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TASK 3: REQUIREMENT ANALYSIS FOR A MOBILE BASED DISASTER MANAGEMENT SYSTEM

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SECTION I: INTRODUCTION

1.1. Purpose of the Document:

The purpose of this document is to outline the requirements for the design and implementation of our mobile-based disaster management system. It serves as a comprehensive guide for the stakeholders involved in the project, including the development team, project managers, and potential users of the system. The document aims to provide a clear understanding of the goals, functionalities, and scope of the system.

1.2. Stakeholders:

The primary stakeholders of the disaster management system include:

- Disaster Management Authorities:
  These are government organizations responsible for coordinating and managing disaster response efforts. They play a crucial role in overseeing the overall functionality and effectiveness of the system.
- Emergency Responders:
  These are the individuals or teams who provide immediate assistance and support during disasters. They rely on the system to receive real-time information, coordinate their efforts, and efficiently allocate resources.
- Victims and Affected Population:
  The system should cater to the needs of those impacted by disasters, allowing them to report incidents, seek assistance, and access relevant information and resources.
- System Developers and Administrators:
  This group encompasses the software engineering team responsible for designing, implementing, and maintaining the disaster management system.

1.3. Goals of the Disaster Management System

The goals of the proposed mobile-based disaster management system are as follows:

- Improve Efficiency:
  The system should streamline and automate various disaster management processes, reducing response times and enabling quick and effective decision-making.
- Enhance Communication:
  It should facilitate seamless communication and information exchange among stakeholders, enabling real-time collaboration and coordination during disaster events.
- Provide Situational Awareness:
  The system should offer comprehensive and up-to-date situational information, including incident reports, resource availability, and rescue operations, to aid in decision-making.
- Enable Resource Management:
  The system should assist in managing and allocating resources efficiently, ensuring their optimal utilization based on the severity and location of disasters.
- Promote Public Awareness:

The system should serve as a platform to disseminate critical information, safety guidelines, and emergency alerts to the general public, promoting preparedness and risk mitigation.

SECTION II: BACKGROUND

2.1 Current Disaster Management Processes and Systems

The existing disaster management processes and systems face several limitations and challenges, which warrant the need for a new system. Some of the common issues observed include:

- Manual and Paper-based Systems:
  Many disaster management processes heavily rely on manual methods, paper forms, and phone calls, leading to delays, errors, and difficulties in information management.
- Lack of Real-time Information:
  The absence of a centralized system makes it challenging to gather, analyze, and disseminate real-time information during disaster events. This hampers effective decision-making and coordination efforts.
- Limited Accessibility and Reach:
  The current systems often lack accessibility and reach, making it difficult for affected populations and responders to communicate, report incidents, and access critical resources and support.
- Fragmented Communication Channels:
  Inefficient communication channels and disjointed information flow among stakeholders hinder effective collaboration and coordination, leading to inefficiencies and delays in response efforts.
- Inadequate Resource Allocation:
  The absence of a systematic resource management system often results in suboptimal allocation of resources, leading to inefficiencies and imbalances in their distribution.

2.2 Need for a New System:

Given the limitations and challenges faced by current disaster management processes and systems, the need for a new mobile-based system is evident. The proposed system aims to address the following needs:

- Seamless and Real-time Communication:
  The system will provide a unified platform for stakeholders to exchange information, coordinate efforts, and communicate in real-time, ensuring efficient collaboration and timely response.
- Enhanced Data Collection and Analysis:
  By automating data collection and analysis, the system will enable the capture and processing of real-time information, allowing authorities to make data-driven decisions and allocate resources effectively.
- Improved Accessibility and Reach:
  The mobile-based nature of the system will enhance accessibility, enabling affected populations to report incidents, seek assistance, and access critical information and resources conveniently.

- Streamlined Resource Management:

  The system will facilitate efficient resource management by providing a centralized platform to track, allocate, and monitor resources, ensuring their effective utilization during disasters.
- Public Awareness and Preparedness: The system will serve as a medium to disseminate essential information, safety guidelines, and emergency alerts to the general public, promoting awareness, preparedness, and proactive risk mitigation.

SECTION III: SCOPE

3.1 Introduction:

Our disaster management system plays a critical role in mitigating, preparing for, responding to, and recovering from natural or man-made disasters. Its scope encompasses a wide range of activities aimed at minimizing loss of life, reducing the impact on infrastructure and communities, and facilitating effective emergency response efforts.

