Software Requirements Specification
for
National Disaster Response System

Sovon Mallick, Nasrin Akter Shimu, Sunirmol Mollik, Sadman Sakib Sarkar,
Syeda Faria Sithi, Musfikus Salihin Sifat

Department of Computer Science and Engineering
Jahangirnagar University
Savar, Dhaka-1342

September 16, 2024

Contents

Chapter 1

Introduction

1.1 Purpose

This document outlines the software requirements for the National Disaster Response System (NDRS), version 1.0. The primary goal of this system is to provide a comprehensive platform for disaster preparedness, response, and recovery. The system enables government agencies, disaster management authorities, volunteers, and citizens to efficiently coordinate during disaster events by offering tools for early warnings, damage assessment, and resource allocation.

In the NDRS, users can access disaster-related training materials, real-time updates, and report incidents or damages in affected areas. The system helps authorities manage relief efforts, assess the extent of disaster impacts, and organize resources for effective recovery operations. Citizens and volunteers are empowered with tools to stay informed, participate in relief efforts, and prepare themselves for potential disasters.

The mission of the NDRS is to enhance national disaster preparedness, reduce response times, and improve coordination between all stakeholders, ultimately minimizing loss of life and property during disasters. This document provides a detailed overview of the required features, performance standards, limitations, and integrations necessary to develop, implement, and maintain the disaster response system. It covers the complete system, ensuring that all components are addressed, from user interaction to backend processing and data security.

1.2 Intended Audience

The National Disaster Response System is intended for the following individuals and teams within the organization and related stakeholders:

- **Developers:**

  Purpose: To use the SRS as a blueprint for implementing the system's functional and non-functional requirements, ensuring alignment with the system design, architecture, and features.
  Focus Areas: Functional requirements, system architecture, data models, and integration points.

- **Testers/Quality Assurance (QA) Team:**

  Purpose: To validate that the system meets the specified requirements and functions as expected. This team will use the SRS to design test cases and scenarios.
  Focus Areas: Functional requirements, performance criteria, security standards, and user acceptance testing (UAT) conditions.

- **Project Managers:**

  Purpose: To oversee the project's development lifecycle, ensuring that it stays on schedule and within budget, while also meeting the defined scope outlined in the SRS.
  Focus Areas: Overall system goals, timelines, deliverables, milestones, and risk factors.

- **Stakeholders (Leadership Teams, Disaster Management Authorities):**

  Purpose: To ensure that the system aligns with organizational objectives and serves its intended purpose. Leadership teams will refer to the SRS to track progress and assess the system's capabilities.
  Focus Areas: System overview, project scope, and high-level functionality, especially concerning disaster response efficiency.

- **Sales and Marketing Teams:**

Purpose: To understand the capabilities and features of the system for promotion and outreach. They may refer to the SRS to highlight the system's value in public relations, advocacy, or partnerships with NGOs and government bodies.
Focus Areas Key system features, benefits, and differentiators that address community needs and disaster response efficiency.

1.3 Intended Use

The National Disaster Response System SRS will serve as a guiding document throughout the software development lifecycle and will be used in the following ways:

1. **For Developers:**
   - The SRS will provide a clear set of functional and non-functional requirements that guide the coding and implementation of the system. Developers will refer to the document to ensure that all specified features, such as disaster reporting, damage assessment, and training modules, are correctly implemented according to client expectations.
2. **For Testers/QA Team:**
   - The SRS will serve as the basis for creating detailed test cases, ensuring that all system functionalities, including performance, security, and usability, are tested thoroughly. Testers will use the document to verify that the final product meets the defined requirements.
3. **For Project Managers:**
   - Project managers will use the SRS to track progress and ensure that the development team is on course to meet the specified requirements. The SRS will be referred to during project reviews and for coordinating with stakeholders to ensure that the system is being developed according to plan.

4. **For Stakeholders:**
    - The SRS will provide stakeholders with a clear understanding of the system's objectives, ensuring that the development aligns with organizational goals. Stakeholders will review the SRS to confirm that the system's features and functionalities meet the expected outcomes, especially regarding disaster response and community impact.
5. **For Sales and Marketing Teams:**
    - Sales and marketing teams will utilize the SRS to highlight key features and benefits of the system, helping them communicate its importance and effectiveness to potential users and partners, including government agencies and relief organizations.

1.4 Product Scope

The National Disaster Response System (NDRS) is a platform designed to improve the coordination and efficiency of disaster preparedness, response, and recovery. It enables government agencies, volunteers, and citizens to access resources, report incidents, and manage disaster response in real-time.

1.4.1 Purpose

The NDRS aims to streamline disaster management by providing tools for early warnings, damage assessment, and resource allocation, ultimately reducing the impact of disasters on communities.

1.4.2 Benefits and Objectives

- Enhancing Preparedness: Provides training materials to help citizens and volunteers prepare for disasters.
- Real-Time Coordination: Enables real-time communication between authorities and responders.
- Damage Reporting: Allows users to report and assess damages to prioritize relief efforts.

- Efficient Response: Automates disaster response to minimize delays and improve recovery.

1.4.3 Alignment with Corporate Goals

The NDRS supports national goals of improving disaster management infrastructure and reducing the human and economic impacts of disasters.

1.4.4 Relating to Business Strategies

By implementing the NDRS, governments can modernize disaster management processes, making them more efficient and responsive to community needs

1.5 Risk Definition

The Software Requirement Specification for the National Disaster Response System (NDRS) outlines potential risks that may arise during the implementation and operation of the system. These risks could impact the effectiveness of disaster management and the overall user experience.

Inadequate User Engagement
Risk that citizens and volunteers may not actively use the platform for preparedness and response, reducing its overall effectiveness in disaster situations.

