are selling their farms and moving towards urban areas. So there is need to think on the solution for effective management of agriculture system. the main problem for managing the agriculture system are 1. Soil structure 2. Water management 3. Crop management 4. Controlling of Insecticides and pesticides 5. Requirement of natural Fertilizers. In this paper we are going to discuss different applications that can be building for management of agriculture system for the discussed issues.*

Farmers are mostly depends on monsoon, fragmented land farming and holding, traditional farming practices, lack of infrastructure in rural areas and less usage of technology applications. so their should be some technology that can increase the crop gain as well as it should take care of the other aspects to manage the crop. Now a days IOT, WSN, AI, satellite farming or site specific crop management (SSCM) or Precision Agriculture are new technology that can use for effective management of farming.

I. LITERATURE SURVEY

No of systems are proposed by people for managing agriculture things but every systems have some pulse and minus points. [1] In this paper Bluetooth is used for monitoring irrigation system. But the limitation of Bluetooth is not applicable from remote distance. [2] In this paper author had used GSM SIM for monitoring irrigation system from remote location. the limitation of the system is it is in manual mode there is no auto shut off in case of insufficient water level and low power supply. [3] In this paper, author had discussed about WSN technology for maintain water level in greenhouse. Major drawback of this system is farmer has to bear major cost of implementing greenhouses.[4]In this paper author has used GPS system for sprinkler but as most of the crops are big in size and sprinkler is not used for large crops. [5]In this paper GSM system is used for precision based agriculture system for crop but the limitation is lack of technology. [6] In this paper soil monitoring is done using GPS system According to literature survey all type of systems are developed using different technology but there is no such effective system which can control all things together. Like there should be water soil and crop management system together and also some prediction and solution based system for use of fertilizers and insecticides and pesticides.

II. SYSTEM ARCHITECTURE



The diagram show entire agriculture system. Form managements of all these system we have to think a system that can manage all these system.

1. Soil Management :

As per soil structure farmer needs to plant crop. While checking the soil structure farmer needs to check the quality of soil while planting each crop. So he can take necessary action to increase the profit gain. So soil management is also playing major role in agriculture management. This module is used twice or thrice in year while planting crop. So it should be low cost and detachable from actual system. There are various sensors available in market which can test humidity, light, and ph balance of the soil. With all these we need to check the minerals and nutrients of the soil so that appropriate fertilizers can be used for cultivation of crop. It should be a prediction system or decision support system.

2. Crop management :

Crop management is basically needed when we are cultivating fruits and also on crop to check whether a proper growth is done or some part of the farm is infected by insecticides or not for this is it needs to be a decision support based system because on the data obtained from monitoring camera is get analyzed and a decision is taken on it. This decision is in the form of Massages, alarm, or generation of an

event. Data derived from camera can be combined with environment data from IoT devices for taking decision. If a crop is infected so it should report to farmer with the solution by taking decision that which type of insecticide is present and which pesticide needs to use.

3. Insecticides and pesticides management :

Whenever a crop is infected by some insecticides our system should report to farmer with the decision of which pesticide is need to be used. For this system should contain all type of insecticides and their solution and preventive majors. For this system should take decision of suggestion of pesticides and their percentage. The information is get retrieved from stored database but the decision need to be taken up to what level we have to use it.