By integrating data-driven approaches, advanced technologies, and collaborative strategies, our comprehensive disaster management system strives to enhance preparedness, strengthen coordination among stakeholders, and support informed decision-making throughout all phases of a disaster. To understand what disaster management is, it is useful to study prevention, preparedness, response and recovery.

- Types of disasters:

  This system will address natural disasters (e.g., earthquakes, floods, hurricanes), technological disasters (e.g., oil spills, cyberattacks), and man-made disasters (e.g., fires, explosions).

3.2 Functionalities:

There are some very important functionalities which we took note of when dealing with our disaster management system, some of these functionalities include;

3.2.1 Incident Reporting and Tracking:

- Data collection from various sources (emergency calls, field reports, social media)
- Incident documentation and categorization
- Incident reporting systems and platforms
- Real-time incident monitoring and updates
- Integration with situational awareness and resource management systems

3.2.2 Resource Management:

- Personnel management (first responders, medical teams, volunteers)
- Equipment inventory and tracking
- Supply chain management
- Resource allocation based on incident needs and priorities
- Collaboration with external agencies and organizations for resource sharing

3.2.3 Emergency Communication:

- Multi-channel alert systems (SMS, voice calls, emails, social media)
- Emergency warning dissemination
- Public information platforms (websites, mobile apps)
- Language and accessibility considerations
- Two-way communication for feedback and inquiries

3.2.4 Situational Awareness:

- Real-time data visualization and mapping
- Integration of sensor data, satellite imagery, and incident reports
- Geospatial analysis for hotspot identification
- Visualization of incident severity and progression
- Early warning systems and predictive analytics

3.2.5 Response Coordination:

- Task management and assignment tracking
- Resource allocation and tracking
- Incident command systems and coordination structures
- Interagency collaboration and communication
- Cross-sector coordination (government, non-profit, private sector)

3.2.6 Decision Support:

- Risk assessment methodologies and tools
- Data-driven modeling and simulations
- Analysis of response strategies and their potential impacts
- Resource optimization and prioritization
- Decision support systems integration with other components

3.2.7 Public Information Dissemination:

- Shelter information and availability
- Safety instructions and evacuation routes
- Public education and awareness campaigns
- Multilingual and culturally sensitive communication
- Utilization of various communication channels and platforms

3.2.8 Preparedness:

- Emergency response planning
- Training and capacity building programs
- Conducting drills and exercises
- Risk assessment and vulnerability analysis
- Preparedness plan evaluation and updates

SECTION IV: FUNCTIONAL REQUIREMENTS

Functional requirements describe the desired end function of a system operating within normal parameters, so as to assure the design is adequate to make the desired product and the end product reaches its potential of the design in order to meet user expectations.

4.1 Incident Management:

- Allows users to report incidents with details like location, type, severity, and timestamp.
- Enable real-time status updates on reported incidents.
- Provide a system for incident categorization and prioritization based on pre-defined protocols.
- Facilitate automatic alerts and notifications to relevant authorities based on incident type and location.

4.2 Resource Management:

- Maintain an inventory of available resources (personnel, equipment, supplies) with detailed attributes.
- Enable real-time tracking of resource deployment and availability during a disaster.
- Allow for efficient resource allocation to incidents based on needs and geographical proximity.
- Integrate with existing logistics systems for resource dispatch and tracking.

4.3 Communication and Collaboration

- Provide a secure platform for multi-channel communication among response teams (voice, text, video)
- Facilitate real-time information sharing and collaboration between different agencies and stakeholders.
- Offer public information channels for disseminating alerts, warnings, and safety instructions and support multilingual communication features for diverse populations.

4.4 Situational Awareness

- Integrate with real-time data feeds (weather, traffic, infrastructure status) to create a comprehensive situational awareness dashboard.
- Allow for visualization of incident locations, resource deployment, and evacuation zones on interactive maps.
- Provide historical data analysis tools to identify trends and improve future preparedness.

4.5 Response Coordination

- Enable creation of incident action plans with assigned tasks and resource requirements.
- Facilitate team collaboration and task management during response operations.
- Offer reporting tools to track progress, document actions, and identify areas for improvement.

4.6 Decision Support

- Integrate with risk assessment tools to predict potential impact and guide deployment strategies.
- Provide analytics tools to support data-driven decision-making during emergencies.

SECTION V: NON-FUNCTIONAL REQUIREMENT

Non-functional requirements (NFRs) are a type of system requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors

5.1 Performance

- The system should have a response time of less than X seconds for critical functionalities (specify target response time).
- The system should be scalable to handle a surge in activity during a large-scale disaster.