Overload on Response Teams
Risk that disaster management authorities and volunteers may face overwhelming workloads during large-scale disasters, impacting their ability to respond efficiently through the platform.

Miscommunication Among Stakeholders
Risk that different stakeholders, including government agencies, responders, and citizens, may misinterpret the system's requirements, leading to misalignment in system usage and disaster response coordination.

Failure to Utilize Training Modules
Risk that users may not fully utilize the provided training materials, which could result in inadequate preparedness for handling real disaster situations.

Security Breaches
Risk that unauthorized access to sensitive data, such as citizen information and disaster reports, could compromise the security and integrity of the system, requiring strong cybersecurity measures.

Changes in Disaster Protocols
Risk that evolving disaster management protocols or government regulations may not be promptly reflected in the system, leading to outdated procedures and potentially ineffective disaster response efforts.

System Downtime During Critical Events
Risk that the platform may experience technical failures or downtime during major disaster events, preventing users from accessing vital information or reporting incidents when most needed.

Chapter 2

Overall Description

2.1 User Classes and Characteristics

The user classes of the National Disaster Management System (NDRS) can be categorized into 5 classes and they are Citizens (registered and general), volunteers, Disaster response team, Government authorities and Administrators.

2.1.1 User class: Citizens

Characteristics:

- Citizens browse the system to get the latest and real-time information about any ongoing or upcoming disaster on the news board of the system.
- Citizens access guidelines for any disaster to get prepared beforehand to minimize the damage.
- Citizens can access emergency contacts based on their needs and location.
- They can get active shelter center information based on incidents and location.
- Registered citizens can report any incident to get help from the disaster response team.
- Citizens receive a daily weather forecast on their device from the system.
- They receive alerts for both probable incident and emergency situation.
- They can donate money, clothes, foods and other things during relief collection activities.

- They can manage their accounts and profiles.

2.1.2 User class: Volunteers

Characteristics:

- Volunteers access training modules and related materials to prepare themselves for any disaster.
- They receive alert for probable disaster.
- They receive assistance request notifications and orders from the disaster response team.
- Volunteers communicate with response team to share update, report progress and request support if needed.

2.1.3 User class: Disaster Response Team

Characteristics:

- Disaster response team receives verified reported incident/disaster, analyze them, notify and dispatch response units as necessary.
- They initiates relief collection activities if needed.
- They assess reported damages and allocate resources accordingly.
- They coordinate NGOs, medical teams, rescue teams and other organizations and monitor their activities during any disaster or incident.

2.1.4 User class: Government authorities

Characteristics:

- Government authority tracks disaster condition, analyzes its impact and makes decisions to tackle it.
- They coordinate national and regional response efforts and dispatches critical resources.
- They send mass alert, advisories, instructions to the general users and response teams.

2.1.5 User class: Administrators

Characteristics:

- Admins reviews reported incidents, verify them and sends them to the response team.
- They manage user accounts based on roles and verify given information for important roles.
- Admin handles any reported issues to make user experience better.
- They connect general users with disaster response team and other associated authorities.

2.2 User Needs

The National Disaster Management System (NDRS) must address the needs of a diverse range of users to ensure effective disaster management and communication. The primary user categories and their specific needs are as follows:

2.2.1 Citizens

Registered Citizens:

- **Timely Alerts:** Registered citizens need to receive timely and accurate alerts about natural disasters affecting their specific locations. They should have the option to set preferences for the types of alerts they wish to receive.
- **Detailed Instructions:** They require clear, actionable instructions for various disaster scenarios, including evacuation routes, safety measures, and emergency contacts.
- **Personalized Information:** Registered citizens should receive alerts and information tailored to their profiles, which may include special considerations based on their registered details (e.g., medical needs, mobility issues).

- **Real-Time Updates:** They need access to real-time updates and ongoing information about the disaster situation, including changes in severity and safety measures.

General Citizens:

- **General Alerts:** General citizens need to access essential information and alerts about natural disasters affecting their region, even if they are not registered with the system.
- **Accessibility:** The system should be easy to access and use, providing essential information in a straightforward format, such as through public websites or SMS.
- **Emergency Contacts:** They need access to emergency contact information and resources to seek help if required.

2.2.2 Volunteers

- **Task Assignment:** Volunteers need a system for receiving task assignments, reporting their status, and coordinating with other team members during disaster response operations.
- **Training and Resources:** They require access to training materials, safety guidelines, and resources necessary for effective disaster response and assistance.
- **Communication Tools:** Volunteers need reliable communication tools to coordinate with disaster response teams and other volunteers, including messaging and situational updates.
- **Location-Based Information:** Volunteers require information relevant to their assigned areas, including hazard maps, resource locations, and affected communities.

2.2.3 Disaster Response Team

- **Comprehensive Data:** Disaster response teams need detailed and accurate data on the disaster's impact, including affected areas, infrastructure damage, and resource needs.

- **Coordination and Logistics:** They require tools for coordinating their efforts with other response teams and agencies, managing logistics, and allocating resources effectively.
- **Real-Time Communication:** The system should facilitate real-time communication and updates among team members to ensure effective coordination and timely decision-making.
- **Incident Reporting:** Disaster response teams need the capability to report on their activities, request additional support, and update the system on the status of the disaster response.

2.2.4 Government Authorities

- **Administrative Control:** Government authorities need access to administrative tools for managing alert criteria, overseeing system performance, and configuring user settings.
- **Strategic Planning:** They require data and analytics to support strategic planning and decision-making, including historical data and trend analysis.
- **Public Communication:** The system should enable authorities to communicate official information, directives, and policy updates to the public effectively.
- **Inter-agency Coordination:** Government authorities need tools for coordinating with other government agencies and organizations involved in disaster management.