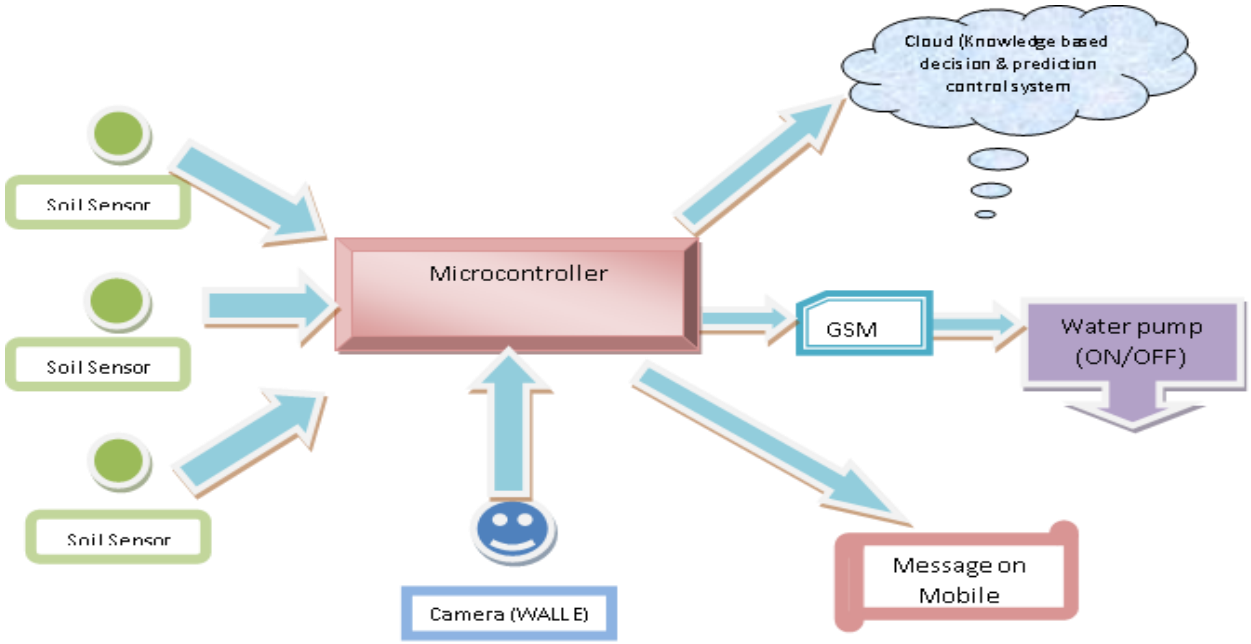
4. Fertilizer management:

According to soil and crop that is being cultivate by farmer this system should suggest appropriate fertilizer. It should be organic and this system should provide information about recent and natural fertilizer and the procedure that to be adopt to prepare and use it.

5. Water management :

There are various system that are developed for managing irrigation system in agriculture sector. So that water will be utilize properly. The system will maintain control on controlling water pump and also take decision to water the plant through drip irrigation. Also it should report to farmer about the water level through massage. And should take the action in case of water level is low or power failure.

System architecture :



Soil Sensor:

Soil sensors are responsible for sensing data from soil like humidity, temperature water minerals and water level in soil. These sensors collect data and transfer to the microcontroller to make decision about necessary action. Sensors are responsible only for data gathering.

Microcontroller:

Here microcontroller is responsible for processing data and to take necessary action on it. When microcontroller received data from sensors if the water level is low it will send on signal to water pump.

When it sense data from camera module (Wall-E) it will examine crop growth and pesticides on crop, through this microcontroller can ensure the crop growth and also the affected crop by pesticides. Once microcontroller receives the data in image format it will send this data to cloud where knowledge based decision and prediction control system is present. Whatever result is processed by cloud the microcontroller sent that prediction to the end user/ farmer to take necessary action.

Knowledge based decision/ prediction control system:

Knowledge is the database of previous decisions. By making use of that decisions system can decide the action to be taken the knowledge bases is gathered from either agriculture department or the information collected from other farmer. Also this knowledge based need to connect to the media so that new updates in agriculture fields and also new farming technique and information about organic fertilizer can be passed to the farmer.

Camera (Wall-E) :

Camera is going to capture the images of abnormal crops and insecticides. The microcontroller compares those images with the knowledge base and according to that it process. The normal images will get discarded at the end of the day.

Controlling of water pump:

Here Controlling of water pump is done using GSM card. Where the pump on off and pump status will be maintain. If the water level is get dropped then the pump should be auto shut off.

Advantages of the system:

1. Observing over all crop tedious task and time consuming task so by camera module we reduced the time.
2. The affected area by crop is indentified easily and early so that can take necessary action on it.
3. The water is utilized effectively and less water consumption through drip irrigation and soil moisture sensing .
4. Farmer will get help in taking decision related to crop management

Limitation

1. Costly
2. Not applicable for small farms