

"Smart Agriculture System Based on IoT"

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Introduction

Farming is the backbone of an economy and comes under the primary sector. Almost 70% of the world's population depends on this occupation for living their day-to-day lives. However, agriculture is one of those domains where many people still rely mostly on physical work. Although it is the conservative way of doing farming, it results in a lot of inefficiency. This project is an initiative to help the farmers to reduce physical work and labour. Technologies such as sensor and monitor can help farmer to monitor crop quality continuous and more accurately.

Overview

In this project, we are going to build a smart farming system using the Internet of Things Technology. This project will help farmers to maintain their fields without the involvement of excessive human involvement. In this method, we will utilize the latest IoT technologies to build a real-time monitoring system for the farmers. It will provide data such as temperature, humidity and soil moisture to the farmers so that the farmers can adjust his field conditions and accordingly.

Purpose

This project will make the daily work farmers much easier as they wouldn't have to travel to their farms everyday to check and maintain their field.

Moreover, this will result in increase in increasing quantity and quality of the goods produced by the farmers. A huge part of farming is based on predictions and guess, which sometimes leads to huge losses in this sector. Hence, to minimize the use of predictions, this model will provide farmers with real time data of their field conditions and the weather around their field.

Existing Problems

- Farmers who do not live near to their fields, have to travel everyday to check the status of the crops.
- The farmers who dont work in groups, have to see if all the crops are sown.
- Also, this makes it very difficult for the farmers to grow the crops in big quantity.