2.2.5 Administrators

- **System Management:** Administrators need comprehensive tools for managing and maintaining the NDRS, including user management, system configuration, and software updates.
- **Monitoring and Reporting:** They require robust monitoring and reporting capabilities to track system performance, user engagement, and alert effectiveness.
- **Security and Access Control:** Administrators need to ensure system security and manage access controls to protect sensitive data and ensure that only authorized users have access to specific functionalities.

- **Support and Maintenance:** The system should provide tools for troubleshooting, support, and maintenance to address any issues that arise and ensure smooth operation.

2.3 Operating Environment

2.3.1 Hardware Platform

- **Desktops:** Minimum Intel Core i5 processor or equivalent, 8GB RAM, 256GB SSD or higher.
- **Laptops:** Minimum Intel Core i3 processor or equivalent, 4GB RAM, 128GB SSD or higher.
- **Mobile Devices:** iOS devices (iPhone 7 and above), Android devices (running Android 9.0 and above).

2.3.2 Operating System and Versions

- **Windows:** Windows 10 (64-bit), Windows 11 (64-bit).
- **macOS:** macOS Big Sur (11.0) and above.
- **Linux:** Ubuntu 20.04 and above, Fedora 34 and above.
- **Mobile:** iOS 14 and above, Android 9.0 and above.

2.3.3 Software Components and Applications

- **Browsers:** Google Chrome (latest stable version), Mozilla Firefox (latest stable version), Microsoft Edge (latest stable version), Safari (latest stable version).
- **Applications:** Zoom, Microsoft Teams, Google Meet for communication purposes.

2.3.4 Database Compatibility

- **Relational Databases:** MySQL (version 8.0), PostgreSQL (version 13).
- **NoSQL Databases:** MongoDB (version 5.0).

2.3.5 Network Requirements

- A stable internet connection with at least 5 Mbps bandwidth is required for real-time notifications and updates.
- The system supports both wired (Ethernet) and wireless (Wi-Fi) connections for optimal performance.

2.4 Constraints

2.4.1 Budgetary Limitations:

The system development and deployment will be constrained by the allocated budget. The available funds may limit the scope of certain features, such as advanced real-time data processing, integration with external systems, or ongoing maintenance and support.

2.4.2 Time Constraints:

The project must be completed within the designated timeline, which includes the design, development, testing, and deployment phases. Delays in any stage of the project, especially during disaster preparedness, could affect the timely delivery of critical system functionalities.

2.4.3 Hardware and Infrastructure:

The system's performance will be limited by the existing hardware and infrastructure available to the development team and end users. For example, the

system may need to function on older devices with limited processing power or memory, as well as in regions with slow internet connectivity or low bandwidth.

2.4.4 Data Privacy and Security Regulations:

The system must comply with all relevant data privacy laws and security regulations, which may limit how data is collected, stored, and processed. Strict compliance may affect the way certain system features (e.g., real-time tracking or reporting) are implemented, especially regarding user consent and data encryption.

2.4.5 Interoperability with Legacy Systems:

The system may need to integrate with existing disaster management platforms or government databases. Compatibility with these legacy systems may pose challenges in terms of data exchange, requiring additional development time and resources to ensure seamless operation.

2.4.6 Geographical Constraints:

The system must be adaptable to different geographical areas, each of which may have unique disaster risks, governmental structures, and technical limitations. Localized customization may be required, potentially increasing the complexity of system implementation.

2.4.7 Human Resource Availability:

The project's success is dependent on the availability of skilled developers, testers, and disaster management experts. Any shortage of human resources may delay certain aspects of the project or limit the quality of the system.

2.4.8 Disaster-Specific Requirements:

The system must accommodate various types of disasters (e.g., earthquakes, floods, storms), each with distinct response protocols. Designing a one-size-fits-

all solution may be challenging and could require the prioritization of certain disaster types over others during development.

2.4.9 User Load Handling:

The system must be capable of handling sudden surges in user activity during disaster events. This requires scalability, which may be constrained by infrastructure limitations or budget constraints, impacting the system's ability to serve all users efficiently during peak times.

2.4.10 Training and Adoption:

The successful adoption of the system by end users (citizens, volunteers, authorities) will depend on training programs and awareness campaigns. The constraint of available time and resources for training may affect user proficiency and system adoption rates, especially in rural areas.

2.5 Assumptions

1. **Availability of Reliable Internet and Power Supply:**

   It is assumed that users, including citizens, volunteers, and disaster management authorities, will have access to a stable internet connection and power supply during normal circumstances. However, during disaster scenarios, internet and power disruptions may limit users' access to critical system functions, such as reporting damage or receiving live updates.

2. **User Technical Competency:**

   It is assumed that users (citizens, volunteers, authorities) will have basic technical literacy and the ability to navigate the system's user interface with minimal assistance. If users face significant challenges using the system due to technical barriers, training programs or simpler interfaces may need to be

implemented.

3. **Timely Access to Updated Data:**

   The system assumes that disaster-related data (e.g., weather forecasts, damage reports, and resources availability) will be available in real-time or with minimal delays from external sources such as government agencies, meteorological departments, and local authorities. Delays or inaccuracies in these external data sources may affect the accuracy and responsiveness of the system.

4. **Resource Availability for System Maintenance and Support:**

   It is assumed that there will be sufficient resources (e.g., personnel, funding, and infrastructure) for the ongoing maintenance, updates, and support of the system after deployment. If these resources are insufficient, the system's reliability, performance, and security may degrade over time.

5. **Compliance with Government Policies and Regulations:**

   It is assumed that the system will be designed in accordance with current government regulations and policies concerning disaster management, data security, and privacy. However, changes in regulations during or after the development process may require additional modifications to the system.

