

Business Case: Smart Irrigation System

1. Background

Measuring soil moisture is a constant concern in the agriculture industry. Soil moisture level indicators help farmers to know what is happening at the root zone of a plant. The level indicators detect the amount of moisture content in soil and sprinkle the water as per requirement.

Soil moisture level indicators aid proper irrigation management for better yields. Knowing the right soil moisture conditions in the field helps less usage of water to grow a crop ideally. It will also enhance yields and crop quality with improved soil moisture management during critical plant growth.

IMCS is building a product that will help the farmers in evaluating the moisture level based on sensors. This application will help the farmers to understand and manage the moisture level in the fields to get better yields

2. Guidelines

- a) You can code in any preferred programming language and the solution can be displayed either as a Windows, Web or a mobile application
- b) Total time allotted for coding is 6 hours (9am to 3pm).
- c) You will be asked to present your work after the development.
- d) Your presentation or demo should be planned to strictly adhere to a duration of 5 minutes. Additionally, 2 minutes is allotted for Q/A with the judging panel.
- e) Strictly, no additional time will be allocated to any individual.
- f) You are allowed to use internet as a resource.
- g) Participation is on individual basis and no other assistance should be taken.

3. Scope of the Business Case Analysis

There are 9 paddy fields as shown in the figure 1 marked as A, B, C, D, E, F, G, H, I. The water would be filled in three of the paddy fields at one time on starting the pump. The three paddy fields are listed in connection are ABC, DEF, GHI. Each of these three field series has a sensor which would evaluate and send the details to the application.

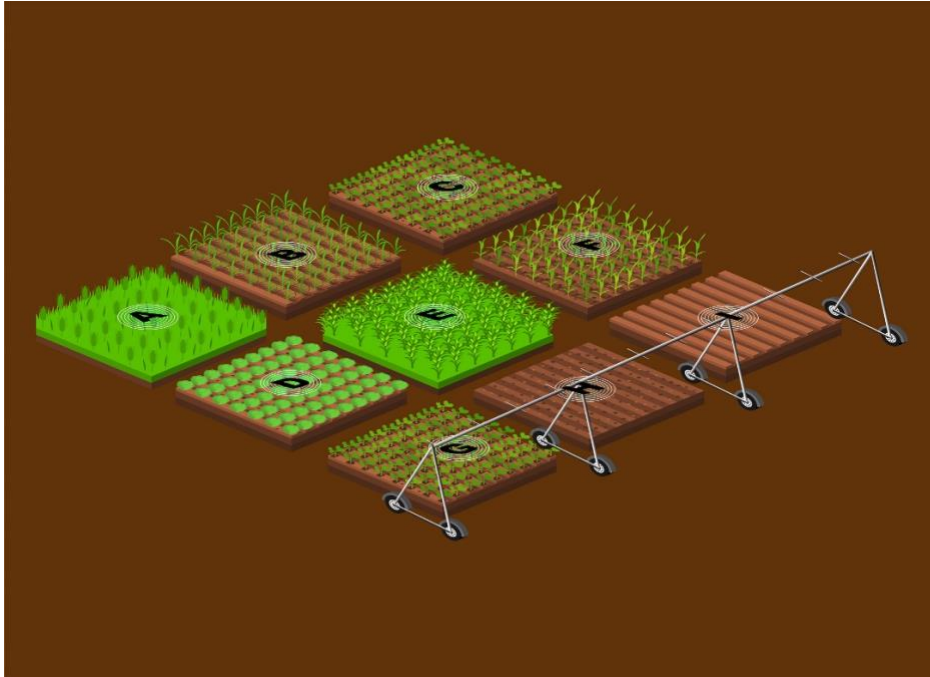


Figure 1

The application would have a start and stop button to control the flow of water. The time required to completely fill the paddy fields with water is provided in the API.