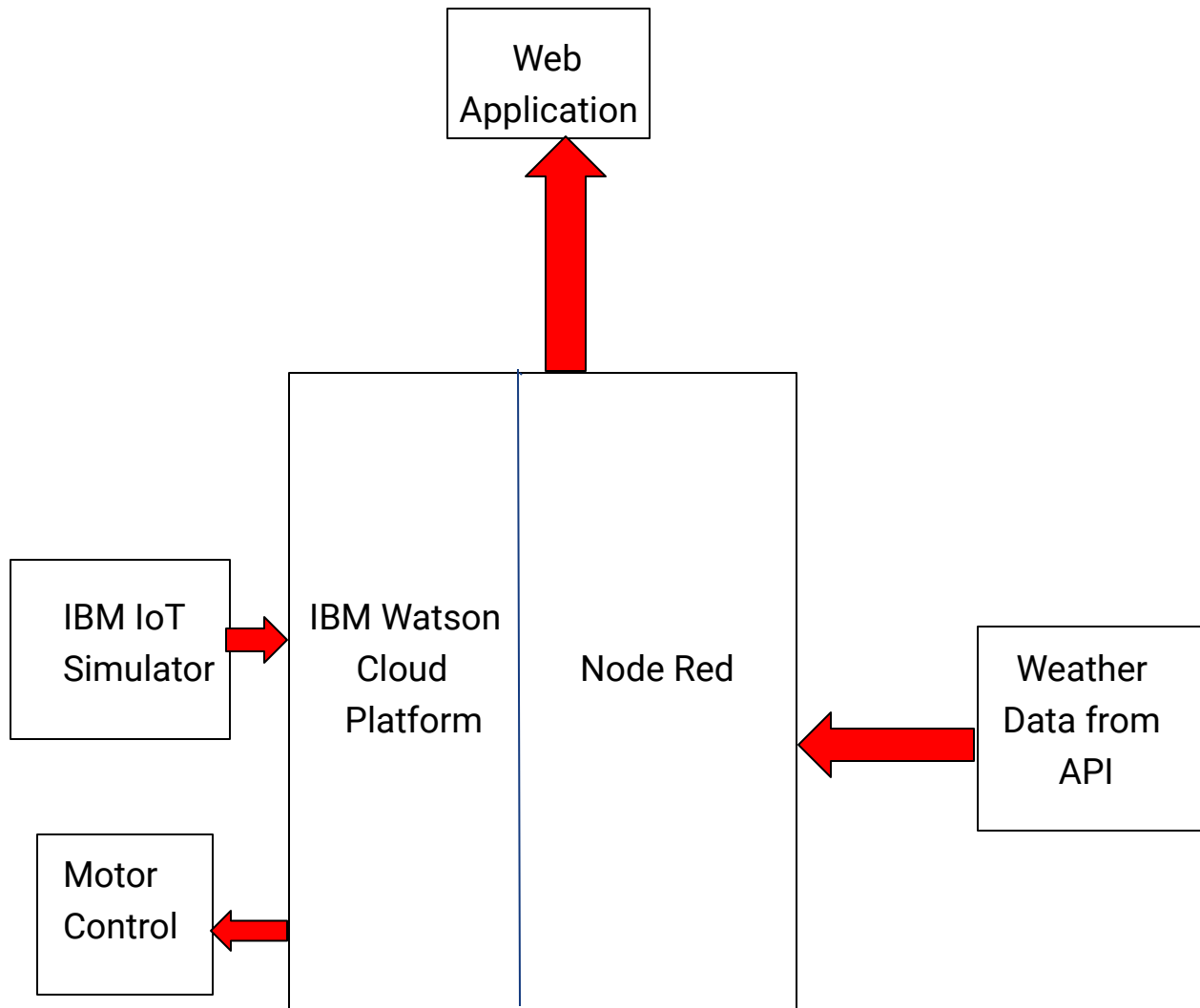
Proposed solutions

A web application will be designed which will allow the farmers to keep track of all the data such as humidity , temperature and soil moisture on the field. Moreover, they will be able to control the motors and irrigate their fields without being present in their farms.