5.2 Security and Privacy

- The system should comply with data privacy regulations and ensure secure storage of sensitive information.
- Implement user authentication and access control mechanisms to restrict unauthorized access.

5.3 Usability and Accessibility

- The system interface should be user-friendly and intuitive for personnel with varying levels of technical expertise.
- The system should be accessible to individuals with disabilities, complying with relevant accessibility standards.

5.4 Interoperability

- The system should be interoperable with existing emergency response systems used by different agencies.
- The system should adopt open data standards to facilitate data exchange with external platforms.

5.5 Regulatory Compliance

- The system must adhere to all relevant local, regional, and national regulations governing disaster management.

SECTION VI: USER ROLES AND PERMISSION

USERS	ROLES	PERMISSIONS
Disaster Model User	These users send disaster analysis requests as descriptive text to execute the model services hosted on the Disaster Management Platform (DMP) via the network	• Access disaster models. • Send disaster analysis requests. • Modify their own requests. • Remove their own requests. • Run disaster models.
Disaster Model Provider	These users provide the disaster models that are hosted on the DMP. They are responsible for ensuring that these models are accurate and up-to-date	• Add new disaster models. • View all disaster models. • Modify the disaster models they provided. • Remove the disaster models they provided. • Test run disaster models.
Admins	Admin users have complete access rights, allowing them to manage all aspects of the application, such as adding new users, modifying settings, and viewing/editing all content	• Add new users, modify settings, add content. • View all content and user information. • Modify all content, user information, and system settings. • Remove any content, user, or system settings. • Run system-wide operations.
Supervisors	Supervisors are responsible for managing content created by other users but may not have full administrative privileges	• Add new content. • View all content. • Modify content created by other users. • Remove content created by other users. • Run operations related to content management.
Users	Regular users are able to create content and view their own content and content created by others and can also request help if need be.	• Access public disaster information and response efforts. • Report incidents or needs. • Modify their own reports. • Remove their own reports. • Request assistance.
Emergency Respondents	These users are typically first responders or other emergency personnel who are or who have been first at the scene of the disaster to coordinate their response efforts	• Add new response plans. • View all response plans and disaster information.

		• Modify their own response plans. • Remove their own response plans. • Implement response plans.
Government officials	These users are government officials who use the system to coordinate disaster response efforts at a higher level	• Add new disaster response policies. • View all disaster information and response efforts. • Modify disaster response policies. • Remove disaster response policies. • Implement disaster response policies. • Notify public about upcoming disasters and what to do
Healthcare Professionals	In the context of a health emergency and disaster management system, healthcare professionals use the system to respond to and cope with health-related hazards	• Add new health emergency plans. • View all health-related disaster information. • Modify their own health emergency plans. • Remove their own health emergency plans. • Implement health emergency plans. • Provide safety drills in case of a disaster
Geographic Information System (GIS) Users	In a GIS-based disaster management system, users input their location and needs (like hospital or refuge areas nearby) into the system, which then displays relevant information on a map	• Input their location and needs. • Access relevant information on a map. • Modify disaster locations. • Remove affected areas which have been dealt with • Request for nearby services

SECTION VII: DATA REQUIREMENTS

Natural disasters are complex events about which both military and humanitarian responders need accurate, reliable, and timely data in order to respond effectively. This data will cover needs in the areas of crisis impact (baseline, damage and needs, and disaster situation data) and the operational environment (coordination, capacity, service locations, security, and access).

A strong match between information needs and available data leads to an enhanced situational awareness, improves sense-making, and enables adequate decision-making when deciding on response activities. Here are some relevant data which are necessary in a disaster management system:

7.1 Geospatial Data:

This helps provide coordinates for disaster prone areas, its topography and infrastructure in that area. High satellite images help assess damage, plan rescue efforts. Maps also help show the various evacuation points shelters and other safety facilities.

7.2 Meteorological and Hydrological Data:

Provides weather forecast, information on water levels and other disasters such are storms etc

7.3 Historical data:

Shows if the area has been affected before, the impact, the vulnerability of the area and provide response strategies.

7.4 Social data:

Shows the average age, majority sex, medical conditions and population density of an area.

7.5 Infrastructure data:

Information and the type of buildings, various routes, communication systems and health facilities in the area

7.6 Emergency Services Data:

Information about emergency services, including contact details, capabilities, and resource inventories, is necessary to coordinate response efforts and allocate resources effectively. This includes data on fire departments, police stations, hospitals, emergency shelters, and other relevant agencies.

