Project Scope Document

1) INTRODUCTION

1.1 Overview

Smart Agriculture System based on IoT can monitor soil moisture and climatic conditions to grow and yield a good crop. Farmer is provided a mobile app using which he can monitor the temperature,humidity and soil moisture parameters along with weather forecasting details. Based on these factors, the farmer can choose when to irrigate his crops, thus increasing his yield, and being sure not to over or under water his crops. This can also be extended to various other processes both in and out of the agriculture sector.

1.2 Purpose

The purpose of this project is to develop a mobile application which serves as an all-inclusive platform wherein the farmer can monitor the current weather details using sensors placed in his field, can forecast future weather conditions, and can also control the system of irrigation, being able to turn the pump ON or OFF based on his crops and the weather details

2) LITERATURE SURVEY

2.1 Existing problem

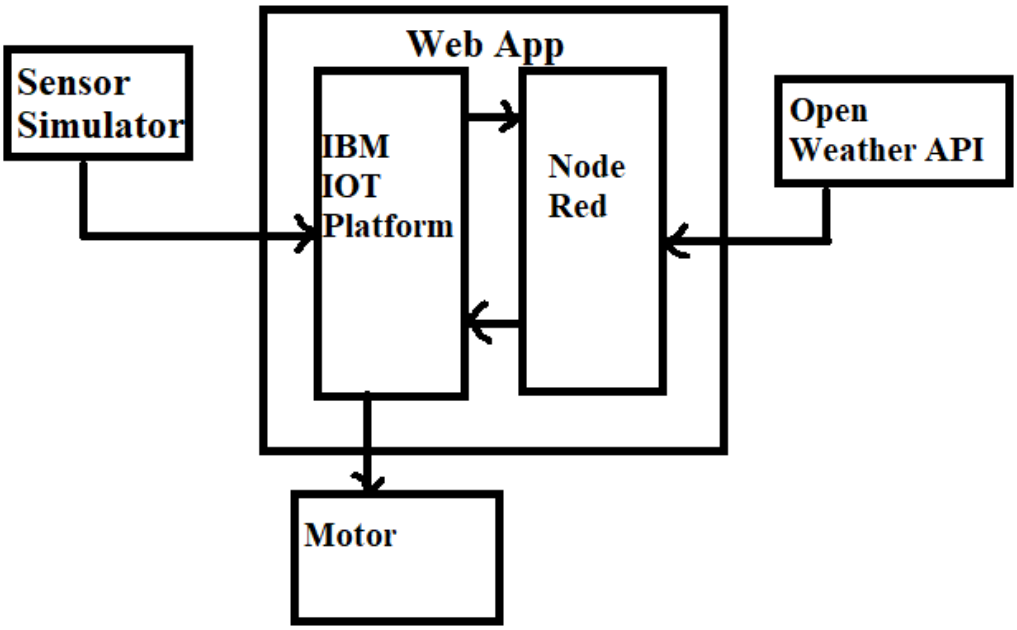
The problem as it stands is two fold, the first would be that the farmer may not have access to the forecasted data and current data of the climactic conditions, all centralised in one location. The second would be that, the farmer would always have to be in close proximity to their field, thus incurring a loss of time in daily travel, or limiting your accommodation choices. If the farmer, for some reason, was unable to tend to his field for a particular day, the crops stand the chance of being underwatered.

2.2 Proposed solution

The solution proposed takes care of both mentioned problems. The creation of a mobile app serves to centralise the data, making it concise and displaying the relevant details to the farmer. The IOT enabled motors and sensors ensure that the information is available to him whenever necessary, and he can also control the irrigation system, thus allowing him to locate himself in a more beneficial manner, and does not require him to tend to his field on a daily basis.

3) THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software designing

- The functions required for the project would be to procure and communicate the weather forevasting data to the client. And provide the functionality of being able to control the irrigation system, from anywhere
- Technical Requirements would be a weather forecasting API, IBM Cloud for communication between the API and the application. Node Red, and the creation of a web app. We are simulation hardware sensors using the IBM IOT Platform.
- Software including Python 3, and Node Red, and an IOT Simulator would be required for the completion of the project.
- We will be simulationweather conditions such as Temperature, Humidity, and Soil Moisture levels using the IOT Simulator, connecting it to the IBM IOT Cloud Platform, which relays the information to NodeRED, which also receives weather forecasts from the OpenWeather API, and finally this information is displayed using a web app.