6. **User Engagement and Participation:**

   The success of certain system functions, such as training modules and reporting tools, relies on user engagement. It is assumed that citizens, volunteers, and authorities will actively participate in disaster preparedness and response initiatives. If user participation is lower than expected, the system's overall effectiveness may be diminished.

7. **Interoperability with Existing Systems:**

   It is assumed that the National Disaster Response System will integrate smoothly with existing systems used by disaster management authorities, NGOs, and other stakeholders. If there are compatibility issues with legacy

systems or third-party platforms, additional integration efforts may be required.

8. **System Scalability:**

   It is assumed that the system will be scalable to accommodate varying levels of user traffic, especially during disaster events when user numbers may spike. If the system architecture is not scalable enough, it may fail to handle high loads during critical times.

9. **Funding and Government Support:**

   It is assumed that the project will receive continuous funding and support from relevant government bodies throughout the development and deployment phases. Any unexpected changes in funding or government priorities could affect project timelines or scope.

10. **Training for System Users:**

    It is assumed that training programs will be available for authorities, volunteers, and other users to ensure they are proficient in using the system. If training is not provided or is inadequate, system adoption and effective use may suffer.

Chapter 3

Requirements

3.1 Functional Requirements

3.1.1 Report Incident and Request Assistance

Conversation: As a registered user, I can report incidents by providing information about the incident using both online and offline services. I can also choose assistance (medical, rescue, fire service, etc.) while reporting an incident, so that I can get help from the authorities.

Confirmation :

1. **Report Incident (through Online System)**

   1.1 Registered users access their dashboard and initiate the process to report an incident to the system.

   1.2 User provides incident information in the relevant fields (incident name, type, location, time, estimated affected area, contact info, etc.) and reports the incident.

   1.3 User selects assistance (medical, rescue, fire service, relief, etc.) according to need before submitting the form.

   1.4 User receives a confirmation message upon successful incident report.

   1.5 The reported incident is displayed in the user's dashboard with tracking status.

   1.6 User receives notifications for each update regarding their reported incident.
   Failure Case:

1.7 An appropriate error message is prompted to the user if any network or technical issue occurs during reporting, and the incident form draft is saved for the next steps of reporting.

1.8 If the reported incident is similar to another incident of the same location, type, and reported time, then the message "This incident is already reported. Track this incident" is prompted to the user with a link to track that incident.

2. **Report Incident (through Offline USSD Service)**

2.1 User accesses the user interface by dialing a specific code from their phone.

2.2 User initiates an incident report by selecting the corresponding option from the menu.

2.3 User inputs incident information, selects assistance if needed, and submits the report.

2.4 A confirmation message is prompted upon successful report submission to the system.

2.5 The reported incident is recorded in the user's dashboard with tracking status.

Failure Case:

2.6 If the user inputs any incorrect USSD code or menu option while reporting the incident, an error message such as "Incorrect USSD code" or "Incorrect menu pin" is prompted to the user.

2.7 If the reported incident is similar to another incident of the same location, type, and reported time, then the message "This incident is already reported. Track this incident" is prompted to the user with a link to track that incident.

3.1.2 Coordinate Volunteers and NGOs

Conversation: As a disaster response coordinator, I want to coordinate with volunteers and NGOs so that resources and support are effectively deployed to

affected areas and we can maximize the impact of our response efforts.

Confirmation:

1. **Register and Verify Volunteers and NGOs:**

   1.1 The system allows authorized users to register new volunteers and NGOs, including their contact details, areas of expertise, and availability.

   1.2 The disaster response coordinator can verify the credentials and background of registered entities to ensure they meet necessary qualifications and standards.

   Failure Case:

   1.3 If registration or verification fails, the system will display an error message and offer options to retry, correct information, or contact support.

2. **Allocate Tasks and Resources:**

   2.1 Disaster response coordinators can assign specific tasks and resources to volunteers and NGOs based on their skills, availability, and proximity to the disaster area.

   2.2 The system provides a task management interface where users can track the progress and completion of assigned tasks.

   Failure Case:

   2.3 If tasks cannot be assigned or tracked due to system errors (e.g., network failure, database error, user-interface error, authentication issues, system overload, software bugs), the authority will receive an error message and options to retry or manually manage assignments.

3. **Communicate and Update:**

   3.1 The system enables the disaster response coordinator to send updates and instructions to volunteers and NGOs through various communication channels (e.g., email, SMS, app notifications).

   3.2 The disaster response coordinator can receive and review responses or status reports from volunteers and NGOs to stay informed about ongoing activities.

   Failure Case:

3.3 If communication fails or responses are not received, the system will notify users of the issue and provide alternative communication methods or contact options like SMS alerts, email notifications, phone hotlines or social media updates.

4. **Monitor and Evaluate Performance:**

4.1 The system allows the disaster response coordinator to monitor the performance and effectiveness of volunteer and NGO efforts through real-time dashboards and reports.

4.2 The disaster response coordinator can evaluate the impact of the coordinated response and identify areas for improvement or additional support.

Failure Case:

4.3 If performance data is unavailable or inaccurate, the system will provide options to manually update information or request assistance from support services. Types of performance data that might be affected include real-time status reports, response time analytics, and incident reporting data.

5. **Collect Feedback and Address Issues:**

5.1 The system facilitates the collection of feedback from volunteers, NGOs, and affected communities regarding their experiences and challenges.

5.2 Users can address any concerns or issues raised in the feedback to improve future coordination efforts. The process includes feedback collection, acknowledgment, and feedback review.

Failure Case:

5.3 If feedback cannot be collected or processed, the system will alert users to the issue and offer options to contact support or resubmit the feedback request. In case of failure, the system will display an error message and can also use status tracking features like tracking ID and status updates.