7.7 Sensor data:

Continuous monitoring of environmental conditions is crucial for early warning systems and real-time situational awareness. This may include data from weather stations, seismic sensors, flood gauges, air quality monitors, and other sensor networks to track ongoing events and provide timely alerts.

7.8 Decision Support Systems:

Data-driven decision support systems, including modeling and simulation tools, can aid in predicting and evaluating the potential impacts of disasters. These systems rely on various input data, such as historical data, hazard models, population characteristics, and infrastructure information, to generate insights and support decision-making processes.

SECTION VIII: SYSTEM INTERFACES:

The system interfaces of our disaster management platform encompass the integration points with external systems or services critical for its functionality. These interfaces serve as bridges connecting our platform with various external sources of data and services. In a disaster management system, effective communication, data exchange, and coordination are essential for timely and efficient response to emergencies. System interfaces play a crucial role in facilitating these interactions by providing channels for communication, data integration, and user interaction.

These interfaces enable emergency personnel, administrators, and stakeholders to collaborate, share information, and make informed decisions. Let's explore some of the key interfaces commonly found in a disaster management system.

8.1 User Interface (UI):

The user interface allows emergency personnel, administrators, and authorized users to interact with the system. It may consist of graphical user interfaces (GUIs), command-line interfaces, or web-based interfaces that provide access to various functionalities such as incident reporting, resource management, and situational awareness. They can be designed for various devices like computers, tablets, and smartphones. The UI should be intuitive and user-friendly, enabling users to quickly understand and respond to the situation

8.2 Communications Interface:

Effective communication is crucial during disaster management. Communication interfaces facilitate real-time communication and information sharing among emergency personnel, agencies, and stakeholders. This interface facilitates communication between different entities involved in disaster management, such as government agencies, non-governmental organizations, volunteers, and the affected people. It can support various communication modes like text, voice, video, etc

8.3 Application Programming Interfaces:

APIs provide a standardized set of rules, protocols, and tools that allow different components of the system to communicate and interact with each other. In the context of disaster management, APIs can help in integrating various systems like weather forecasting systems, resource management systems, communication systems, etc.

8.4 Sensor Interface:

In our disaster management systems, various types of sensors (like weather sensors, seismic sensors, etc.) will be used to monitor and predict disasters. The sensor interface helps in collecting and processing data from these sensors

8.5 Resource Management Interface:

During a disaster, efficient resource management is critical. The resource management interface enables users to input, track, and allocate resources such as personnel, equipment, supplies, and transportation. It provides functionalities for inventory management, resource availability status, request handling, and logistics planning.

8.6 Emergency Alert System Interface:

This interface allows the system to send alerts and warnings to the people in the event of a disaster. This interface enables users to report incidents and emergencies to the system. It includes functionalities for capturing incident details, location information, severity assessment, and multimedia attachments such as photos or videos. Incident reports submitted through this interface are typically processed and used for further analysis and response coordination.

8.7 Geospatial Interface:

Geospatial interfaces provide maps and visualization tools to display and analyze geospatial data relevant to disaster management. These interfaces may integrate with Geographic Information Systems (GIS) to show real-time incident locations, evacuation routes, critical infrastructure, and resource distribution. Users can interact with the map interface to obtain situational awareness and make informed decisions.

SECTION IX: REPORTING AND ANALYTICS

Reporting and analytics refer to the process of collecting, organizing, and analyzing data in order to extract meaningful insights and make informed decisions. Reporting and analytics play a crucial role in disaster management by providing stakeholders with valuable information for effective decision-making, resource allocation, and performance evaluation.

The reporting and analytics capabilities of our system are crucial for monitoring, analyzing, and deriving insights from disaster-related data.

9.1 Importance of Reporting and Analytics in Disaster Management

- Reporting and analytics enables informed decision-making by providing insights into disaster-related data, performance metrics, and KPIs.
- They facilitate the identification of trends, patterns, and anomalies, helping stakeholders to mitigate risks, allocate resources efficiently, and improve response strategies.
- Reporting and analytics provide a comprehensive view of the system's performance, enabling continuous evaluation and improvement.

9.2 Types of Reports

- Regular Reports: These reports will provide periodic updates on various aspects of disaster management, such as incident response, resource allocation, and damage assessment. They help stakeholders track progress and identify areas requiring attention.
- Ad Hoc Reports: These reports will be generated on-demand to address specific information requirements or ad hoc analysis. They support customized data exploration and provide insights into specific aspects of disaster management.
- Executive Reports: These reports will offer high-level summaries and key metrics tailored for executive-level decision-makers. They focus on providing concise information to support strategic planning and decision-making.

