

Software Requirements

Road Repair and Tracking System

Ashish Padhy
121CS0196
Software Engineering Lab

23rd January 2024

Complaint Registration

RRTS/Complaint Registration	
Function	Submission of road repair requests
Description	Allow residents to submit road repair requests through various channels, such as phone or written complaints.
Inputs	<ol style="list-style-type: none"> 1. Resident's ID 2. Address of the road repair location 3. Description of the problem 4. Severity of the issue
Source	Residents of the city put forth complaints
Outputs	Registered road repair request with a unique identifier.
Action	Clerk logs into the system and enters the resident's complaint, assigning a unique identifier to the request.
Requires	Secure login for clerks to access the system.
Pre-condition	Clerk has access to the system, and a resident has submitted a road repair request.
Post-condition	The road repair request is registered in the system with a unique identifier.
Side-effects	SMS is sent on registration of repair.

Table: Complaint Registration

Authentication and Authorization

RRTS/Authentication and Authorization	
Function	User Authentication and Authorization
Description	Ensures secure access to the system and assigns user roles based on authentication.
Inputs	<ol style="list-style-type: none"> 1. Username 2. Password
Source	Users attempting to log into the system
Outputs	Authenticated user with assigned roles.
Action	<ol style="list-style-type: none"> 1. System validates provided credentials and if it is successful, the system grants access or roles. 2. If authentication fails, the system notifies the user and prompts for correct credentials.
Requires	Secure login interface and role-based authentication.
Pre-condition	User attempts to log into the system.
Post-condition	<ol style="list-style-type: none"> 1. User is authenticated, and system assigns appropriate roles (if successful). 2. User is prompted for correct credentials (if authentication fails).
Side-effects	User account is locked on three consecutive failed logins.

Supervisor Assessment

RRTS/Supervisor Assessment	
Function	Examination and assessment of reported road conditions
Description	Enable assigned supervisors to examine and assess reported road conditions, determining repair priorities based on severity and locality characteristics.
Inputs	<ol style="list-style-type: none"> 1. Assigned area for assessment 2. Reported road conditions
Source	Supervisors
Outputs	Priority of repair task and its validity
Action	Supervisor logs into the system and selects an assigned area for assessment. The system displays road conditions, allowing the supervisor to prioritize repairs.
Requires	Secure login for supervisors to access the system.
Pre-condition	Supervisor has access to the system and an assigned area for assessment is available.
Post-condition	Repair tasks are prioritized, and task statuses are updated in the system.

Table: Supervisor Assessment

Resource Management

RRTS/Resource Management	
Function	Estimation of raw material requirements, machinery, and personnel for repair tasks
Description	Assist supervisors in estimating raw material requirements, machinery, and personnel needed for each repair task.
Inputs	Repair task details.
Source	Supervisors
Outputs	Estimates for raw materials, machinery, and personnel required.
Action	Supervisor initiates a request for resource estimation in the system. The system provides estimates for raw materials, machinery, and personnel required.
Requires	Secure login for supervisors to access the system.
Pre-condition	Supervisor has access to the system, and repair task details are available.
Post-condition	Resource estimates are provided in the system.
Side-effects	Supervisors are intimated about the changes.

Table: Resource Management

Dynamic Scheduling

RRTS/Dynamic Scheduling	
Function	Generation of optimal schedules for road repairs based on real-time data
Description	Generate optimal schedules for road repairs based on real-time data on available resources, considering priority and resource availability.
Inputs	Updated repair task details and resource availability.
Source	System and Administrators
Outputs	Updated repair schedules based on priority and resource availability.
Action	System receives updated repair task details and resource availability. It generates and updates repair schedules based on priority and resource availability through appropriate graph algorithm
Requires	Real-time monitoring of resource data.
Pre-condition	Repair task details and resource availability are updated in the system.
Post-condition	Repair schedules are optimized and there is no clash between two repairs.
Side-effects	Mails are sent to the requisite persons with the updation.

Table: Dynamic Scheduling

Reporting

RRTS/Reporting	
Function	Generation of comprehensive reports on road repair statistics
Description	Allow the mayor of the city to request various road repair statistics over time.
Inputs	Request for road repair statistics through the system.
Source	Mayor
Outputs	Comprehensive reports on road repair statistics.
Action	Mayor initiates a request for road repair statistics through the system. The system generates and displays comprehensive reports as per the mayor's request.
Requires	Secure login for the mayor to access reporting features.
Pre-condition	Mayor has access to the system, and a request for road repair statistics is initiated.
Post-condition	Comprehensive reports on road repair statistics are displayed.
Side-effects	None

Table: Reporting

Priority Assignment of Road Repair Task

Parameter	Description	Priority Calculation
Severity	The severity of the road damage, categorized as low, medium, or high.	Assign priority based on severity levels (e.g., High severity = High priority).
Traffic Impact	The impact of road damage on traffic flow, categorized as low, moderate, or high.	Assign priority based on traffic impact (e.g., High impact = High priority).
Recent Use	Frequency of road usage in recent times, indicating the importance of the road to the community.	Assign priority based on recent use (e.g., High recent use = High priority).
National and Historical Significance	The historical or national significance of the road.	Assign priority based on significance (e.g., National significance = High priority).

Table: Task Prioritization Parameters