SOFTWARE REQUIREMENTS SPECIFICATION

for

Integration with

Moisture Meter

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Contents

Revision History

Name	Date	Reason For Changes	Version

1 Introduction

Purpose

It is seen that every year lots of produce get wasted during the preservation in the warehouse. This is due to the atmospheric conditions, so it is nothing but the timely changes in the surroundings of the warehouse which affect warehouse partly and then at the whole. Through this work Food Industries and FCI will get help on ‘’to preserve the food safely”.

Each warehouse will be continuously monitored for moisture and atmospheric changes. These changes will get analysed and necessary action will be taken for implementing the proper storage conditions.

Document Conventions

This document uses the following conventions.

1. DB Database
2. DDB Distributed Database
3. ER Entity Relationship

Intended Audience and Reading Suggestions

The target audience is primarily for operator of large warehouses that either have or plan on installing a Moisture monitor system on their property and for also for local market business for helping them monitor to get exact moisture content on timely update.

Once installed, the Moisture monitor system will communicate through a web application to allow users to view data from their moisture sensors, set and control the watering of their warehouse and give an alert/buzzer if the moisture goes above the threshold value.

Project Scope

Food corporation of India(FCI) use moisture meter and the reading of that moisture meter is being noted manually and are fed into their online system.As there is a human intervation, there could be chances that the reading are noted are erroneous. So,it will help FCI and Food Industries to monitor food warehouses remotely and timely.

Manual process of checking moisture and temperature of godowns will be eliminated.Depending on the conditions necessary action will be taken like dusting, spraying chemicals, protection against rodents, insects, so that food grains loss will be no more.

References

Smart Irrigation Controllers: How Do Soil Moisture Sensor (SMS) Irrigation Controllers Work? By Michael D. Dukes, Mary Shedd, and Bernard Cardenas-Lailhacar

"Internet of things(IOT) AND Cloud Computing for agriculture:An overview, Patil, V.C.,Al-Gaadi,K.A.,Biradar, D.P., &Rangaswamy, M.(2012). India, 292-296.

Websites

https://www.researchgate.net/publication/313804002_Smart_farming_IoT_based_smart_sensors_agriculture_stick_for_live_temperature_and_moisture_monitoring_using_Arduino_cloud_computing_solar_technology

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.524.7529&rep=rep1&type=pdf

https://innovate.mygov.in/sih2018-search

Overall Description

Food grains are stored in go downs, silo bags ,jute bags. Bad weather condition and seasonal changes causes rotting of grains mostly due to moisture and temperature. So it is necessary to maintain suitable level of moisture and temperature of godowns. In survey it is been observed that the most of problem is with post harvest grain where loss is more. In survey paper it is mentioned that "how to maintain moisture and temperature".

India is growing country of agriculture where most of the population and families depends upon farming. A survey says that in India there is 563 lakh metric tons of storage capacity for grains out of which 554 lakh metric tons is in godowns only. A recent survey of FCI says there is 1/3 loss of grains due to improper maintenance, the most of the loss is due to temperature and moisture ,which may cause fungi and in turn pest. FCI observed loss of grains in various states like Maharashtra ,Madhya Pradesh and Punjab (Granary of India), it is due to improper maintenance of godowns moisture and temperature for post harvest grains.
Below are the survey papers which focus on Smart Farming.
Smart farming :-IoT based smart sensors agriculture stick for live temperature and moisture

User Classes and Characteristics

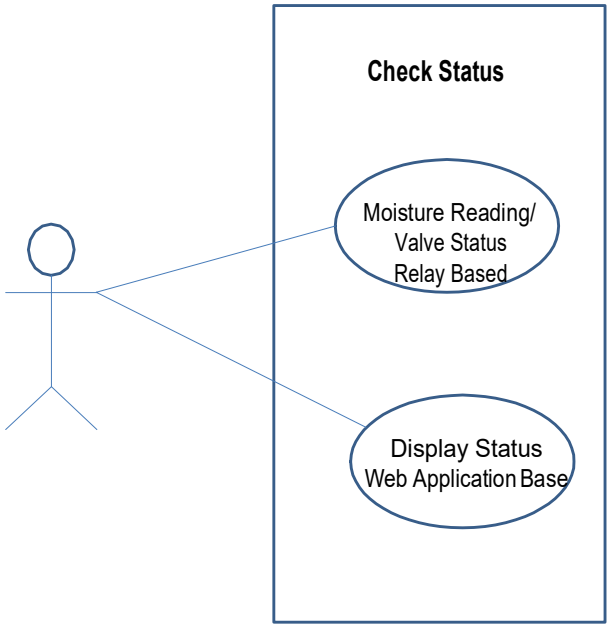

Figure 2.1:Use Case Diagram.