- There is also a button which controls the output, in this case, the running of a motor, which is to simulate the irrigation lines.

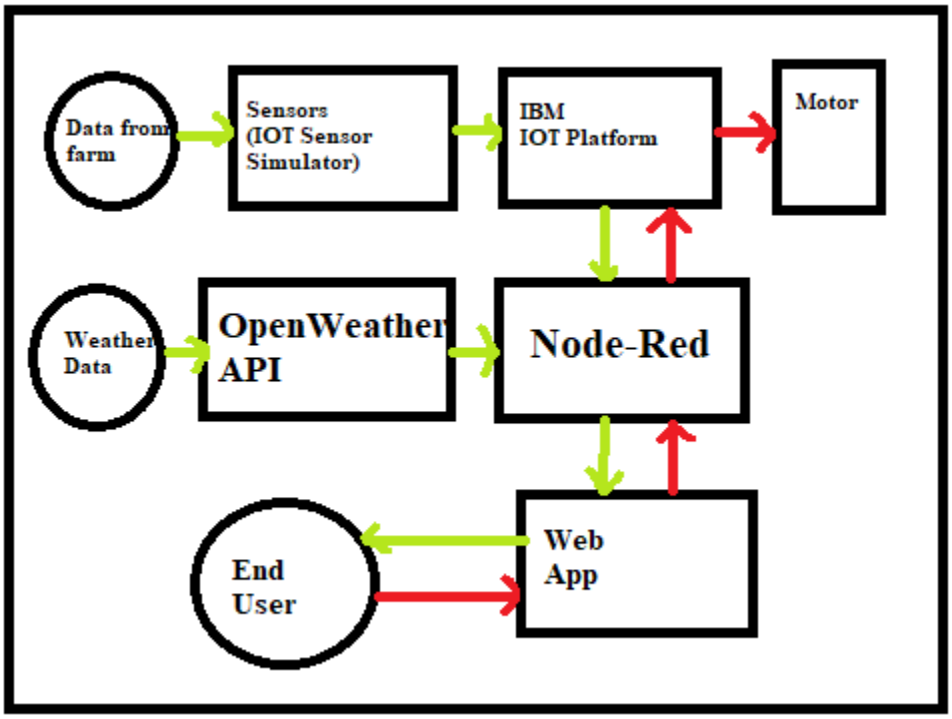
4) EXPERIMENTAL INVESTIGATIONS

-On creating the IOT device on the IBM Watson IOT Platform, we have successfully connected it to the IOT Sensor Simulator, and have received details on the Temperature, Humidity and Soil Moisture, in real time.

- We have connected the same to Node-Red and are able to successfully extract the aforementioned details, and can separate the properties based on their name.

- We have also connected Openweather API to furnish the current weather report as well, that can provide even more information to the farmer, so he can take a well-informed decision on when to irrigate, accessible from any location.

5) FLOWCHART



6) RESULT

The result is a mobile appication that is accessible via a stable internet connection, that gives the farmer access to a myriad of data concerning his livelihood, and can save farmers an immense amount of time, resources and money.

7) ADVANTAGES & DISADVANTAGES

7.1 Advantages

-The data is accessible wherever and whenever necessary.
- Can easily be scaled to accommodate more sensors, for larger areas.
- Saves time and resources for the end user. '

7.2 Disadvantages

- Sensors can be expensive, and farmers may not be able to afford multiple sensors to cover the entire field.
- The ROI will take time to be beneficial.
- The WebApp design can not be custom for each farmer, and to do so, must contact the developer.

8) APPLICATIONS

The applications of this technology have far reaching possibilities, within and outside the scope of the agriculture sector. An entire mobile-surveillance suite can be created for the farmer, including multiple drivers that can run the various tasks within the farm- thus automising the farming process. However this would require a large capital investment.

9) CONCLUSION

To conclude, I say that we have developed a basic IOT thing for the farmer, and they can reap the benefits of this technology, leaving wide scope of improvement.

10) FUTURE SCOPE

A system such as the one we have created for the farmer can be extremely beneficial both in and out of the agriculture sector, and can be used to automate usually laborious and time-taking processes.

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11) BIBILOGRAPHY

APPENDIX

A. Source code
The source code was made available using github, it was a python 3 code that deployed the project.
B. References
Any reference material was also provided by smart-internz, as well as useful YouTube videos for reference.