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Disaster Management Mobile Application

Introduction

A disaster management mobile application is a software tool designed to assist individuals, communities, and organizations in preparing for, responding to, and recovering from disasters and emergencies. These applications are typically accessible via smartphones and tablets, providing users with access to critical information, resources, and services before, during, and after disasters. The primary purpose of a disaster management mobile application is to enhance resilience, promote safety, and facilitate effective disaster response and recovery efforts.

Requirement gathering

Requirements gathering for a disaster management mobile app involves systematically collecting, documenting, and analyzing the needs and expectations of stakeholders, including users, government agencies, emergency responders, and community organizations.

I. Approach to requirement gathering

1. **Identify Stakeholders:**
   - Determine all stakeholders involved in disaster management, including end-users, government agencies, NGOs, emergency responders, and community organizations.
2. **Conduct Stakeholder Analysis:**
   - Understand the roles, responsibilities, and objectives of each stakeholder group.
   - Determine their level of influence, interest, and contribution to the project.
3. **Define Project Scope:**
   - Clearly outline the goals, objectives, and constraints of the project.
   - Define the geographical scope, types of disasters to be addressed, and target user demographics.
4. **Conduct User Research:**
   - Gather insights from potential users through surveys, interviews, focus groups, and observation.
   - Understand their needs, preferences, pain points, and expectations regarding disaster management.
5. **Perform Risk Assessment:**
   - Identify potential risks and challenges associated with the development and implementation of the mobile app.
   - Assess the impact and likelihood of each risk and develop mitigation strategies.

6. **Document Requirements Specifications:**
    - Create detailed requirements documentation, including functional specifications, use cases, user stories, wireframes, and prototypes.
    - Ensure that requirements are well-documented, unambiguous, and traceable throughout the development process.

II. Stakeholders Identification and their roles

Stakeholders in a disaster management mobile application are individuals, groups, or organizations who have a vested interest or involvement in the development, implementation, and utilization of the application. They play various roles and contribute to different aspects of the application's lifecycle. Various stakeholders play critical roles in ensuring its effectiveness, adoption, and success. Here are the key stakeholders associated with their roles in the application:

1. **Emergency Responders:**
    - **Constitution**: Emergency responders include firefighters, paramedics, police officers, and other first responders who are directly involved in disaster response and rescue operations.
    - **Involvement**: They use the mobile application to receive real-time alerts, access critical information (such as incident locations, hazards, and resource availability), communicate with other responders, and coordinate response efforts.
2. **Government Agencies:**
    - **Constitution**: Government agencies at local, regional, and national levels are responsible for coordinating disaster management and providing support during emergencies.
    - **Involvement**: They may use the application to disseminate official alerts and warnings, share situational awareness updates, manage resources (such as shelters and evacuation routes), and coordinate response and recovery efforts with other agencies and stakeholders.
3. **Non-Governmental Organizations (NGOs):**
    - **Role**: NGOs play a vital role in providing humanitarian aid, relief services, and support to affected communities during disasters.
    - **Involvement**: NGOs may use the application to coordinate volunteer activities, request assistance or donations, disseminate information about relief efforts, and collaborate with government agencies and other organizations involved in disaster response and recovery.

4. Citizens and Residents:

- **Constitution**: Citizens and residents living in disaster-prone areas are directly impacted by emergencies and play a critical role in preparedness, response, and recovery efforts.
- **Involvement**: They use the application to receive alerts and warnings, access information on evacuation routes and shelters, report emergencies or hazards, request assistance, and communicate with responders and other community members.

5. Media Organizations:

- **Constitution**: Media organizations, including news outlets and journalists, play a crucial role in disseminating accurate information, raising awareness, and shaping public perceptions during disasters.
- **Involvement**: They may use the application to access official updates and alerts, report on disaster events and response activities, and share information with the public to facilitate informed decision-making and community resilience.

