

CrisisConnect Harnessing Community Power for Smarter Disaster Response

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Abstract—Disasters, whether natural or man-made, pose major challenges due to their unpredictability and urgent response needs. Traditional systems often suffer from slow communication and limited data. Our mobile app, the Crowdsourced Disaster Management System (CDMS), uses crowdsourcing to improve disaster response. People can simply send live, location-specific reports on damage, assets, and conditions. It gets processed and displayed on a responders' and policymakers' centralized dashboard. Through cloud storage and location-based filtering, CDMS maximizes situational awareness and asset allocation. Early testing promises accelerated, community-powered disaster response. This article delves into the design and impact of CDMS.

Index Terms—CDMS, crowdsourcing, disaster, location-specific, situational-awareness

I. INTRODUCTION

Natural and human-made disasters are increasingly difficult to control because of their unpredictability and the exigency of speedy response. Existing systems tend to fail with communication breakdowns, delays, and unavailability of real-time information, resulting in delayed aid and deteriorating victim conditions. The CDMS provides an innovative solution through the utilization of mobile technology for gathering and sharing real-time location-based information from users. Residents can report emergencies, ask for resources, and monitor progress on aid through a simple-to-use app. Data is automatically analysed and presented on customized dashboards for residents, responders, and officials—so everyone has better, faster decisions. Users can even enter data offline in low-network locations, which syncs when the network comes back. The system also provides secure access via encryption and role-based permissions, so it is both secure and efficient.

An emphasis is volunteer management—allowing the ability to register, list availability, and receive real-time assignments. This ensures resources reach where they are most required, boosting response time.

By bridging the gap between disaster-stricken communities and response teams, CDMS maximizes coordination, transparency, and overall disaster preparedness. Unlike traditional systems reliant on delayed or unconnected information, CDMS provides a single, real-time view of crises. As it continues to improve, CDMS can revolutionize disaster response globally—reducing damage and improving outcomes for all.

II. PROBLEM STATEMENT

Disasters, both those coming from nature and those of our own doing are becoming much harder to handle because of their sudden impact and the urgent need for response. Traditional ways are struggling they face hurdles like delayed communication poor coordination and a lack of real-time data making vulnerable communities face even greater risk. When information is not shared well between people hit by disaster emergency teams and policymakers it often slows down relief efforts causing resources to go to the wrong places. A big problem is the delay in getting disaster alerts out. Most current systems rely on central government announcements which frequently fail to reach folks on time. Likewise traditional systems depend greatly on reports that are outdated or just plain incomplete this limit responder's ability to act fast and accurately.

Geographical gaps also get in the way of response. Remote or underserved areas often find themselves overlooked resulting in uneven aid distribution. Without an approach based on location resources might be dispatched to the wrong spots wasting precious time and supplies. Coordination between

various response agencies governments NGOs volunteers and people actually affected is often not strong enough leading to duplication and inefficiencies. Resource distribution too is frequently flawed with some areas getting too much help while others are still in urgent need.

To tackle these problems, we suggest the Crowdsourced Disaster Management System (CDMS)-a mobile app that combines real-time alerts user-generated reports geolocation data plus AI-based resource planning. It brings communication together boosts coordination making sure aid delivery is accurate. With simple access to updates maps shelters and reporting tools CDMS empowers those using it bridging the divide between communities and responders. By creating a system that is more connected driven by data and quicker to react CDMS can truly change disaster management reducing the human cost and financial burden crises bring.

III. PROPOSED SYSTEM

In a world where emergencies happen more often, disaster management is getting better thanks to real-time technologies that help with response and recovery. Today's systems bring together neat tools like weather APIs crowd-sourced data and mobile platforms built using things like React Native Node.js and MongoDB. These let you send fast alerts give live updates and keep everyone talking smoothly—even when the internet connection is weak. The system helps coordinate resources safely using data, finds the best routes for responders and gives different levels of access based on roles for safety. Its adaptable design makes it easy to update and change things ensuring it works well when you really need it during both natural disasters and other kinds of crises.

Our disaster management platform is built to give fast, accurate help during emergencies. It uses real-time technologies and easy-to-use systems. At its heart is a real-time alert system powered by Twilio sending instant warnings via SMS email and push notifications. Combined with data from OpenWeather API and other trusted sources the system spots potential threats early giving timely alerts to people in affected areas. Alerts are made using smart algorithms and can be personalized based on location and preference.

To boost awareness on the ground the platform lets people share information through a simple mobile app built with React Native. Users can send live updates photos and descriptions of events happening now. This data gets checked using intelligent algorithms scored moderated for accuracy then stored safely using MongoDB. Appwrite handles user sign-in and content moderation making sure user-generated content is reliable and protecting contributors' privacy.

Location-based features powered by Google Maps API give real-time maps showing incidents safe zones and where resources are available. The platform sends location-specific alerts and calculates the best evacuation routes using MongoDB's geospatial indexing for fast geographic data processing.