3.1.3 Facilitate Training

Conversation: As a responder or authority, I want to participate in or conduct training sessions so that I can be well-prepared for disaster response and pre-

paredness activities.

Confirmation:

1. **Access Training Modules**

   1.1 The system provides a list of available training sessions (both online and offline) based on role and region.

   1.2 Users can view the relevant details of each session, including the type of training (theoretical or practical), schedule, trainers, and prerequisites.

2. **Training Registration**

   2.1 The system allows users to register for available training sessions by providing the necessary details.

   2.2 Users can select the appropriate training session that matches their availability and needs.

   Failure Case:

   2.3 If registration fails due to incorrect details or system issues, the system displays an error message with guidance on correcting the issues and provides a retry option.

3. **Training Materials Access**

   3.1 The system provides access to training materials such as documents, presentations, and videos once users register for a session.

   3.2 These materials are accessible before and after the session to ensure continuous learning.

   Failure Case:

   3.3 If users cannot access training materials due to technical problems, the system alerts users with an error message and offers contact support options.

4. **Attendance Management**

   4.1 For offline training, authorities can mark attendance using the system.

   4.2 For online training, the system automatically logs attendance based on session participation.

   Failure Case:

4.3 If attendance is not recorded correctly, the system notifies the user and the administrator, allowing them to manually rectify attendance records.

5. **Certification and Completion**

5.1 After successful completion of the training, users receive a certificate of participation or completion.

5.2 The system stores the training history and certificates in the user's profile for future reference.

Failure Case:

5.3 If the certificate is not generated or recorded properly, the system informs the user and provides an option to request reissue or contact support.

6. **Feedback Mechanism**

6.1 The system provides a feedback form at the end of each training session to gather input from participants.

6.2 Users can provide feedback on the session content, trainers, and overall experience.

Failure Case:

6.3 If feedback submission fails, the system displays an error message and allows users to retry or contact support.

7. **Training Notifications**

7.1 The system sends reminders and notifications about upcoming sessions, cancellations, or updates via email and in-app notifications.

7.2 It also alerts users when new training modules are available that match their interests or roles.

Failure Case:

7.3 If notifications are not delivered, the system prompts users to check their notification settings and offers to resend notifications.

8. **Failed Registration Handling**

8.1 If a user fails to register due to system or schedule issues, the system provides troubleshooting suggestions and an option to contact support.

8.2 The system also logs the failure reason and provides feedback for improving the registration process.

3.1.4 Donation Management

Conversation: As a general user (both domestic and international), **I want to** contribute to national disaster relief efforts through various channels such as mobile banking, bank transfer, international remittance, and courier services, **so that** I can easily support the affected people with money and goods during natural disasters in Bangladesh, knowing that my contributions will be transparently managed and utilized effectively.

Confirmation:

1. **Domestic Donations:**
   - 1.1 The system allows users to donate money via mobile banking services such as bKash, Nagad, and Rocket.
   - 1.2 The system enables users to transfer money through bank transfers by entering the relevant bank account details.
   - 1.3 Users can send relief goods through integrated courier services, and the system records the details of the donated items (e.g., rice, clothes).

     Failure Case:
   - 1.4 If a donation fails due to network issues or incorrect account details, the system displays an error message and provides retry options or customer support information.
2. **International Donations:**
   - 2.1 The system allows international users to donate via bank transfers or remittance channels such as Western Union, Wise, Xoom, and Taptap Send.
   - 2.2 The system converts foreign currencies to Bangladeshi Taka (BDT) and displays the equivalent donation amount.

     Failure Case:
   - 2.3 If a remittance transaction fails due to incorrect information or conversion issues, the system notifies the user and provides steps for correction or support.
3. **Donation Transparency:**
   - 3.1 The system maintains a public ledger showing the amount of money donated, the donor's name (if they choose to disclose it), and any goods donated.

3.2 The system shows how donations are allocated (e.g., flood relief in Sylhet or cyclone relief in coastal areas).

3.3 Users receive updates on how their contributions are utilized.

Failure Case:

3.4 If the ledger is not updated due to technical issues, the system notifies users of the delay and offers an option to check back later.

4. **Top Donor Recognition:**

4.1 The system displays a "Top Donor of the Month" section, highlighting the largest contributors.

4.2 Donors can choose whether or not they want their names publicly displayed on the leaderboard.

Failure Case:

4.3 If the system fails to update the leaderboard or record a donation, users are notified with the option to report the issue for manual review.

5. **User Notifications:**

5.1 Donors receive confirmation messages via email or SMS when their donation is successfully processed.

5.2 The system sends notifications when the donated funds or goods are used for specific relief efforts.

Failure Case:

5.3 If notifications are not sent due to technical problems, the system alerts the user to check notification settings and provides an option to resend notifications.

6. **Admin and Reporting Panel:**

6.1 Admins can view a dashboard that tracks incoming donations (money and goods) and monitors their allocation.

6.2 The system generates detailed reports summarizing donations, disbursements, and remaining funds/items for future relief efforts.

Failure Case:

6.3 If report generation fails, admins are notified, and the system provides a troubleshooting guide or support contact options.

7. **Security and Compliance:**

7.1 The system ensures secure transactions for both domestic and international donors, following financial regulations.

Failure Case:

7.2 If suspicious activity or fraudulent transactions are detected, the system flags the transaction and prevents it from being processed, alerting the user and admin.

8. **Courier Service Integration:**

8.1 The system integrates with courier services, allowing users to send relief goods, with details of items logged in the system.

8.2 The system generates a tracking ID for each donation of goods, which the user can use to monitor delivery status.

Failure Case:

8.3 If courier service integration fails, the system notifies the user and provides contact options for support or courier tracking information manually.