6. Technology Providers and Developers:

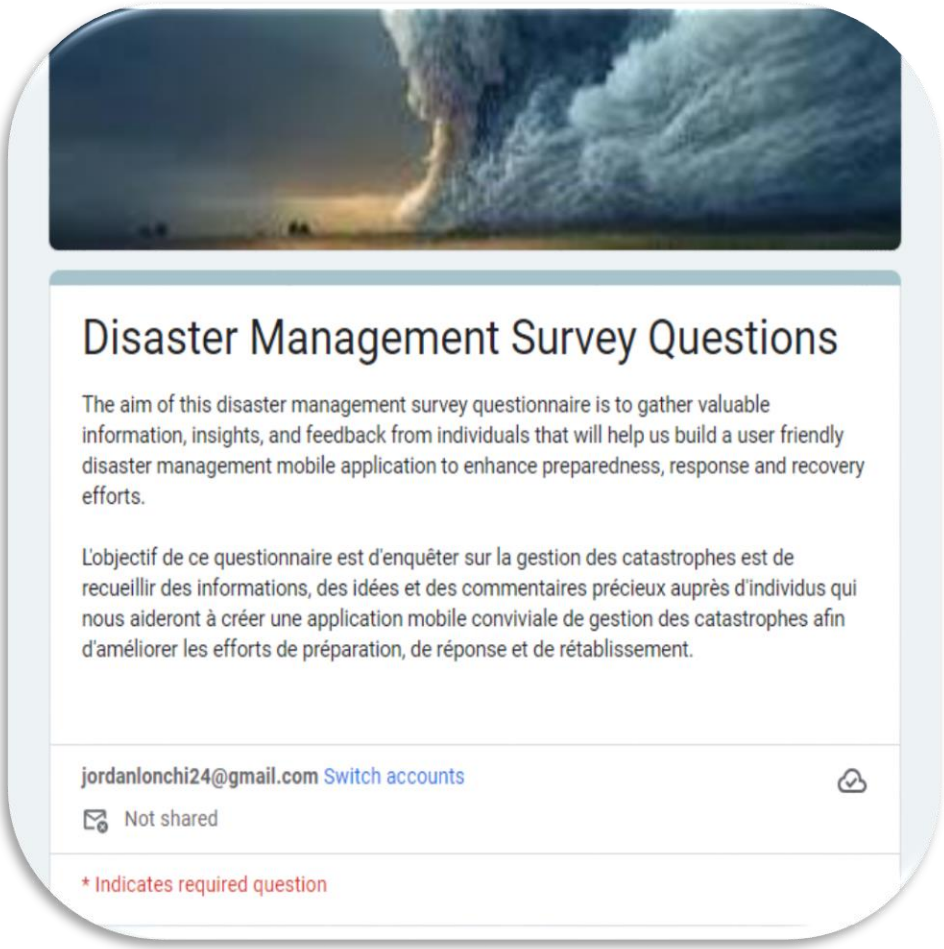
- **Role**: Technology providers and developers are responsible for designing, developing, and maintaining the disaster management mobile application.
- **Involvement**: They collaborate with other stakeholders to understand requirements, develop and test the application, provide technical support and updates, and ensure the application's usability, reliability, and security.

III. User research techniques

User research techniques play a crucial role in understanding the needs, preferences, and behaviors of users in the context of a disaster management mobile application. Here are some user research techniques specifically tailored for this domain:

1) Survey Questionnaires :

Conduct surveys and questionnaires to gather quantitative data on users' demographics, experiences, and preferences related to disaster preparedness, response, and recovery. Ask about their knowledge of hazards, past experiences with disasters, and expectations from the mobile application.



2) Interviews :

Conduct one-on-one interviews with stakeholders, including emergency responders, government officials, community leaders, and residents, to gain qualitative insights into their perspectives, challenges, and needs in disaster management. Explore their goals, workflows, pain points, and suggestions for improving disaster preparedness and response efforts.

3) Reverse Engineering :

Analyzing and understanding the functionality, design, and underlying technologies of existing applications in order to extract valuable insights and identify best practices. By leveraging reverse engineering techniques effectively, developers can accelerate the development process, reduce development risks, and deliver a high-quality, feature-rich app that meets the needs of users and stakeholders in disaster management scenarios.

Examples of some disaster management mobile application include: **Disaster Alert App, FEMA App**

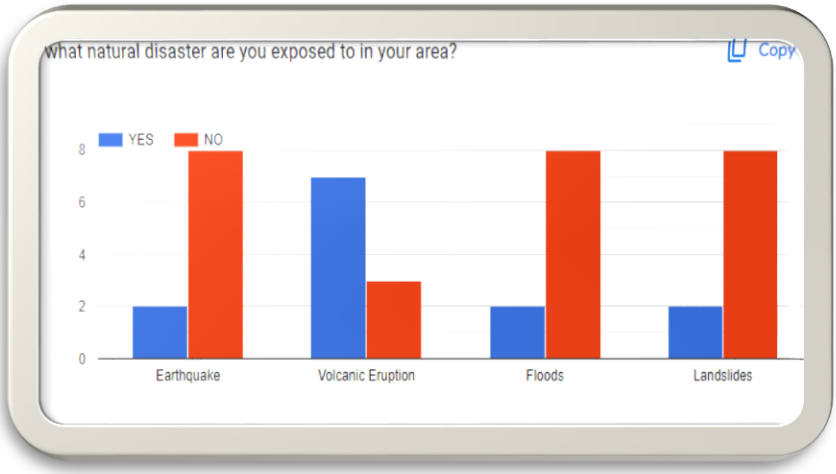
4) Brainstorming :