9.3 Dashboards and Visualizations

- Dashboards: Dashboards provide real-time visual representations of key metrics and performance indicators. They offer a consolidated view of critical information, enabling users to monitor the system's health, track progress, and identify emerging issues promptly. Dashboards provide a snapshot of the key data points in a visually appealing and easy-to-understand format. They are typically interactive, allowing users to drill down into the data for more details. A dashboard for disaster management could include metrics like the number of active disasters, resources deployed, people affected, response time, etc.
- Interactive Visualizations: Interactive visualizations allow users to explore and analyze data intuitively. They provide dynamic representations of data using charts, graphs, maps, and other visual elements, facilitating data-driven insights and decision-making. Visualizations are graphical representations of data. They can include charts, graphs, maps, and other visual elements. Visualizations make it easier to understand large volumes of data and identify patterns and trends. In the context of disaster management, visualizations could be used to show the geographical spread of a disaster, trends in disaster occurrences, resource utilization, etc.

9.4 Disaster-Related Data

- Incident Data: This includes information about specific disasters, such as location, time, severity, and impact. It helps in understanding the scope and characteristics of incidents, guiding response efforts and resource allocation.
- Resource Data: Resource data encompasses details about available resources, their locations, capabilities, and utilization. It assists in optimizing resource allocation and ensuring effective utilization during disaster response.
- Performance Data: Performance data measures the effectiveness and efficiency of disaster management processes, such as response time, resource utilization, and incident resolution. It enables performance evaluation and continuous improvement.

9.5 Performance Metrics and Key Performance Indicators (KPIs)

- Response Time: The time taken to respond to incidents and initiate appropriate actions.
- Resource Utilization: The efficiency of resource allocation and utilization during disaster response.
- Incident Resolution: The rate at which incidents are successfully resolved or mitigated.
- Cost Efficiency: The cost-effectiveness of disaster management operations, including resource usage and response strategies.
- Public Satisfaction: Measuring public satisfaction with the disaster response efforts and services provided.

SECTION X: CONSTRAINTS AND ASSUMPTIONS

When developing and implementing a system, it is essential to identify and understand the constraints and assumptions that may impact its development and operation. Constraints refer to the limitations or boundaries that affect the system's design, development, or implementation, while assumptions are the beliefs or presumptions made during the requirements gathering process. By explicitly acknowledging and addressing these constraints and assumptions, project stakeholders can make informed decisions, manage risks, and ensure the system's success.

10.1 Constraints:

Constraints can arise from various aspects, including technical considerations, time limitations, budgetary constraints, organizational policies, regulatory compliance, and stakeholder requirements.

10.1.1 Technical Constraints:

- Hardware limitations: The system must be compatible with the existing hardware infrastructure, and any upgrades or replacements may incur additional costs.
- Software compatibility: The system should be compatible with the current software environment, including operating systems, databases, and third-party integrations.
- Performance requirements: The system should meet the specified performance criteria, such as response time, scalability, and reliability.
- Security constraints: The system must comply with security standards and protocols to protect sensitive data and prevent unauthorized access.
- Technology limitations: The system's development and implementation should consider the limitations of the chosen technologies, such as programming languages, frameworks, and tools.

10.1.2 Time Constraints:

- Project deadlines: The system development and implementation must adhere to specific timeframes, taking into account any dependencies or milestones.
- Time-to-market: The system should be delivered within a predetermined timeframe to meet market demands, remain competitive, or align with business objectives.

10.1.3 Budget Constraints:

- Cost limitations: The system's development and implementation will adhere to the allocated budget, including expenses for hardware, software, resources, and any third-party services.
- Cost-effectiveness: The system should provide value for money, balancing the costs with the expected benefits and return on investment.

10.1.4 Organizational Constraints:

- Regulatory compliance: The system must comply with relevant laws, regulations, and industry standards, ensuring data privacy, security, and ethical considerations.
- Organizational policies: The system's development and implementation should align with internal policies, procedures, and guidelines.
- Stakeholder requirements: The system should meet the needs and expectations of various stakeholders, including end-users, management, customers, and regulatory bodies.

10.2 Assumptions:

Assumptions, on the other hand, are the beliefs or expectations made about certain aspects of the system or its environment. These assumptions may pertain to user knowledge and skills, data availability and quality, system integration, scalability, and change management processes. Assumptions help in defining the scope of the system and guide decision-making during development.