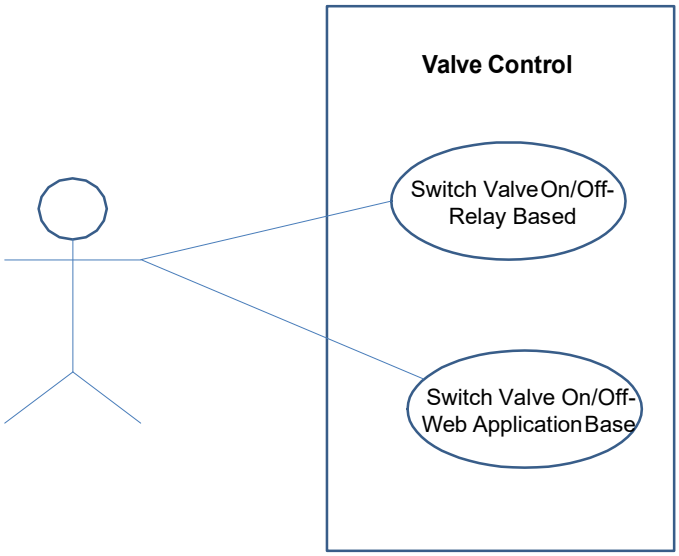

Figure 2.2:Use Case Diagram.

Note:

"All users have to have basic computer skills which include working with a web browser such as Internet Explorer or FireFox. Since all interaction with the UI of the system is through a browser window, the system can not be used without access and knowledge of web browser functionality."

Operating Environment

Operating environment for 3D Clothing Assist is as listed below.

distributed database

2.client/server system

3.Operating system: Windows.

4.database: MySql database

Design and Implementation Constraints

Each user must keep their password as confidential. More over the user must have individual ID for creating a login in the system.

Only Administrator can control user addition and deletion in the system. Also this group could only create reports.

User Documentation

The product is under development stage and requires a complete implemented prototype to explain the user documentation. Once the prototype is designed and implemented online manuals, user manuals can be provided.

Assumptions and Dependencies

1.Initially only two locations are connected.

2. Each location is always connected, whether an operator is logged on at the remote location or not.

3. Each User must have a UserID and pass.

4.There is only one Administrator.

5.Server must always run under Linux system

6. Internet connection is a must.

7. Proper browsers should be installed.

8. Text readers should be installed to view the help files.

Overview of data requirements

Inputs:

1. User must give his ID and password to access the Internet.

2. Moisture data from sensor.

Output:

1. User account details from the server.

2. Details of various Moisture levels.

3. The various content from warehouse .

2 External Interface Requirements

User Interfaces

As stated in section 2.1 this system is a self contained system, relying on very little in the way of external software interfaces. However, the system will require interfaces with the installed computer's hardware. The system is to be a web-enabled system, meaning that all user interaction is done through a web page. The System interfaces required on the system server are the following:

1.Network interface to a network with an internet connection

2. Database connection to the mySQL database containing schedule data The user

can interact with.
All user interfaces other than initial installation occur through a web page.

Hardware Interfaces

The IOT device is managed by the application in the mobile phone and the hardware connection to the database server is managed by the underlying operating system on the mobile phone and the web server.

Software Interfaces

The IOT device communicates with the application in order to get information from it. The communication between the database and the user consists of operation concerning reading data, while the communication between the database and the web application consists of only writing operations.

Communications Interfaces

The communication between the different parts of the system is important since they depend on each other. However, in what way the communication is achieved is not

important for the system and is therefore handled by the underlying operating systems for both the mobile application and the web portal.