9. **Anonymous Donation Option:**

9.1 The system allows users to choose whether to disclose their identity when donating.

Failure Case:

9.2 If anonymity settings fail to apply correctly, users are notified, and the system provides an option to report the issue.

10. **Failed Donation Handling:**

10.1 If a donation fails due to technical or network issues, the system logs the failure and offers troubleshooting suggestions.

10.2 Users are provided with an option to retry the donation or contact customer support for further assistance.

3.1.5 Emergency Shelter Center Information

Conversation: As an ordinary user, I want to access information about nearby shelter centers during a national disaster so that I can find a safe place for myself

and my family.

Confirmation:

1. **Location-Based Shelter Listings:**
   1.1 The system provides a list of nearby shelter centers based on the user's current or manually entered location.
   1.2 The system uses GPS to automatically display nearby shelters or allows users to input a different location manually.
2. **Shelter Details:**
   2.1 For each shelter center, users can view critical information, including the address, capacity, availability status (open/closed/full), and available facilities (e.g., food, water, medical assistance, sleeping arrangements).
   2.2 Contact details for the shelter center are also provided, including a phone number or email for immediate inquiries.

   Failure Case: If shelter details cannot be loaded, the system informs the user and provides basic information such as the address, or suggests trying again later.
3. **Navigation Assistance:**
   3.1 The system provides real-time directions to the selected shelter using maps or GPS tools.
   3.2 Users can switch to a map view to see the shelter's exact location, and the system provides directions based on the user's preferred mode of transportation (car, walking, public transport).
   3.3 If there are roadblocks or traffic issues, the system suggests alternate routes or nearby shelters with better accessibility.
   Failure Case:
   3.4 If navigation tools fail to load or provide directions, the system recommends manual map access and offers emergency helpline numbers for assistance in finding the shelter.
4. **Real-Time Shelter Status Updates:**
   4.1 Shelter status and availability (open/closed/full) are updated in real-time to reflect the current conditions.

4.2 Users receive updates on the availability of essential services, such as medical aid or food supplies.

4.3 In case of limited internet access during a disaster, users can request shelter and emergency contact details via SMS.

Failure Case:

4.4 If real-time updates fail, the system alerts the user with the last known status and suggests checking later for updates or trying the SMS service.

5. **Shelter Alerts and Notifications:**

5.1 If there are any changes in the status of a selected shelter (e.g., it becomes full or closes), users are notified immediately.

5.2 The system also notifies users of newly opened shelters in the vicinity during the disaster.

5.3 In case of limited internet access, users can request emergency contact and shelter details via SMS by sending their location, and the system responds with relevant shelter information.

6. **User Feedback on Shelter Conditions:**

6.1 After visiting a shelter, users can leave feedback or report issues (e.g., overcrowding, insufficient resources) to help authorities address problems in real-time.

Failure Case:

6.2 If feedback submission fails, the system provides an error message and allows users to retry or contact support through alternative channels (e.g., phone or email).

3.1.6 Get Guidelines about Incident

Conversation: As a disaster response authority, I want to get clear guidelines about managing different types of incidents so that I can follow the best practices during a disaster.

Confirmation:

1. **Access Guidelines:**

   1.1 The system allows authorized users to view guidelines for specific disaster types, such as floods, cyclones, and earthquakes.

   1.2 Users can search for guidelines based on the incident type, location, or severity.

   Failure Case:

   1.3 If the system fails to retrieve the guidelines, it will display an error message and provide a retry option.

2. **Download and Share Guidelines:**

   2.1 Users can download the guidelines as a PDF or share them with team members.

   Failure Case:

   2.2 If the download or sharing fails, the system will provide an error message and allow users to retry.

3. **Receive Regular Updates:**

   3.1 The system notifies users when new guidelines or updates are available for a specific incident.

   3.2 **Failure Case:** If notifications fail, the system will provide a retry option or prompt users to contact support.

4. **Offline Access:**

   4.1 The system allows users to download guidelines for offline use when there is no internet connection.

   Failure Case:

   4.2 If offline access is unavailable, the system will notify the user and offer a retry or suggest checking the internet connection.

3.1.7 Assess Damage

Conversation: As a disaster response authority, I want to assess the damage in affected areas so that I can gather accurate information for effective relief and

recovery planning.

Confirmation:

1. **Start Damage Assessment**

   1.1 The system allows authorized users to create a new assessment for a specific location and disaster type.

   1.2 Users can input details like area, damage type, and severity.

   1.3 `Failure Case:` If the assessment can't be created due to errors, the system will show a message and provide a retry option.

2. **Collect Data**

   2.1 Users can upload photos, mark locations on a map, and record damage information (e.g., infrastructure, human, environmental). **Failure Case:**

   2.2 If there's no internet, the system allows offline data collection, syncing when the connection is restored.

3. **Damage Categorization and Prioritization**

   3.1 Categorize Damage: The system helps users label damage as minor, moderate, or severe based on predefined criteria.

   3.2 Prioritize Areas: It prioritizes the most affected areas to guide resource allocation and urgent actions.

   Failure Case:

   3.3 If the data is incomplete or inaccurate, the system notifies users to correct it or seek help from authorities.

4. **Generate Report**

   4.1 The system compiles the input into a damage report with details and images.

   4.2 Users can download or share the report.

   Failure Case:

   4.3 If the report cannot be generated, the system provides an error message and an option to retry.

5. **Submit Report**

5.1 After reviewing, users submit the final report to the disaster management team.
Failure Case:

5.2 If submission fails, the system allows users to retry or contact support.

6. **Receive Confirmation**

6.1 The system sends notifications to relevant parties once the report is submitted.
Failure Case:

6.2 If notifications fail, the system allows users to resend or contact support.

3.1.8 Manage News Board

Conversation: As an admin, I can manage the news board (post news, update news, post alert/breaking news), so that we can provide the latest information about all incidents occurring throughout the country.