It is important to regularly review and validate these constraints and assumptions throughout the system development lifecycle. As the project progresses or new information becomes available, adjustments may be required. Failure to address constraints or reassess assumptions can lead to project delays, cost overruns, or unsatisfactory system performance.

Regular communication with stakeholders and validation of constraints and assumptions ensure that the system development process remains aligned with the project goals and expectations.

SECTION XI: DEPENDENCIES

The mobile-based disaster management system project has several dependencies and external factors that need to be considered during the design, development, and operation phases. These dependencies may include:

11.1 Third-Party Software:

The disaster management system will rely on several key third-party software components to enable its functionalities:

- Mapping and navigation APIs (e.g., Google Maps, OpenStreetMap) for providing real-time location data and emergency routing information.
- Weather data APIs (e.g., OpenWeatherMap, AccuWeather) for retrieving up-to-date weather forecasts and disaster-related information.
- Notification and communication platforms (e.g., SMS gateways, push notification services) for sending emergency alerts and updates to users.

11.2 Hardware:

The system's operation is dependent on specific hardware components:

- Smartphones: The system will be primarily accessed through smartphones with Android and iOS operating systems.
- GPS-enabled devices: To enable accurate location tracking and mapping.
- Internet connectivity: The system will require internet connectivity for data transmission and real-time updates.

11.3 Data Sources:

To ensure up-to-date and comprehensive disaster information, the system will integrate data from various sources:

- Weather services: To provide weather forecasts and warnings.
- Governmental and non-governmental disaster management databases for obtaining information about past and ongoing disasters.
- Public safety and emergency response agencies for real-time incident reports and emergency response coordination.
- Crowdsourced data from users for reporting on-the-ground conditions and sharing critical information during disasters.

11.3 Regulatory Changes:

Compliance with key regulations and standards is imperative for the system's development and deployment:

- Data privacy regulations: The system must comply with data privacy regulations such as GDPR and CCPA.
- Accessibility standards: The system must be accessible to users with disabilities.

SECTION XII: ACCEPTANCE CRITERIA

The acceptance criteria for the mobile-based disaster management system define the conditions that must be fulfilled for the system to be considered acceptable and ready for deployment. These criteria encompass various aspects, such as functionality, performance, usability, security, and reliability. The following points outline the key areas to be considered:

12.1 Functional Requirements:

The system's core functionalities are defined by specific operational needs:

- The system must be able to provide real-time location tracking of users in the affected area.
- The system must be able to send emergency alerts and updates to users.
- The system must be able to facilitate communication between users and emergency responders.
- The system must be able to provide access to essential resources and information.
- The system must be able to collect and analyze data to support decision-making.

12.2 Non-Functional Requirements:

In addition to functionality, the system must meet critical non-functional criteria:

- The system must be reliable and available during emergencies.
- The system must be easy to use and understand.
- The system must be secure and protect user data.
- The system must be scalable to accommodate a large number of users.
- The system must be performant and responsive.

12.3 Performance:

The system's performance criteria will define acceptable response times, data processing speeds, and system scalability to handle a significant number of concurrent users or disaster events. Performance benchmarks should be established and validated against expected workloads.

12.4 Usability:

The system will have a user-friendly interface that is intuitive, accessible, and easy to navigate. Usability acceptance criteria may include factors such as clear information presentation, streamlined workflows, minimal user errors, and efficient task completion.

12.5 Security:

The system will incorporate robust security measures to protect sensitive data, prevent unauthorized access, and ensure the integrity and confidentiality of information. Acceptance criteria for security may include compliance with industry standards, encryption protocols, secure user authentication, and secure data transmission.

12.6 Reliability:

The system will demonstrate high reliability to ensure availability during critical situations. Acceptance criteria may include metrics such as system uptime, fault tolerance, disaster recovery mechanisms, and backup procedures.

12.7 Testing and Validation

Various testing phases are outlined to ensure system robustness and user satisfaction:

- Unit testing will be conducted to ensure the functionality of individual components.
- Integration testing will be conducted to ensure the components work together seamlessly.
- System testing will be conducted to ensure the system meets the overall requirements.
- User acceptance testing will be conducted to ensure the system is user-friendly and meets user expectations.

SECTION XIII: PROJECT TIMELINE AND DELIVERABLES

By the end of the semester, the following will be delivered:

- System design document
- Developed mobile application
- Test reports
- User manual

SECTION XIV: REFERENCES

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