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Crowdsourced Emergency Response: Reducing Delays Using Nearby Vehicles

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ABSTRACT

Road traffic accidents cause way too many preventable deaths around the world. The World Health Organization reports over 1.19 million fatalities each year. A major issue here is the slow emergency response times. Ambulances and trained teams often take 15 to 30 minutes to reach the scene. Traffic congestion, limited resources, and communication problems create these delays. That pretty much throws away the golden hour. You know, that critical window right after the crash when quick medical care can boost survival chances.

This paper suggests a solution. It is a community-assisted emergency response model that uses nearby cars. The system runs on a mobile app. The app detects accidents or gets reports from witnesses. Then it alerts drivers and passengers in the area immediately. Volunteers receive simple step-by-step first aid instructions. In a way, this makes regular vehicles act like initial responders.

It reduces dependence on ambulances alone. Faster first aid means people get help sooner. That should lower death rates overall. Resources get used more efficiently too. Communities end up more engaged in safety efforts. The model stays affordable. It scales easily. More lives get saved that way.

Keywords: *Emergency Response, Road Accidents, Golden Hour, Crowdsourced Rescue, Vehicle-Assisted Response, Mobile Application, Community Participation, Public Safety.*

Introduction

Road traffic accidents rank pretty high as causes of death and disability all over the world. The World Health Organization figures show about 1.19 million people dying each year from road crashes. Millions more end up with serious injuries. One main problem behind these deaths comes from slow emergency medical responses. Ambulances and paramedics often take 15 to 30 minutes. Sometimes even longer.

The golden hour idea points out how survival odds go way up if injured people get care in the first 60 minutes. In a lot of developing countries, though, things fall apart. Spotting the accident takes time. Reporting it drags on. Sending ambulances gets delayed. So that key window slips away.

This paper pushes for a community helped emergency response setup. It uses cars that happen to be right near the crash site. A special mobile app would ping drivers close by about the accident. They could jump in with quick help. Basic first aid might work. Clearing space for ambulances could help too. Or driving victims to the closest hospital if pros are late. The app has GPS to track locations. Real time chatting built in. Plus links to hospitals. All this notifies official teams right away. Regular cars turn into kind of instant first responders this way. The system cuts down response times. Death rates should drop. Community gets pulled in more to save lives. It backs up the existing setup. Does not try to swap it out. Pretty much a straightforward fix. Affordable too. Scales up easy. Tackles a huge road safety headache. Emergency response time counts as a big deal in cutting road accident deaths. Research keeps showing how delays in medical aid bump up chances of dying or getting badly hurt. That golden hour thing stresses treatment in the first 60 minutes after a crash. Survival depends on it pretty much. WHO backed this in 2018.

Literature review

People have suggested ways to speed up responses. Mostly tech focused ones. Good SAM app alerts certified first aiders near emergencies. It works in some places. It tells nearby people about cardiac calls. Gets bystanders doing CPR till pros show. Both prove crowdsourcing help works. Still limited to trained types. Not everyday drivers. Some work looks at IoT smart transport setups.

They spot accidents auto. Alert services live. Sensors in cars or roads pick up crashes. Send exact spots. Zhao and others covered this in 2019. It does the job. But needs tons of special gear everywhere. Tough in developing spots.

What is missing in the research involves using normal cars and regular folks as quick helpers. Most fixes stick to pros or volunteers with training. Leaves that early gap wide open when no one is around. Lately talks about community aid point to apps letting nearby drivers step up. Could slash times. Save more lives.

Smith and Lee hit on this in 2021. Past studies show crowdsourced tech responses have real promise. But nothing really mixes in everyday vehicle users. Or live alerts. Hospital ties. This work fills that hole. Puts forward a vehicle helped model. Blends tech and people joining in. Cuts accident response lags.