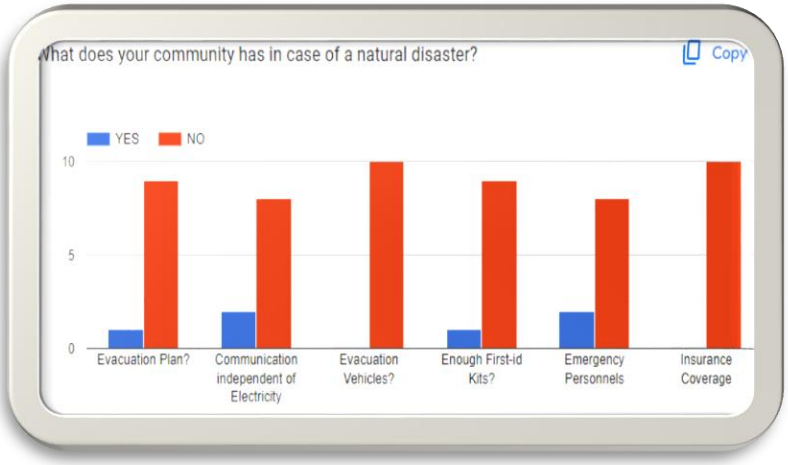
It is a collaborative and creative process of generating ideas, solutions, and strategies to address challenges, improve functionalities, and enhance user experiences related to disaster preparedness, response, and recovery.

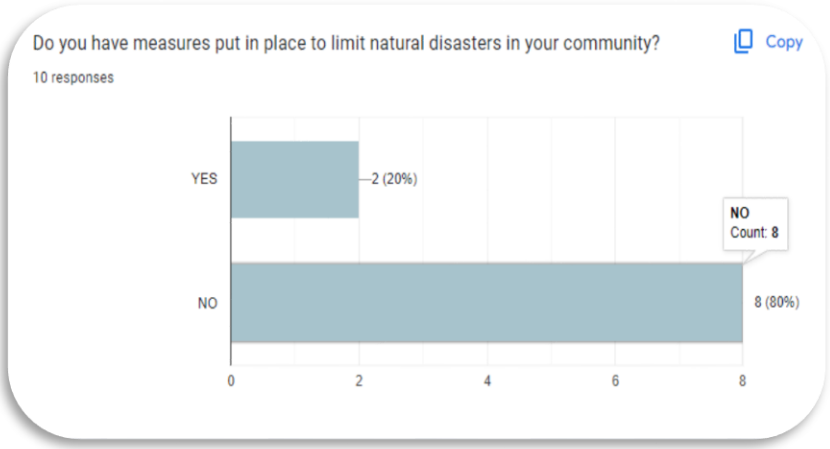
User research Results

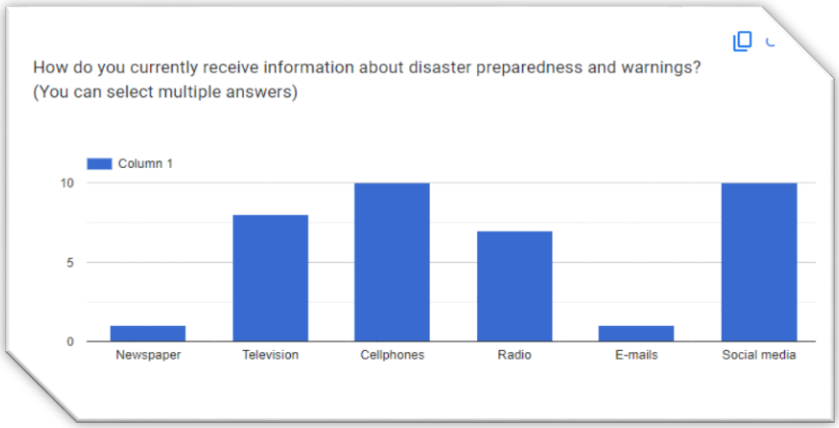
From the survey questionnaire

Raw Data Assessment: Here, google forms was used to generate statistics about each response from stakeholders' feedback as seen on the figures below:









From the interview with emergency responders

They think these applications will be of incredibly valuable tools for enhancing situational awareness, communication, and coordination in the field. Features such as the ability to receive real-time alerts and notifications about developing situations will help them stay informed about evolving hazards, weather conditions, and other critical information that may impact thier

response efforts. Additionally, they think the mapping and navigation features that the app will offer to visualize incident locations, access evacuation routes, and identify nearby resources such as shelters or medical facilities will be a great help to them in other to make response quick and effective.

One challenge that was brought up by these emergency responders is connectivity issues, particularly in remote or disaster-affected areas where network infrastructure may be compromised.

