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ALGEBRA

Disaster Response

and Management System (DRMS)

Functionality specification

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Content

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Introduction

The State of Artstotzka has started developing a Disaster Response and Management System, with which they aim to enhance emergency preparedness, improve response coordination, and minimize the impact of natural and man-made disasters.
The point of this document is to provide scope and concepts of this system and present requirements related to functionality.
It is intended for emergency responders, and other disaster management administration. Its intent is to make the flow of information between IoT devices, web and mobile apps, and disaster centre's more efficient, reliable and secure, generally making communication between said roles easier.

Scope of the project

The system includes web-based command centre, mobile app and an IoT system connected to external sensor monitors, which will provide real time monitoring of seismic activity, flood levels, air quality and issue alerts. It will also provide a central hub, where data will be processed and stored.
It shall allow for monitoring of real-time alerts, and in time incident reporting and updates to ongoing situations. It will also allow navigation to affected areas and allow responders to make notes; allow communication through in-app messaging, which will be used on secure channels through telecom providers; allow deployments of resources and make reports on the effectiveness of response. It will also support multiple languages and provide stable data syncing.
The project does not include the installation of IoT sensors, any maintenance of telecom infrastructure, responsibility of decision making for emergency situations, or providing public alerts for all civilians on national level.

Concepts

The system is meant to centralize detection of emergency situations, the response of emergency personnel and disaster management. The IoT devices collect data from environment and sends it to the central system. Here information is processed and sent to users. The mobile apps allow the emergency responders to access the data and publish any updates. The web -based command centre is meant for coordination between emergency personnel and disaster management team. The system is meant to be efficient in extreme conditions, and with limited connectivity.

Role description

Emergency responders (firefighters, medical teams) receive alerts via the mobile app, can update their status and report incidents as they occur. Thy can directly communicate with command centre through in-app messaging in the field, even in extreme situations and with poor connection.
Administrators can deploy resources such as rescue teams, medical supplies, and equipment to affected areas, tracking their progress live.
The system also generates reports to analyse the effectiveness of response efforts post-disaster.

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Assumptions and dependencies

This system is designed to be accessible and reliable under extreme conditions. Both apps must work offline, syncing data with the server once connectivity is restored.
Mobile app supports English, Arabic, Spanish and Hindi, while the web app will be available in English and Spanish.
The user is expected to able to use the app accordingly and make informed decisions in high stress situations. The system is also depended on integrity of telecom infrastructure.
The same is assumed for the disaster management team.

Requirements related to functionality

1. Geolocation feature

As an emergency responder, I want to use geolocation features in the mobile app so that I can navigate to affected areas and submit updates about ongoing situations of emergency.

2. Secure communication

As an emergency responder, I want to communicate with disaster management team and other responders on secure priority channels, provided by telecom providers, following regulation of using reserved channels.

3. Central hub

As a disaster management administrator, I want to access a central command hub that visualizes real-time data from IoT sensors and field reports through dashboards and heatmaps, so that I can monitor the situation and coordinate response efforts.

4. System analysis

As a disaster management administrator, I want the system to generate analysis reports after emergency situations so that I can evaluate the effectiveness of response actions and improve future responses.

Requirements related to characteristics

1. Multilingual support

The system will be available in multiple languages – the mobile app in English, Arabic, Spanish and Hindi, while the web app will be available in English and Spanish.

2. Encrypted communication

The communications between IoT devices, mobile apps, and the web system will be encrypted, ensuring data security.