3 System Features

The moisture meter enables user to measure moisture content in a warehouse.It can be monitored through mobile app.It will help to maintain proper condition in warehouse.

System Feature 1

Description and Priority

A Customer can browse through the shops and choose products to place in a virtual shopping environment. To proceed with the purchase, the customer is prompted to login. Also, the customer can modify personal profile information (such as phone number and shipping address) stored by the application.

Stimulus/Response Sequences

The Customer will chose a specific combination of clothing apparels from different online stores and use the provided application to try the clothes virtually in 3d fashion.

Functional Requirements

This Functional Requirements Specification documents having operations and activities that a system must be able to perform.
The Functional Requirements should include:

1. Interface requirements
   a) Field 1 accepts User's Facial data entry. b)Field 2 only accepts the chosen apparels.
   c)Screen 1 can print on-screen data in appropriate visual format.
2. Business Requirements
   a) Data must be entered before a request can be approved.
   b) Clicking the Approve button moves the request to the Approval Work flow.

Product Description and Functional Overview

This section provides the reader with a product description and functional overview of HICS. The aspects of our product that are described in detail include its primary operation(s), core functionality, and the key individual features and functions required that make HICS work.

Features and Functions

Our product will consist of a central control unit, soil moisture sensors, and a web application that work and communicate effectively with each other. See Figure 2-1 for a high-level concept of the components.

