

LOCAL GOVERNMENT UNIT 1: EMERGENCY RESPONSE AND DISASTER MANAGEMENT SYSTEM (AI CHAT ASSISTANT, REAL-TIME EMERGENCY ALERTS, COMMUNITY PORTAL, GIS-INTEGRATED EMERGENCY SUPPORT OPERATIONS)

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Abstract

The increasing frequency of natural disasters worldwide underscores the need for effective and efficient disaster management systems. Traditional emergency responses in many areas are hampered by slow reaction times, fragmented communication, and manual processes that struggle to coordinate human and material resources during large-scale emergencies. Even brief delays can result in significant casualties. This study introduces a technology-driven Emergency Response and Disaster Management System (ERDMS) designed to address these challenges by integrating real-time communication, data-driven decision-making, and situational awareness through advanced mapping technologies. The system was developed and evaluated using Agile methodology, implemented through rapid iterative cycles with continuous involvement from local government officials, emergency responders, and residents. In this real-time prototyping and testing process, adjustments were made quickly to address emerging requirements. The system's effectiveness was assessed by combining quantitative data from surveys with qualitative insights gathered from interviews and focus group discussions. A total of 53 participants, including residents, LGU personnel, and emergency responders, evaluated the system under simulated emergency conditions. Participants tested the system across various emergency scenarios, providing positive feedback while also identifying areas where certain features could be improved to ensure effectiveness under real-world stress. The feedback was thorough and constructive, allowing the assessment of a significant portion of the system's features, which received 100% positive feedback at a 95% confidence level. The research demonstrates the effectiveness of the proposed framework in enhancing disaster response. Stakeholders rated the system highly on critical attributes, such as alertness, and the development team implemented numerous improvements based on real-time feedback from tests and simulated life-threatening scenarios. While the framework effectively facilitates communication and perception formation among diverse stakeholders, its performance could be further enhanced by integrating advanced augmented reality capabilities.

Keywords: disaster management system, emergency response, agile development, real-time alerts, gis mapping, ai chat assistant