Confirmation

1. **Post a New News**

1.1 Admin is provided an interface with a text field and upload image option to create a new post about any incident.

1.2 Whenever a new news is posted to the board, users are notified with a link to view the newly posted news.
Failure Case:

1.3 Newly added news post is stored in the system.

1.4 If creating a new post fails or is interrupted due to network or technical issues, an error message is prompted.

1.5 An error message is shown if the uploaded images are not found in the given location or if an unsupported text style is used.

2. **Update News**

2.1 Admin accesses all the previously posted news in the system and selects any news to update it.

2.2 Admin is provided an interface with editable selected news post.

2.3 Admin edits text or uploads a new image or deletes the previous one and saves the changes.

2.4 Once the news is updated, a notification is sent to the registered users with a link to view the news.
Failure Case:

2.5 If any network or technical issue occurs while updating the news post, the previous form of the news is saved and an error message is prompted to the admin.

2.6 An error message is provided if the text or newly added image is not found or supported by the system.

3. **Post Red Alert/Breaking News**

3.1 Admin posts a red alert news or breaking news in case of emergency by providing necessary text or images or other files to the interface.

3.2 A red-colored heading of the news is sent with a notification to the registered users with a link to view the detailed news.

3.3 The red alert/breaking news post is stored in the system for future assessment.
Failure Case:

3.4 An error message is prompted if any network or technical issue occurs while posting alert news.

3.5 Unsupported image or text format, or wrong image path, generates an appropriate error message for the admin while creating alert/breaking news.

3.1.9 Emergency Authorities Contact Information

Conversation: As an ordinary user, I want to access emergency contact information during a national disaster so that I can quickly reach the necessary authorities for help.

Confirmation :

1. **Location-Based Contact Information:**

   1.1 The system allows users to view emergency contact numbers specific to their current location, including key authorities such as police, fire department, medical emergency services, and disaster response units.

   1.2 Users can manually enter their location or allow the system to auto-detect it using GPS on their device.

2. **Up-to-Date Information:**

   2.1 The emergency contact details are verified and regularly updated by the system to ensure accuracy, particularly during national disasters.

   2.2 The system notifies users if any updates to the contact details occur while they are accessing the information.

   Failure Case:

   2.3 If the system cannot verify the latest contact details, it displays an error message and offers the last known valid information, with an alert to proceed with caution.

3. **Multiple Access Points:**

   3.1 The emergency contact information is available on various platforms (e.g., mobile app, website, emergency alert system).

   3.2 Users can access this information with a consistent experience across platforms, ensuring it is easy to retrieve during an emergency.

   Failure Case:

   3.3 If the platform fails to display the information (e.g., app not loading or website down), the system suggests alternate methods such as SMS alerts or accessing a cached version of the data.

4. **Offline Access:**

   4.1 Users can save or download the emergency contact information for offline use, allowing access even during network disruptions.

3.1.10 Inform Media

Conversation: As a disaster response coordinator, I want to inform the media about the current disaster situation so that they can disseminate timely and accurate information to the public and aid in coordinated response efforts.

Confirmation:

1. **Prepare Media Notification:**
   1.1 The system allows disaster response coordinators to create a media notification for a specific disaster event, including key details and updates.
   1.2 The disaster response coordinator can input information such as the nature of the disaster, affected areas, current status, and any urgent messages or instructions.
   Failure Case:
   1.3 If the notification cannot be created due to errors, the system will display an error message and offer an option to retry or save the draft.
2. **Select Media Channels:**
   2.1 The disaster response coordinator can choose which media channels (e.g., TV, radio, online news platforms, social media) to send the notification to.
   2.2 The disaster response coordinator can add contact details for media representatives or select pre-configured media lists.
   Failure Case:
   2.3 If a media channel cannot be reached, the system will notify users of the issue and allow them to choose alternative channels or contacts.
3. **Compose Notification Content:**
   3.1 The disaster response coordinator can draft the notification content, which may include text, images, and links to additional resources or official reports.
   3.2 The disaster response coordinator can preview the content before sending it out to ensure accuracy and clarity.
   Failure Case:
   3.3 If there are errors or issues with the content, the system will alert users to make necessary corrections or consult a content expert.

4. **Monitor Media Coverage:**

   4.1 The system enables disaster response coordinators to track and review media coverage resulting from the notification.

   4.2 The disaster response coordinator can access summaries, reports, or direct links to media outlets covering the disaster.

   4.3 **Failure Case:** If media coverage data is not available or incomplete, the system will provide an option to manually update or request assistance from media monitoring services.

5. **Receive Feedback:**

   5.1 The system allows the disaster response coordinator to receive and review feedback from media representatives and the public regarding the notification.

   5.2 The disaster response coordinator can address any concerns or questions raised in the feedback.

   Failure Case:

   5.3 If feedback cannot be processed or accessed, the system will provide an error message and options to contact support or resubmit the request.

3.1.11 Notify Real-time Alert (General & Emergency)

Conversation: As a disaster response authority, I want to send real-time alerts (both general and emergency) to citizens and officials so that everyone can be informed and take action during critical situations.

Confirmation:

1. **Send General Alert:**

   1.1 The system allows authorized users to send general alerts, such as weather updates or precautionary instructions, to specific regions.

   1.2 Users can customize the message and choose the target audience (citizens, first responders, or both).

   Failure Case:

1.3 If the alert cannot be sent due to errors, the system will display an error message and offer a retry option.

2. **Send Emergency Alert:**

2.1 The system allows users to send high-priority emergency alerts, such as evacuation notices or warnings of immediate danger (e.g., floods or cyclones).