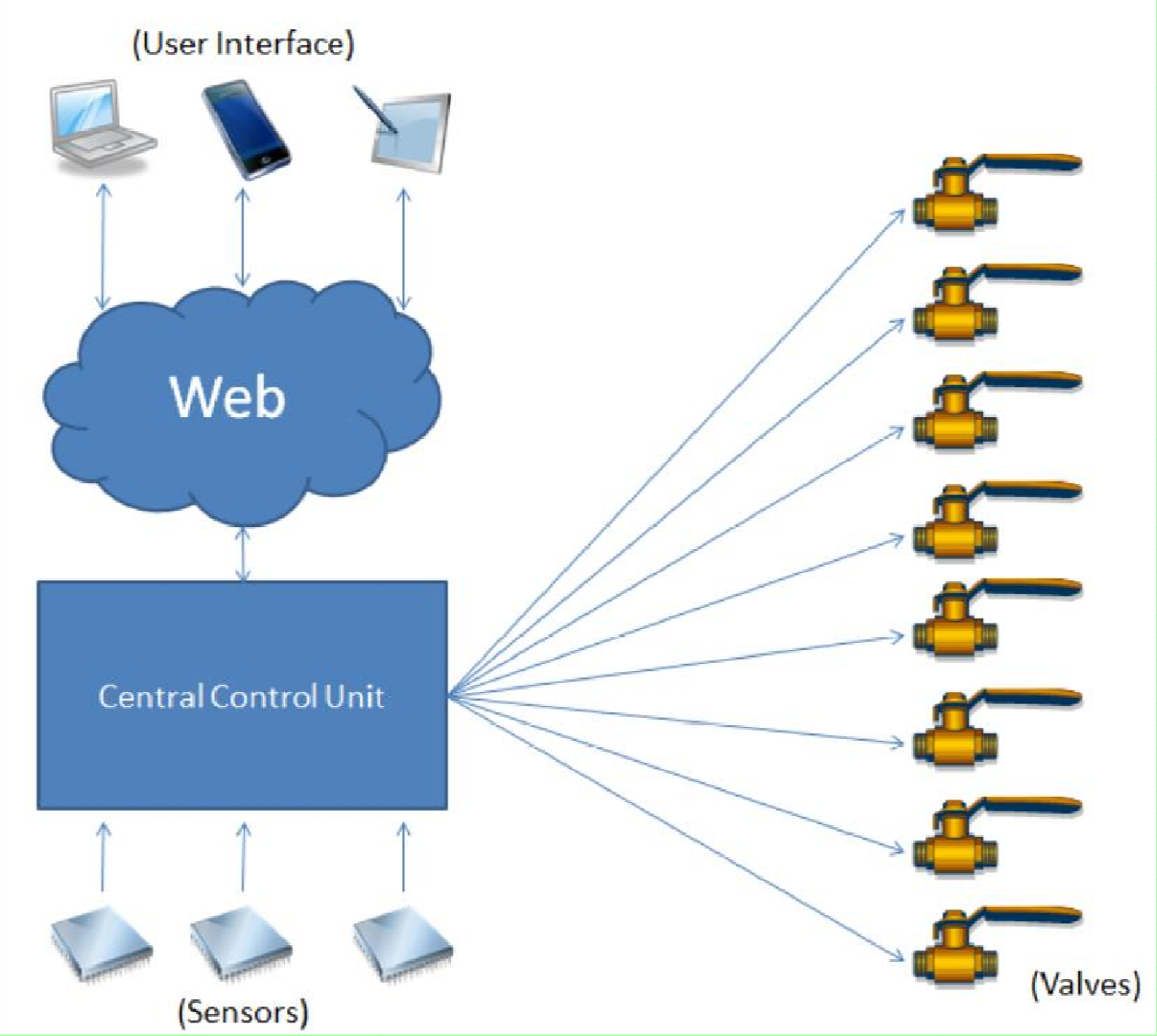

Figure 2-1 High-level concept diagram

- **Soil Moisture Readings**: The most important components that will contribute to the effectiveness of HICS are the soil moisture sensors. The sensors monitor soil moisture levels in the user's lawn and sends the information to the central control unit. This data is processed by the microcontroller in the control unit and uploaded, via the internet, to the HICS web server.

- **Web Services:** One of the features that makes HICS smarter than other home irrigation systems is its ability to analyze soil moisture readings and set watering schedules effectively. HICS utilizes a web server to store all soil readings from the microcontroller into a database. These readings are then analyzed to determine what water amounts the lawn requires and allows the user to adjust their watering schedules accordingly.

- **Remote Control:** A main component of HICS is a web application that can be used to monitor and control the irrigation system from a computer or smart phone. This application will provide control features to adjust watering schedules, read and record data collected by the moisture sensors, and turn the sprinkler valves on and off. This will allow the user to maintain complete control over their home irrigation system regardless of their physical location.

- **Scheduling:** Users will be able to create and change watering schedules for the HICS via the web application. HICS will provide its own suggested watering schedule that will be created based on soil moisture levels, current weather conditions, and previous watering history. In addition to automated scheduling, users will be able to manually set or change schedules based on personal preferences or to adhere to local community water restrictions.

- **Local Weather Analysis:** HICS provides a weather monitoring feature that the user can set to override watering schedules based on reports from an included rain sensor. To optimize water usage, HICS will not operate when it is raining at the systems location. This information will be transferred between the rain sensor and the central control unit to override any scheduled watering that occurs while it is raining.

- **Web Application with Scalable Interface:** HICS will include a web application that is designed to allow users to access their home irrigation system on any device that is connected to the internet and has access to a web browser. The web application will be built with scalability in mind to enable the same functionality on a mobile device as it would on a desktop computer. This approach will provide a similar look and feel across different interface devices and will enable our software to be used on a wide array of platforms.

- Registration and Account Management: To ensure the integrity of our system, each user must create an account and register their HICS device before being able to access the features of the web application. Each HICS device will be given a unique serial number that will be used for registration purposes. Once the user creates an account and registers their device they will be granted full access to interface with their device via the web application.

External Inputs and Outputs

- Inputs: HICS will require multiple inputs and outputs across each of its components. Analog data signals will be transferred from the soil moisture sensors to the central control unit. This input provides the information about the soil moisture levels. When using the web application, users requests information about their home irrigation system. Users can also use the application to send information to the central control unit to control the system. These inputs are made from end users and will be sent as a digital signal to turn on and off the water valves.

- Outputs: When users request information from the web server, the output will be defined as the response information about the home irrigation system. This information could include current soil moisture readings, history of watering, and current watering schedules. When HICS is remotely operated, the output will be defined as the signals sent to the water valves to open and close as dictated by the user

3. Regulatory/Compliance Requirements
    a) The database will have a functional audit trail.
    b) The system will limit access to authorized users.
4. Security Requirements
    a) The system must automatically log out all customers after a period of inactivity.
    b) The system should not leave any cookies on the customer's computer containing the user's password.

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