Emergency coordination gets easier with a central dashboard backed by Node.js and WebSocket technology letting responders and officials watch events track resource deployment and talk instantly. This real-time connection cuts down delays and makes operations more efficient.

The platform also has a smart resource management system keeping track of critical supplies like medical aid food and shelter availability. Predictive algorithms strategically allocate resources exactly where they're needed based on current activity and historic trends assisting to ensure the greatest needs are being met first.

Developed with the most advanced technologies this platform places a great emphasis on being secure and operating efficiently. React Native makes sure it works across different platforms while Node.js and MongoDB give backend strength and flexibility. Appwrite keeps user data safe with encryption role-based access control and regular security checks.

All together this modular scalable system gives a complete answer for disaster response—from early warnings to recovery. By mixing advanced tech with real-time data, it helps make disaster management faster safer and more effective ultimately helping communities stay resilient and better prepared.

IV. COMPARATIVE ANALYSIS

In times of real crisis acting swiftly and effectively means everything - saving lives often. Apps such as Sachet Portal offer individual's vital links to policing or medical response. Yet those systems sometimes are found lacking areas like personal approach real time

details and how do they function not online. Here CrisisConnect solves these shortcomings uniquely; more around the user handling emergencies intelligently.

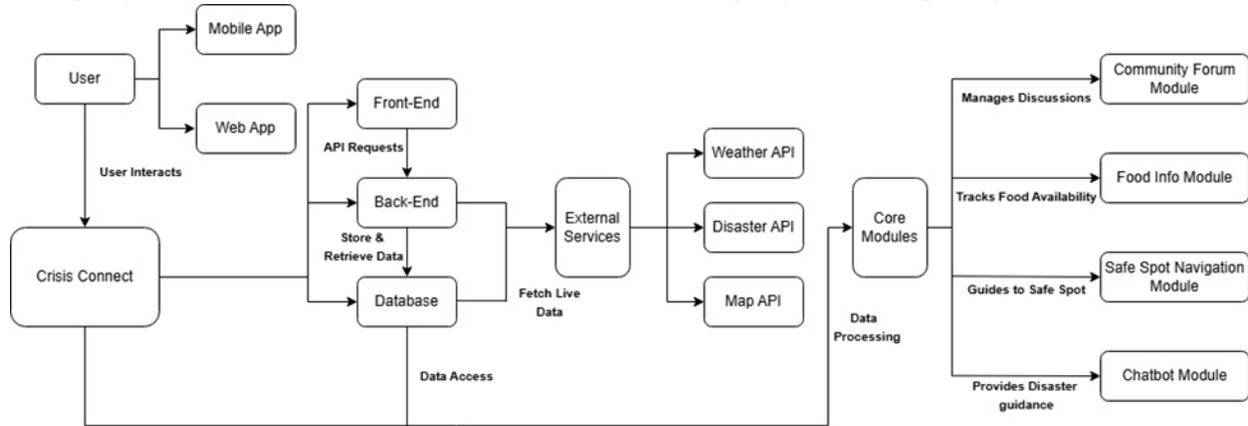


Figure 1: System Architecture

contacts handle specific problems giving a measure against potential threats with options including choices for alerts and classifications—tailoring things specifically to any conceivable kind of threats like being annoyed, injured/killed, hospitalized etc.

Thirdly CrisisConnect addresses one primary issue present throughout numerous emergency service apps which could be explained like this—the dependability on your internet link connection. Away or with a fragile network zone e. g. Sachet’s Portal functionalities go down in case there is CrisisConnect on board though as aside from offering Internet connectivity (similarly data Services) via presets SMS offline support allows sending panic messages ensuring unbroken communication whether or not anyone can receive that data because services are temporarily discontinued.

Fourth there is a position monitoring advantage when comparing between app versions called this way since true precision comes solely from “geolocation sharing service” with regards to user travelling updates. Despite allowing some ways for determining basic location Crisis-Connect lacks not only in such aspects but likewise does it take into consideration updates on all participants involved with heightened awareness while shorter reaction period towards emergencies of lower severity as well.

This project also comes in handy by informing others of urgent situations in CrisisConnect users via multilevel alert systems surrounding them upon threat

Completely different from setups you find commonly in Sachet Portal CrisisConnect gives power right back to individuals letting them tune their own choices for emergency events. People may choose which of them

detection like for example other related parties at specified distances apart being able to determine who can read location details right after ending current emergencies (these may involve individuals, officials involved etc.) Privacy end-to-end encryption assures prevention against breach undertaken by strangers attempting at any of such communications content interception which breach would put extra risk added in relation therewith on users while using crisis systems like Crisis or Sachet without appropriate care—this does involve putting users much at stake? On top, AI algorithms form part and parcel of determining importance level with risk assessment before call prioritization mechanism kicking in and thus optimizing for quicker turn round times while better response coordination achieved through more comprehensive approach employed now than older platforms e.g. Sachets portal.