IV. Users reluctance to a disaster management mobile application

Users may have various reasons for thinking that a disaster management mobile application is not a good idea, based on their perceptions, experiences, and concerns. Here are some potential reasons why users might have reservations about the concept of a disaster management mobile application:

1. **Limited Awareness or Understanding**: They may not fully understand the purpose, functionality, or benefits of a disaster management mobile application. They may be unaware of how such an app could assist them in preparing for, responding to, or recovering from disasters and emergencies.
2. **Reliability and Trustworthiness**: They may question the reliability, accuracy, and trustworthiness of information provided through a disaster management mobile application. They may have concerns about the source of information, the quality of data, and the potential for misinformation or false alarms, particularly during high-stress situations.
3. **User Experience and Usability**: They may perceive disaster management mobile applications as complex, confusing, or difficult to use, especially if they have limited experience with technology or digital interfaces. They may worry about the usability of the application under stressful or chaotic conditions during emergencies.
4. **Privacy and Data Security**: They may have concerns about the privacy and security of their personal information when using a mobile application, particularly if it requires sharing sensitive data or location information. They may worry about the risk of data breaches, unauthorized access, or misuse of personal information by third parties.
5. **Cultural and Linguistic Barriers**: Users from diverse cultural backgrounds or linguistic communities may feel that the application does not adequately address their specific needs, preferences, or communication styles. They may worry about language barriers or cultural insensitivity in the design and content of the application.

V. General requirements for our application

After interacting with the stakeholders, we were able to identify these potential requirements expected from the stakeholders.

These requirements arise from both the need and expectations of stake holders and also solutions to the reluctance of end users to enroll into our disaster management mobile application.

➢ Requirement from survey questionnaire and interviews

- **Alerts and Notifications**: Ability to receive real-time alerts and notifications about impending disasters, emergencies, or hazards.
- **Emergency Contacts**: Integration of emergency contact information for local authorities, emergency services, healthcare providers, and community organizations.
- **Information Resources**: Access to educational materials, preparedness guides, safety tips, and disaster recovery resources.
- **Communication Tools**: Features for two-way communication, group messaging, and emergency broadcasts to facilitate coordination and communication during disasters.
- **Mapping and Navigation**: Integration of interactive maps, evacuation routes, shelter locations, and hazard zones to assist with navigation and decision-making.
- **Incident Reporting**: Capability to report incidents, hazards, and emergencies directly from the application, including location-based reporting and multimedia attachments.
- **Resource Allocation**: Tools for resource management, logistics coordination, and allocation of emergency supplies, equipment, and personnel.
- **Community Engagement**: Features for community engagement, volunteer coordination, and information sharing among residents, organizations, and stakeholders.
- **Data Security**: Implementation of security measures, encryption protocols, and data privacy controls to protect sensitive information and ensure compliance with regulations.
- **Offline Functionality**: Design the mobile application to include offline capabilities, allowing users to access critical features and information even when internet connectivity is unavailable. Offline functionality can include offline maps, cached data, and the ability to perform essential tasks without requiring a network connection.

➢ Requirements from brainstorming and reverse engineering

- **Intuitive Interface**: User-friendly design, intuitive navigation, and clear visual cues to facilitate ease of use and accessibility for users of all skill levels.
- **Accessibility Features**: Support for accessibility standards, including screen readers, text-to-speech, and alternative input methods for users with disabilities.

- **Multi-Language Support**: Provision of multilingual support to accommodate users from diverse linguistic backgrounds and communities.
- **Device Compatibility**: Compatibility with various mobile devices, operating systems, screen sizes, and resolutions to ensure broad accessibility and usability.
- **Offline Capabilities**: Seamless transition between online and offline modes, with features that remain functional even in the absence of internet connectivity.
- **Performance Optimization**: Fast loading times, responsive interactions, and efficient use of system resources to provide a smooth and responsive user experience.

➢ Requirements from online researches

- **Data Protection**: Compliance with data protection regulations, privacy laws, and security standards to safeguard user data and personal information.
- **Emergency Management Guidelines**: Adherence to emergency management guidelines, standards, and best practices established by relevant authorities and organizations.
- **Accessibility Regulations**: Compliance with accessibility regulations, such as the Web Content Accessibility Guidelines (WCAG), to ensure accessibility for users with disabilities.
- **Emergency Communication Protocols**: Alignment with emergency communication protocols, procedures, and protocols established by government agencies, emergency services, and public safety organizations.

Conclusion

The requirement gathering process for a disaster management mobile application ensures that the application effectively meets the needs of users, stakeholders, and communities in preparing for, responding to, and recovering from disasters. By adhering to these principles and best practices, we developers can create a disaster management mobile application that empowers users, enhances community resilience, and contributes to more effective disaster preparedness, response, and recovery efforts.