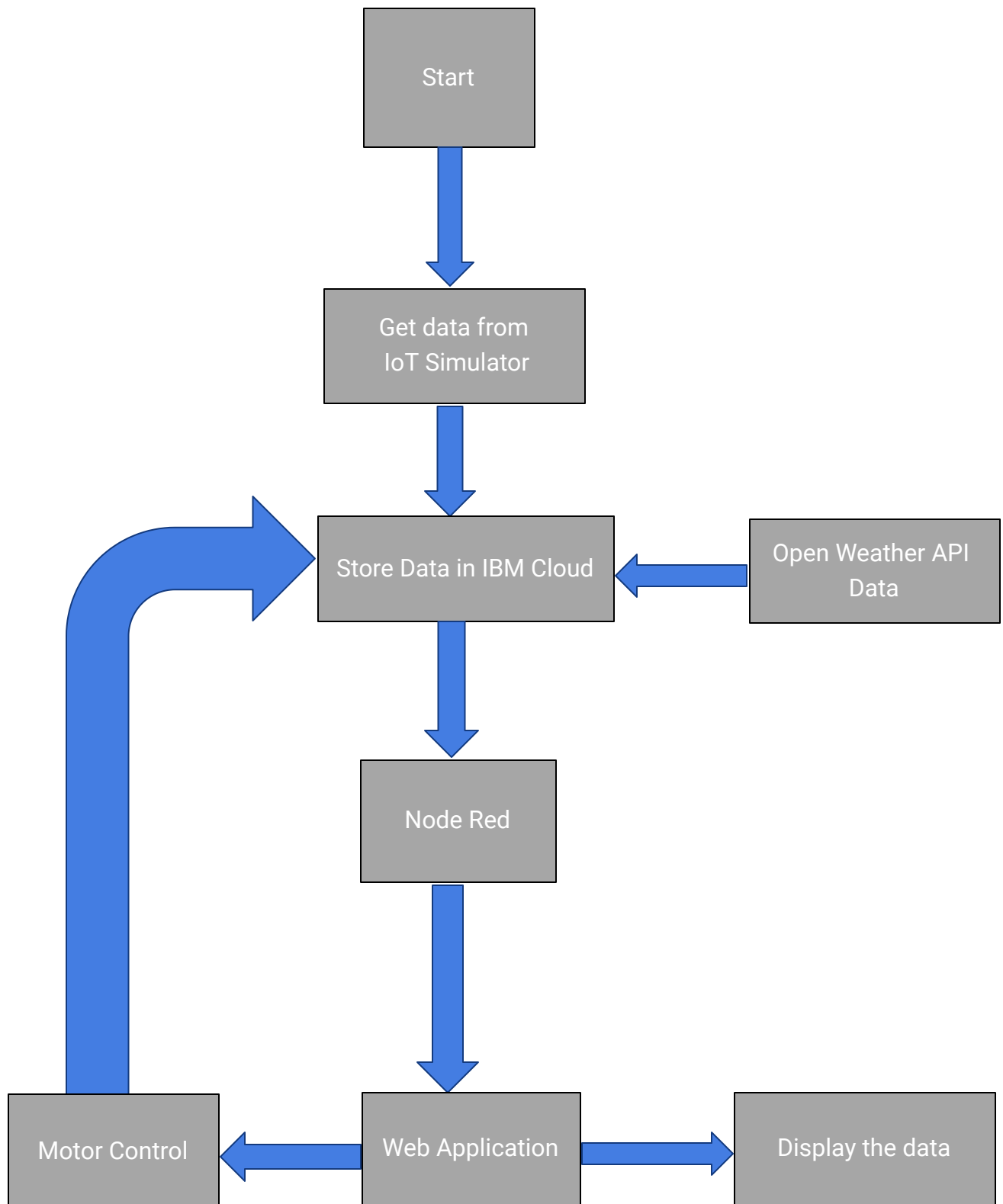
Theoretical Analysis

- To begin with, we will first go to the IBM Watson IoT platform and create a device in it. Then, we will connect this device to the Watson IoT sensor simulator, which will act as the sensor data in our project.
- After connecting the data, we will see that in the recent events, the sensor simulator will start sending the data to the cloud platform.
- After this, we will configure the Node-RED to separate the different parameters of the IoT sensor simulator.
- Now, we will create an account on Open Weather API and install its nodes in the Node-RED. After this, we will use the HTTP request node to get real time weather data from the Open Weather API. We will separate the required parameters from the weather data as per our requirement.
- Then, we will create some button nodes which will be used as motor buttons, connected to another device in the IBM Watson IoT platform.
- Following this, we will configure the buttons to send notifications when they are pressed with the help of a Python code.
- At the end, we will connect all the parameters with the dashboard nodes, so that we can show their real time data in the Node-RED UI dashboard.
- All this data will be shown in the web application. The web application will also have two motor buttons, which will switch off and on the motor.

Block Diagram



Flow Chart



Result

With this system, the farmers will be able to monitor their fields in real time and be aware of the weather conditions near their field. They will also be able to control the state of the motor with the help of an application.

Advantages

- It will enable the farmers to access and manage real-time data of their field from any place.
- It will increase the profitability and sustainability
- The efficiency levels will increase significantly.
- The farmers will be able to grow the crops on a large scale due to low labour and time investments.
- They will be able to manually control the irrigation from any location.
- They will be able to monitor the field and weather conditions through a web app.

Disadvantages

- The farmers will rely significantly on good technical support to fully make use of this system.
- The initial cost of setting up this project could be high.

Applications

- This will help to reduce waste and increase productivity by manual motor control through an application.
- The mode can be continuously upgraded to incorporate new features such as automatic irrigation.

- The IoT model can be customized to work in precision farming and greenhouses.
- This concept can be expanded to other domains such as livestock farming. With the help of sensor , health of the livestock can be monitored which will directly help in the yield production of good produced from them.

Conclusion

The IoT based smart farming System being proposed via this report will assist farmers in increasing the agriculture yield and take efficient care of food production. Moreover, it will allow farmers to control the state of the motor through an application. It will have high efficiency and accuracy in fetching the live data of temperature and soil moisture. Adding to this, the farmer will also be able to monitor the weather conditions around their fields.

Future Scope

- Future work would be focused more on increasing sensors on this system to fetch more data, especially with regard to Pest Control.
- We can also use drones to monitor the fields.
- This technology can also find its application in livestock farming.