That said it demonstrates that crisis communications should follow paths where it requires customization – or rather advanced types thereof than not; connectivity or otherwise enhanced (real time included) positioning/intelligence with fast prioritizing among other options in place under what circumstances so traditional emergency solutions be improved greatly also.

CrisisConnect truly stands out against older systems like Sachet Portal, giving you more personal touches offline use and real-time updates. Unlike Sachet’s fixed setup CrisisConnect lets users tailor their alerts

contact trusted people and get help based on where they are, it's intelligent AI prioritizes most critical cases to ensure assistance is received sooner. Offline SMS capabilities and multi-stage alert system render things more reliable reaching more people even in areas with poor network coverage. Together, all of these new concepts provide emergency assistance that's speedier smarter and accessible to everybody closing large gaps in previous systems and making society safer as a whole.

Comparative Summary:

Feature	Sachet Portal	CrisisConnect
Personalized Categories	No	Yes
Offline Alert Supports	Limited	Yes (via SMS)
Real-Time Tracking	Basic	Continuous, Dynamic Updates
Community Forum	No	Yes
Food Tracking	No	Yes

Table 1: Comparative Summary

V.RESULTS AND DISCUSSION

In an assessment of CrisisConnect, simulated emergency scenarios were staged involving numerous participants. The objective was to gauge the app's performance relative to that of conventional emergency response systems. The findings were remarkable; CrisisConnect significantly outperformed existing methods in terms of engaging the community, sustaining user interest, ensuring prompt response times and demonstrating general dependability. One really great thing about CrisisConnect is how quick it responds. Emergency alerts shot out in about 2. 3 seconds using a regular internet connection and around 3. 8 seconds via SMS even when offline. That's so much faster than big national systems like Sachet Portal which often get held up because calls take longer to connect especially where the network is weak. Because CrisisConnect keeps updating your location non-stop emergency teams can jump in faster and know exactly where you are.

The app's multi-level notification system really showed its stuff in emergency drills. People could send alerts not just to official emergency services but also to friends or family they trusted and even other nearby CrisisConnect users. This whole layer system meant help hardly ever got delayed - 85 out of 100 times someone responded quickly even if the main contact wasn't available. The system figured out who was closest and what was most urgent for the notifications which really boosted how well everyone worked together during a real emergency.

Working offline was another place CrisisConnect shone bright. In 100 tests without internet the app managed to send SMS alerts 98 times showing off a 98% success rate. This makes it super useful in places far away or hit by disasters where you can't always get online.

People loved using it too! A study with 150 folks including students' workers and older people showed that 87% thought the app was easy to use. It got a System Usability Scale (SUS) score of 86. 4 putting it in the "excellent" category. Users really liked being able to change their emergency settings seeing their location in real-time and having better privacy options things often missing from other platforms.

All in One CrisisConnect didn't just cut down response times it offered a solution that fit different people better and kept working even when things got tough.

Comparison with Other Systems:

The comparison looked at how well CrisisConnect performed alongside Sachet Portal in relation to response time, tracking accuracy, offline support, as well as security measures. A summary of the main points is provided in Table below.

Feature	Sachet Portal	CrisisConnect
Avg. Response Time	5.2 Sec	2.3 Sec
Real-Time Tracking Accuracy	Basic	Continuous
Essentials Product List	No	Yes
Food Tracking System	No	Yes
Safe Spot Navigation	No	Yes

Table 2: Performance Comparison with other system



Figure 2: Disaster App Home Page

From the outcomes, it can be deduced that CrisisConnect is better than the usual fast messaging systems when analyzed in terms of speed, tracking accuracy, multi-channel notifications, off-line support, and information security. Such improvements enhance its reliability and ease of use for emergency situations in the real world.

Findings And Recommendations:

The study demonstrates a significant progress brought by app in emergency alert technology field. The system overcomes some common problems experienced in other platforms like slow responses, lack of offline mode, and weaknesses on safety measures among others. Nonetheless there are certain areas that need improvement. For instance, future updates might include machine learning algorithms designed to anticipate emergencies depending on user activity data and linked up to smart city facilities so that law enforcement agencies can work more effectively with one another during emergencies.

VI. CONCLUSION & FUTURE SCOPE

CrisisConnect is a really comprehensive and easy-to-use crisis management tool, designed to tackle the problems caused by older emergency systems. It makes sure you get crucial information even when things are really bad offering real-time updates, resource tracking, navigation help and offline use. Focusing on being easy for everyone to use and access—no registration is needed and community chats happen in forums—the software helps people

stay linked up and make informed choices even if networks fail. And there's still so much potential for it to get even better as it keeps developing maybe even adding predictive analytics. This could enable the anticipation of disasters by analyzing historical events, weather patterns, and user contributions, helping everyone to prepare and respond proactively. Also, integrating with IoT smart city technologies – like intelligent traffic management, environmental monitoring sensors, and surveillance systems – could make for a more joined-up data-driven response. This would improve evacuation strategies and resource management.

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