

Software Requirements Specification (SRS)

for

Smart Toilet Cleaning Management System

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1. Introduction:

'TOMA', a smart toilet cleaning management system ANDROID APP that monitors the hygiene within the toilet and generates alerts or alarms for the staff members if the toilet requires any attention. The toilet will be equipped with turbidity and gas sensors that monitor water quality and smell respectively.

1.1. Purpose:

A smart toilet cleaning management system that monitors the hygiene within the toilet and generates alerts or alarms for the staff members if the toilet requires any attention. And allow building owners and Facility Management(FM) and cleaning companies to manage usage across multiple restrooms.

1.2. Scope

- a. Mobile Application for interaction between Admin and Facility Management
- b. Staff members can receive alert messages from Admin

1.3. Definitions, Acronyms, and Abbreviations:

1.3.1. Acronyms and abbreviations

- a. TOMA: Smart toilet cleaning management system : app name
- b. SRS: Software Requirements Specification
- c. NTU: Nephelometric Turbidity unit

1.3.2. Definitions

- a. "Smart toilet cleaning management system": An Application for IIIT ALLAHABAD admin building which helps staff workers for smart management of the toilet system.

1.4. References:

IEEE SRS Format

1.5. Overview:

Smart toilet cleaning management system that monitors the hygiene within the toilet and generates alerts or alarms for the staff members if the toilet requires any attention. The toilet will be equipped with turbidity and gas sensors that monitor water quality and smell respectively.

The turbidity sensor is measured in Nephelometric Turbidity unit (NTU) where high NTU value indicates the water is dirty, whereas the gas sensor (MQ2) detects the foul smell with high output voltage, and later sends a signal to the system to compare with the hygiene threshold and accordingly send the message/ email to the staff regarding the toilet being unhygienic and require immediate cleaning.

2. Overall Description:

2.1. Product Perspective:

The smart toilet cleaning management system is an Android APP that would be able to give a basic and easy exchange of information, i.e. it should be able to close the gap between the need to clean the toilets and the ability to do so.

2.2. Product Functions:

Use Cases	Description of use cases
Login	Allows staff members to login
Signup	To register the staff members
Verify Password	Verification of ID of staff members
Invalid Password	When user inputs wrong password
Update Profile	To update the user information
Connecting to system	Updating the info on app from database and assigning staff members

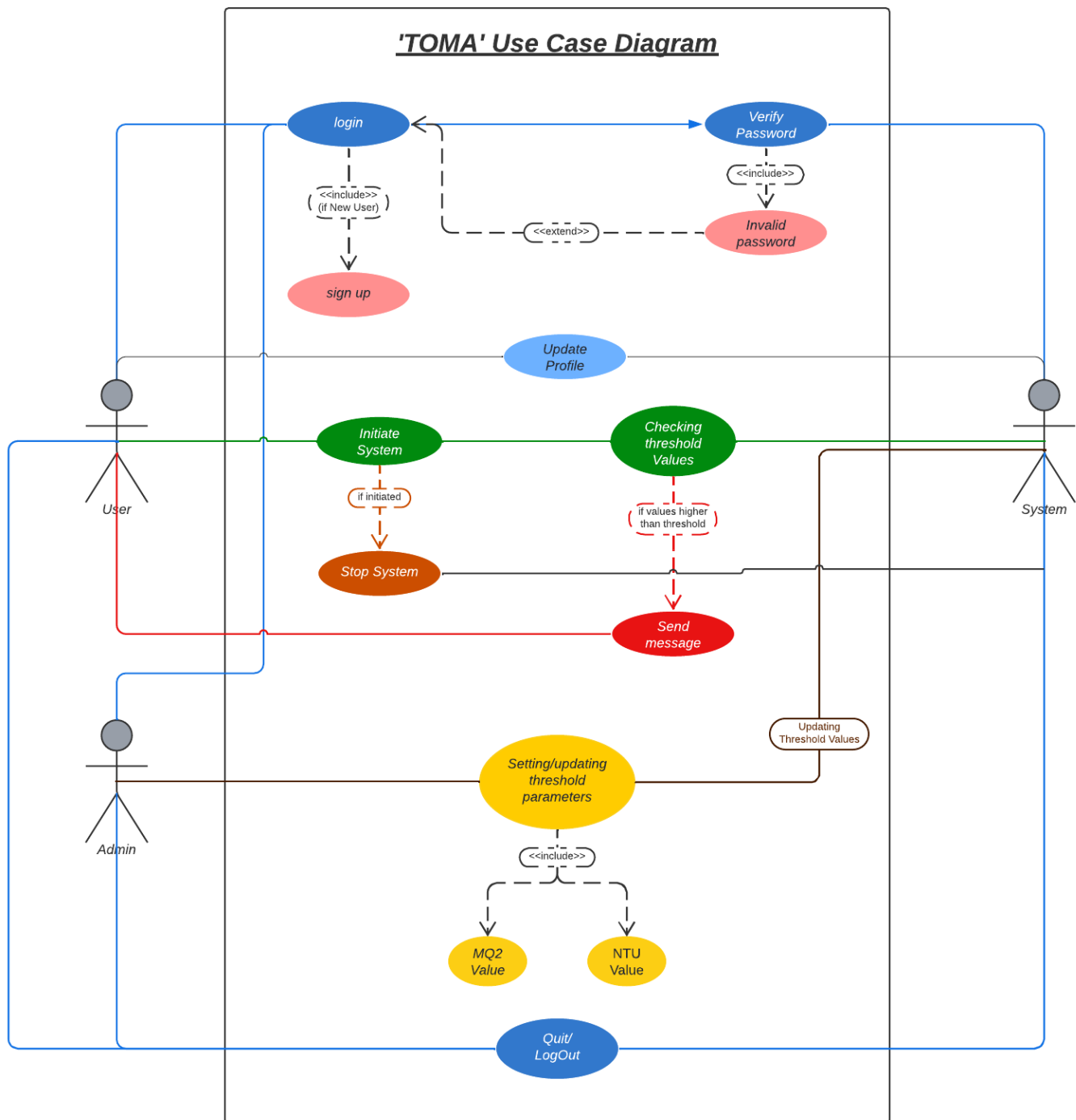
Hygiene Configuration	To set the threshold parameters for hygienic condition
NTU Value/MQ2 Value	To set and check the value of turbidity/foul smell
Initiate Button	To display the live status of the environment in the toilet and compare it with the defined thresholds.
Alert Message	If an unhygienic condition is detected an alert message should be sent to the staff member for immediate cleaning.
Stop Monitoring Button	To stop monitoring the live status and return to main screen
Log	System will store the log files and history of actions taken
Quit	To logout the user from app