For example, if it takes five minutes to fill water for a set of fields (A, B, C), then the moisture level at the end of the 5th minute in fields ABC is 100%. At the beginning of 6th minute, the pump in fields EFG starts and continues for the next 5 minutes. At the beginning of 6th minute, the moisture level in fields ABC drops at the same rate as in filling. If the stop button is clicked at any point, the moisture level drop continues and the rise in moisture level starts from the same field group on starting the water fill up again.

The pattern of fill up is shown in figure 2, 3, 4.

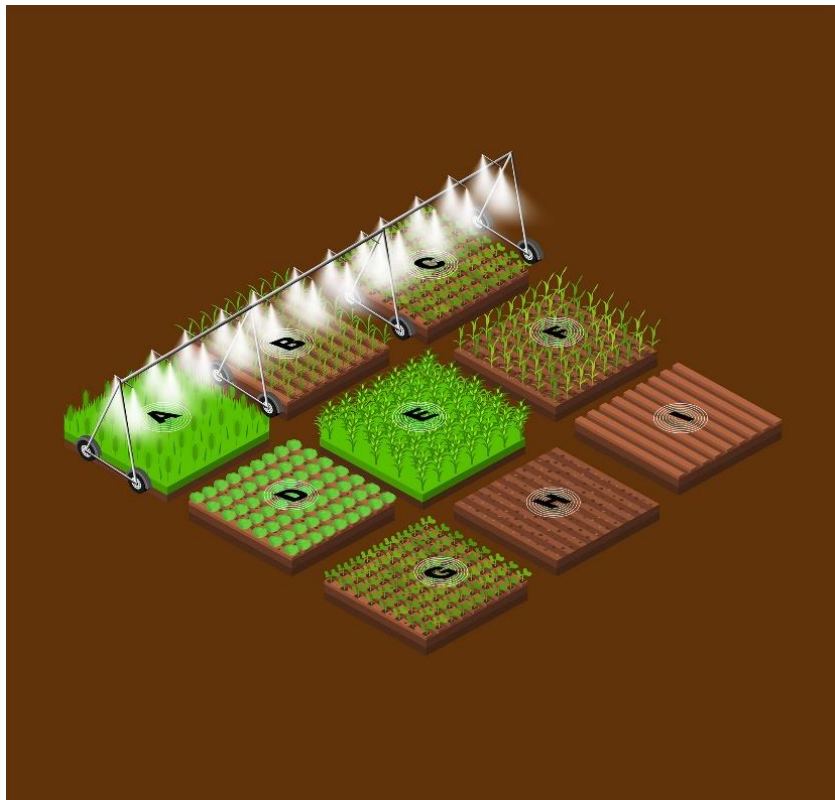


Figure 2

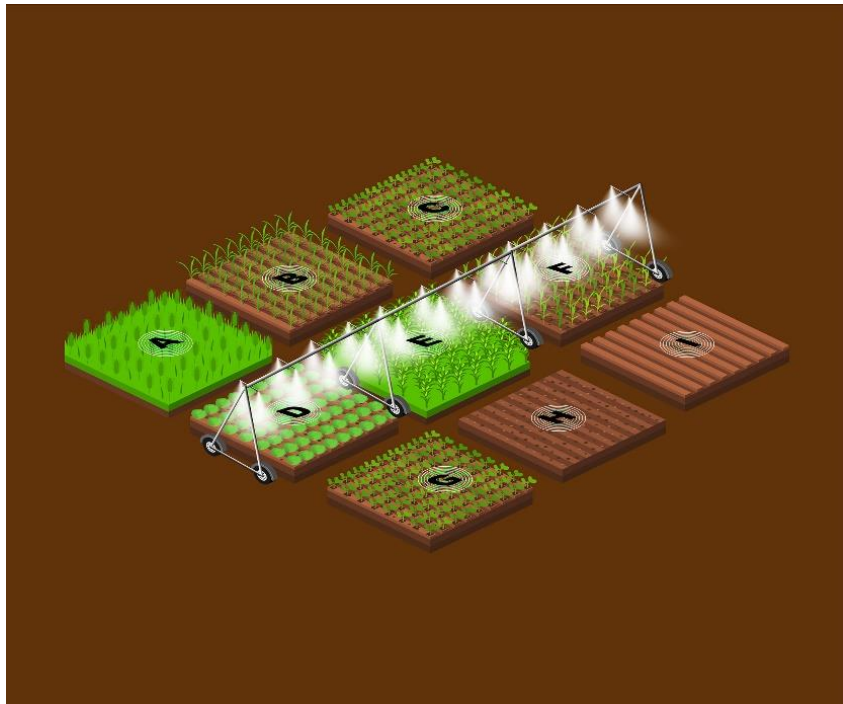


Figure 3

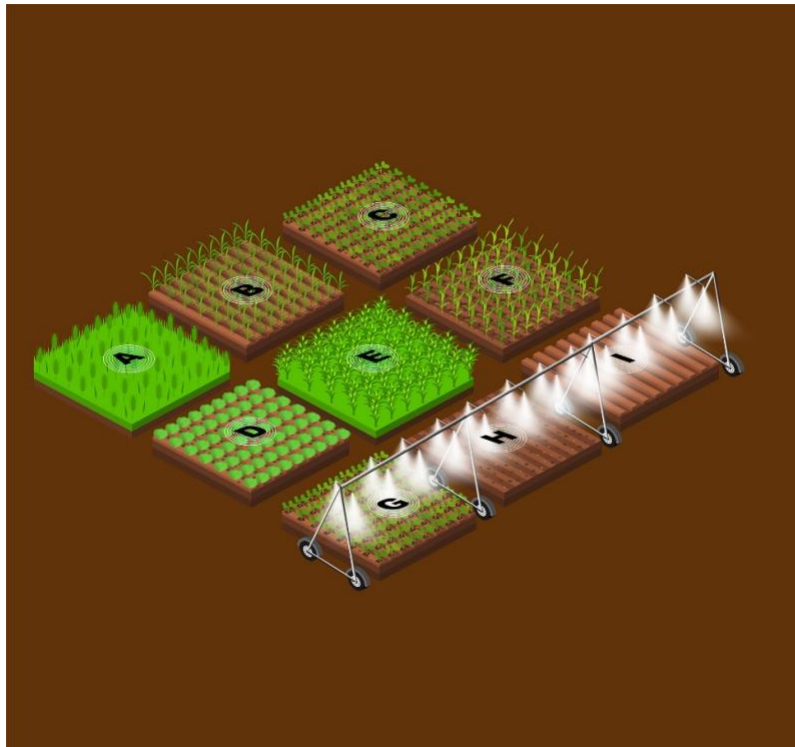
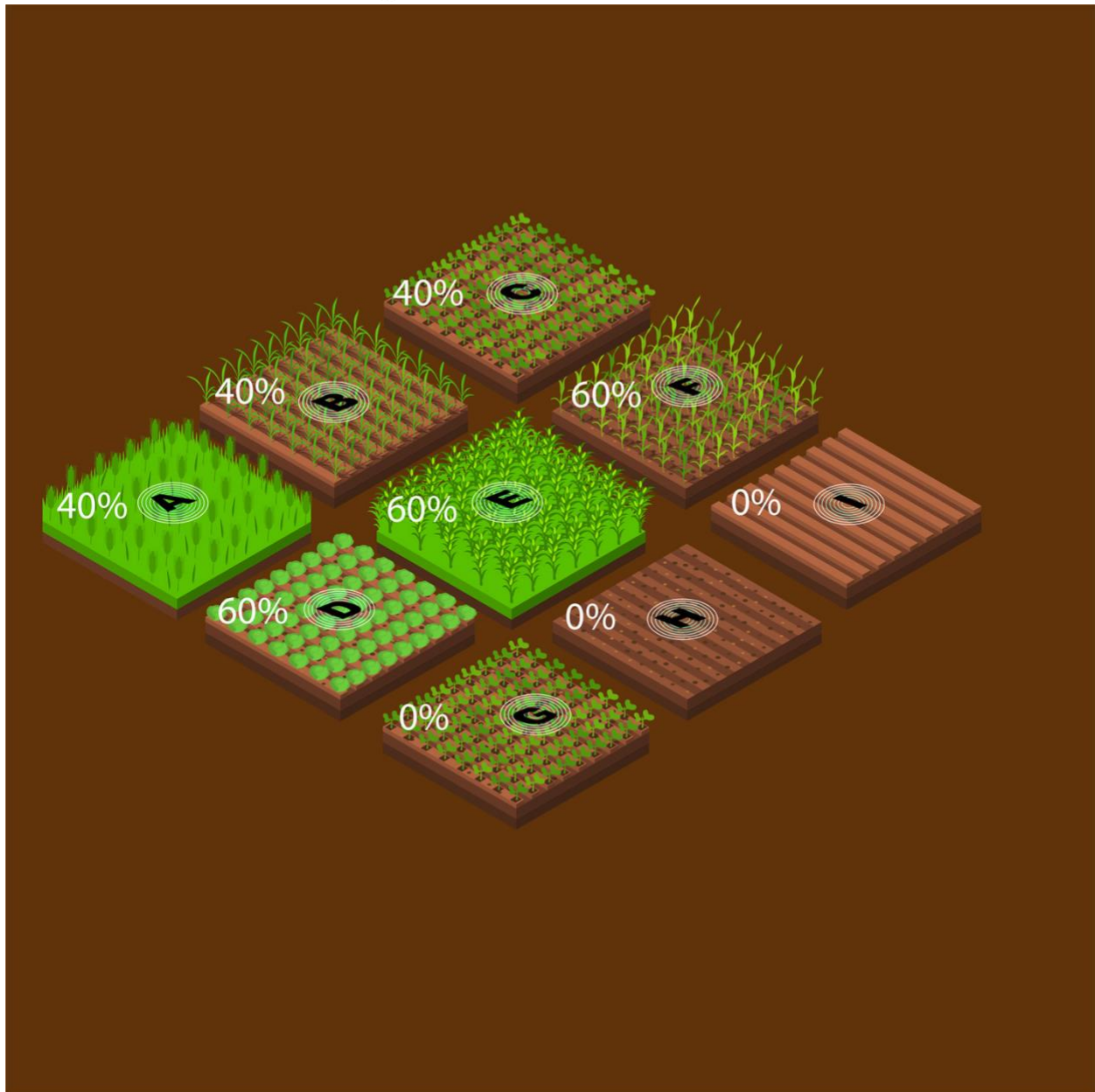