2.2 The system will prioritize these alerts and send them immediately through multiple channels (e.g., SMS, email, push notifications).

Failure Case:

2.3 If the alert fails to send, the system will notify the user and offer options to retry or contact support.

3. **Target Specific Areas:**

3.1 Users can select affected regions using maps or input specific locations where the alert is needed.

Failure Case:

3.2 If the location data is incomplete or inaccurate, the system will prompt users to correct the information before proceeding.

4. **Receive Confirmation:**

4.1 The system confirms once the alert is successfully delivered to the target audience.

Failure Case:

4.2 If confirmation of delivery cannot be sent or received, the system will notify the user and allow them to retry or contact support.

5. **Track Alert Status:**

5.1 Users can view the delivery status of the alert (e.g., "Sent," "Delivered," or "Failed") for tracking purposes.

Failure Case:

5.2 If tracking data is unavailable, the system will notify the user and offer options to retry or check later.

3.1.12 Archive Previous Incidents

Conversation: As a user, I want to access information about previous disaster incidents in Bangladesh, so that I can learn from past events and understand the impact of those disasters, including estimated losses, human deaths, and related media (photos or videos).

Confirmation:

1. **Access Archived Incidents:**
   1.1 The system provides a list of past disaster incidents that occurred in Bangladesh, organized by date and type of disaster.
   1.2 Users can filter incidents by disaster type (e.g., flood, earthquake, cyclone, fire) or by region.
   Failure Case:
   1.3 If the system fails to load the archived incidents, it displays an error message and offers an option to retry or contact support.
2. **Incident Details:**
   2.1 Each archived incident contains information such as the date, type of disaster, estimated losses (property and economic damage), and the number of human deaths.
   2.2 Users can click on each incident to view detailed information, including a description of the event and its aftermath.
   Failure Case:
   2.3 If the system fails to load incident details, it alerts the user and provides a retry option.
3. **Media Attachments:**
   3.1 Archived incidents can include photographs or videos that were taken during or after the event, providing visual context.
   3.2 Users can view or play these media files directly within the system.
   Failure Case:
   3.3 If media files fail to load, the system displays an error message and offers an option to try again or report the issue.
4. **Learning from Past Events:**

4.1 Users can read summaries or reports on how the incident was managed, including lessons learned or response strategies.

4.2 The system may offer related content, such as articles or case studies about the incident, for users who want to dive deeper into specific events.

5. **Search and Navigation:**

5.1 Users can search for specific incidents by keyword, disaster type, or region.

5.2 The system provides easy navigation, allowing users to browse between different incidents and return to the main archive list.

6. **Security and Data Integrity:**

6.1 The system ensures that archived data is protected from unauthorized access or modification.

Failure Case:

6.2 In case of any data integrity issues, the system alerts the admin, ensuring that the archived information remains accurate and unaltered.

7. **Failed Data Load Handling:**

7.1 If any data fails to load (incident details, media, or reports), the system provides troubleshooting suggestions or an option to contact support.

7.2 The system logs failure reasons for future improvements in data retrieval.

3.2 Non-Functional Requirements

3.2.1 Performance Requirements

The system must handle a high volume of users and data during disasters when demand spikes. Key performance requirements include:

1. **Response Time:** The system must respond to user actions (e.g., report submission, training access) within 2 seconds, even under peak load conditions.

2. **Scalability:** The system should be able to scale dynamically to accommodate a large number of users (up to 100,000 concurrent users) during disaster events.
3. **Data Throughput:** The system must be capable of processing and storing large volumes of real-time data (e.g., damage reports, user locations) without significant performance degradation.
4. **Availability:** The system must have an up-time of at least 99.9% annually, with minimal downtime, especially during disaster situations.

3.2.2 Safety Requirements

The system deals with disaster response and public safety; the following requirements are crucial:

1. **Data Integrity:** The system must ensure that all critical data (e.g., damage reports, resource allocation, rescue operation updates) remains intact and accurate during transmission and storage, preventing any loss of vital information.
2. **Failover Mechanism:** A robust failover mechanism must be in place to ensure that if one server goes down, the system switches to backup servers seamlessly, minimizing disruption.
3. **Disaster Recovery:** The system must have a disaster recovery plan that ensures full data recovery within 2 hours in case of system failure or data loss.

3.2.3 Security Requirements

Security is paramount, as the system will handle sensitive information related to disaster scenarios, including personal data and critical infrastructure details.

1. **Authentication and Authorization:** Role-based access control (RBAC) must be implemented, ensuring that only authorized users (e.g., citizens, responders, authorities) can access specific parts of the system.
2. **Audit Logs:** The system must maintain detailed audit logs of all actions performed by users, especially for sensitive actions like damage assessment

and resource allocation. These logs must be stored securely for at least 1 year.

3. **Incident Response:** In case of a security breach, the system must notify administrators immediately and log all relevant details of the breach to facilitate rapid investigation and containment.

3.2.4 Quality Requirements

The system must ensure high-quality standards in terms of usability, reliability, and maintainability to effectively support disaster response operations.

1. **Usability:** The system interface must be user-friendly, ensuring that even citizens with minimal technical knowledge can easily report incidents, access training, and receive alerts.
2. **Reliability:** The system must be reliable, ensuring that all core functions (e.g., damage reporting, resource allocation) operate correctly under normal and peak loads. The failure rate must be less than 0.01% over a one-year period.
3. **Maintainability:** The system must be modular and easy to maintain, with well-documented code, so that future updates (e.g., adding new features or fixing bugs) can be implemented without significant downtime.
4. **Portability:** The system must be accessible across various devices (e.g., desktops, smartphones, tablets) and platforms (e.g., Android, iOS, web browsers, USSD systems) to ensure accessibility for all users, regardless of their technology.