2.3. User Characteristics:

2.3.1 Staff Member

Staff member is the user who will interact with the user interface of the system to know the condition of toilets. The user should be a verified staff member of the institution and should have a unique id assigned to him/her that can serve as their user id.

2.4. Use Case Diagram:



3. Specific Requirements:

3.1 Functional Requirements

We describe the functional requirements by giving various use cases.

Use Case 1:

Name: Login

Summary: Allows Admin/Staff members to login.

Actors: Users/Admin

Pre-conditions:

- Internet connectivity.

Main success scenario:

- Admin or Staff member's click on the login/sign up button.
- App checks for the authorization of login.

Extension:

Password incorrect.

Post-condition:

Admin/Staff members can now access all features of the app.

Use case 2:

Name: Update Profile

Summary: User/Admin are allowed to update their personal information.

Actors: User/Admin

Pre-conditions:

- Internet connectivity.
- Admin or Staff members must update something

Main success scenario:

- Admin/Staff member's click on the update button.
- They can view their information.

Use Case 3:

Name: Hygiene System

Summary: System will now give the current reading of the gas sensor and turbidity sensor.

Actors: User/System

Pre-conditions:

- Internet connectivity

Main success scenario:

- Staff members will now clean the toilet to make it hygienic.
- Staff members will get alerted when the sensor gives more than threshold value.
- After cleaning they will now check the current reading.

Extension: Error in checking again. Shows error dialog box. Occurs due to poor internet connectivity.

Use Case 4:

Name: MQ2/NTU Value

Summary: Check and set the MQ2/NTU Value

Actors: User/Admin

Pre-conditions:

- Internet connectivity

Main success scenario:

- Admin will check the MQ2/NTU Values
- User will check the MQ2/NTU Values

Extension:

Error in checking again. Occurs due to poor internet connectivity or system out-break.

Use Case 5:

Name: Initiate Button

Summary: Start Hygiene system for a particular user

Actors: User

Pre-conditions:

- Internet connectivity

Main success scenario:

- Users will now clean the toilet to make it hygienic.
- After cleaning they will now check the current reading.

Extension:

Error in checking again. Occurs due to poor internet connectivity or system out-break.

Use Case 6:

Name: Alert Message

Summary: If the Hygiene system will give above threshold, then alert messages will be sent online to staff members.

Actors: User

Pre-conditions:

- Internet connectivity

- Staff members will get alerted when the sensor gives more than the threshold value set by the admin.

Main success scenario:

- Users will switch off the alarm while working on it.
- Users will now clean the toilet to make it hygienic.
- After cleaning they will now check the current reading.

Extension:

Error in checking again. Occurs due to poor internet connectivity or system out-break.

Use Case 7:

Name: Stop Monitoring

Summary: Stop the live status of Hygiene System

Actors: User

Pre-conditions:

- Internet connectivity

Main success scenario:

- Live status will stop
- User will return to the main screen.

Extension:

Error in checking again. Occurs due to poor internet connectivity or system out-break.

Use case 8:

Name: Log

Summary: System will store the log files and history of actions taken

by the staff members.

Actors: System

Pre-conditions:

- Internet connectivity

Main success scenario:

- There will be a stored history of the work done by staff members
- User will be given the final pay according to their work they have done.

Extension: Error in checking again. Shows error dialog box. Occurs due to poor internet connectivity.

3.2 Hardware Requirements

The app will run on android devices.

Requirements: Minimum 2GB ram for smooth functioning of the app.

3.3 Software Requirements

Minimum SDK version: Android 5.0.1 (Lollipop)

3.4 Design Constraints

- Reliability: The information about the workers will be secure.
- Data Reserve: Data should not become corrupted in case of system crash or power failure.

4. Other Non-Functional Requirements:

4.1 Safety measurements

Staff members will get a message prior to cleaning the toilet for their safety, instructing them to put on gloves and masks before cleaning the toilet to avoid becoming infected.