Figure 4

4. Requirments:

- i. Registration: The application should allow the user to register with the following details:
First Name
Last Name
Email Address
Phone Number
- ii. Authentication: While registering, the application should incorporate one of the authentication concepts like Retinal Scan, Touch ID required while login.
- iii. Business logic: Once the user logs in, he needs to consume the web API (insert) to perform the calculations. This API will provide the data to calculate the time required to fill water in each field set (ABC, DEF, GHI).
Based on the data provided, the user needs to write the business logic to compute the calculations of moisture level in each field at any point based on the Start and Stop button.
- iv. Display the computation results of moisture level should be displayed on the map based on the user activity of starting and stopping the water flow.



Sample image of the moisture level is shown in Figure 5.

Links for the APIs:

i. To get time:

<http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/api/data/gettime>

Links to the images:

<http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation.jpg>

http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_per.jpg

http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_1.jpg

http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_2.jpg

http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_3.jpg

5. Evaluation Criterion

Criterion	Attributes
Registration (10%)	<ul style="list-style-type: none"> Without verbal explanation, can the readers grasp the intent of the analysis?
Authentication (10%)	One of the below <ul style="list-style-type: none"> Thumb Retina Face recognition
API (20%)	<ul style="list-style-type: none"> Usage of APIs Justification of the usage
Logic (40%)	<ul style="list-style-type: none"> Logic used Functionality Data representation
Presentation (20%)	<ul style="list-style-type: none"> Knowledgeable on subject matter Presentation Skills Q/A skills