Smart Agriculture System Based on IoT

The global population is predicted to touch 9.6 billion by 2050 – this poses a big problem for the agriculture industry. Despite combating challenges like extreme weather conditions, rising climate change, and farming's environmental impact, the demand for more food has to be met. To meet these increasing needs, agriculture has to turn to new technology. New smart farming applications based on IoT technologies will enable the agriculture industry to reduce waste and enhance productivity from optimizing fertilizer use to increasing the efficiency of farm vehicles' routes.

Project Scope, Schedule, Team & Deliverables

Project Summary : Agriculture can be made smart by using IoT technologies. Smart Agriculture increases quality, quantity, sustainability and cost-effectiveness of crop production and also analyses the weather conditions. The paper aims at using evolving technology i.e., IOT for opting Smart Agricultural system. The highlighting feature of this project is that it measures different agricultural parameters effecting the yield and it also a GPS module to get the information about the location. Secondly, it sends all the information to the cloud where it can be further analysed. On top of that this project also contains an android mobile app providing an easy access of information to the farmer. This helps farmers in increasing the quantity as well as the quality of production, water conservation i.e, Measuring soil moisture is important in agriculture to help farmers manage their irrigation systems more efficiently. Not only are farmers able to generally use less water to grow a crop, they are able to increase yields and the quality of the crop by better management of soil moisture during critical plant growth stages. Embedded system for automatic irrigation of an agriculture field offers a potential solution to support site- specific irrigation

management that allows producers to maximize their productivity while saving the water.

- Reducing the risk of electric shocks, deaths due to poisonous creatures in the fields
- Watering depends on the moisture level present in the field.
- All the farm parameters can view through online in graphical notation.
- Efficient and low cost design.
- Fast response.
- User friendly.

Project Requirements :

- **Low power embedded system**– High performance and less battery consumption are the inverse factors that play an important role in design of electronic system.
- **Cloud computing**– The data collected from the devices is stored on reliable storage servers so here cloud computing comes into action.
- **Network connection**– For communication and getting the live data we need internet connection.

Functional Requirements :

- Install the web application and connect to Wi-Fi.
- The IBM IoT simulator reads the random temperature, humidity and soil temperature and will pass the data to the IBM Watson cloud Platform which are called as events.
- These events can be visible on the web application with the help of NODERED.
- The weather conditions which are noticed on the Open Weather API are passed to the NODERED which can be visible on the web application.
- Based upon the weather and soil conditions the farmer decides whether to ON/OFF the motor which helps in increasing the quality of production.

Technical Requirements :

- **Performance:** Improves the performance of the agriculture system by monitoring the field in real time.
- **Crop Monitoring:** IoT sensors will enable the collection of crucial data such as soil moisture where it will be monitoring the crop health and soil composition.
- **Weather Monitoring:** By constant weather monitoring which alert farmers on changing weather conditions.
- **Management:** The Smart Agriculture system ensures proper water management for irrigation and in turn reduces water wastage.
- **Mobility:** Farmer can monitor and can be able to access the information remotely via smartphone.
- **Efficiency:** With the Smart Agriculture system, the efficiency level can be increased in terms of usage of soil, water etc.
- **Accuracy:** The Smart Agriculture system has high efficiency and accuracy in fetching the live data of temperature and soil moisture.

Software Requirements :

- Open Weather API
- IBM IoT Simulator
- IBM Watson Cloud Platform
- NODERED
- HTTP/MQTT
- Python IDE

Project Deliverables :

- To update the farmers with the new technology and to avoid manual labour.
- To supply efficient water through motor pump and enhance the productivity of crops.

- To meet the difficulties such as severe weather conditions and advancing climate change, and environmental consequences resulting from intensive farming practices.
- To design a model and connect it to the android app and cloud server.
- To enable farmers to have the live data of soil moisture, environment temperature at very low cost so that live monitoring can be done.

Project Schedule :

TOPIC	START DATE	END DATE
SRS Documentation	21-05-2020	24-05-2020
Setup Development Environment	23-05-2020	26-05-2020
Backend design	27-05-2020	31-05-2020
Frontend design	01-06-2020	05-06-2020
Testing	06-06-2020	11-06-2020
Report	12-06-2020	19-06-2020