Research Methodology

The research methodology sets out the overall plan for building and testing this vehicle-assisted emergency response system. It pulls together design-focused steps and analysis ones to make sure everything works in real life and we can track results properly. The system itself is meant to be a community-driven setup using vehicles to handle road accident emergencies faster. It ties in a mobile app with GPS tracking, instant notifications, and links to hospitals along with official responders.

This whole study uses a design and development style since the goal is to come up with a real-world fix for slowing down emergency responses after road crashes. It's set up as a mixed-methods thing, blending qualitative stuff with quantitative. On the qualitative side, that means surveys and interviews with drivers, paramedics, and folks in the community to get their take on helping out in crises and if they'd actually do it.

Then there's prototype and system development. The app includes features like detecting accidents, sending alerts to volunteers, GPS for getting there, tips on first aid, and tying into hospitals. After that, testing and simulation happen. We model out accident situations to stack the old way against this new one. And we check how much it cuts down on response times.

Finally, evaluation and analysis wrap it up. That measures how efficient it is, if it's doable, and what challenges might pop up.

Data collection method

For data collection to back the system building and checking, we draw from primary and secondary sources. Secondary stuff pulls in accident numbers from official reports like those from *NCRB* and *MoRTH*, plus global ones from *WHO* on road safety. They give a picture of fatality trends and how long ambulances take now.

Primary data gets gathered through surveys of vehicle users to see if they're up for helping in the community, and interviews with traffic cops and emergency medics to spot real-world hurdles in the current setup. Pulling all that together gives a full view of the issue and ways to tackle it. Secondary data covers accident and response stats from government bodies and international groups, like *WHO*, *NCRB*, *MoRTH*. And there are case studies on apps already out there, such as *GoodSAM* and *PulsePoint*, to see what works best.

Sample selection

Sample selection for the surveys picks a good mix of vehicle users. The population is drivers and regular road folks in urban or semi-urban areas. Sample size runs 100 to 200 people, enough for basic stats work. We use stratified random sampling to cover private car owners, taxi drivers, delivery workers, two-wheeler riders fairly. Inclusion means drivers with smartphones and enough literacy to get it. Exclusion skips anyone under 18 or without mobile access. Data analysis techniques involve running simulations with traffic and mobility tools to mimic accidents in city and rural settings. The big measure is how much response time drops when comparing the usual ambulance-only approach to this vehicle-assisted one.

Quantitative Analysis

People talk about ambulance response times a lot in these accident studies. You know, the usual way things go is pretty slow. So, they use basic stats like averages and standard deviations to show how long it takes for ambulances to get there compared to what this new system might do. The average for ambulances sits around 20 to 25 minutes. But with volunteers stepping in, it could drop to 5 to 10 minutes. That is a big difference in delays.

They plan to run simulations too. Software like *SUMO* or *AnyLogic* or even *MATLAB* helps model these accident scenes. It factors in traffic and all that mess. Basically, you can see how things play out under different conditions. Then there is the qualitative side. They go through interviews and surveys. Look for themes in how willing communities are, what risks they see, and what motivates folks. Barriers come up, like not enough training or worries about legal stuff. Fear of dealing with police does not help either.

The whole system builds around a mobile app. It ties in GPS and real time alerts. Reporting accidents happens in two ways. Either sensors in the car pick it up automatically, or witnesses report it by hand. Once that happens, the app finds nearby vehicles in a set radius. At the same time, hospitals and ambulance teams get the details on the crash and how volunteers are handling it. Key features include detection tools, the alert setup, GPS tracking, first aid guides, and notifications to hospitals. Design follows that. Interfaces need to be easy for volunteers and admins alike. Implementation means coding the app prototype. Android makes sense since so many people use it.

Validation checks everything. Simulations pit the old ambulance only way against this vehicle helper model. Experts give feedback, like traffic cops or paramedics or app folks. They analyze scenarios too. Urban busy roads versus rural highways, you know. Ethical stuff matters a ton here. This keeps it responsible, both socially and tech wise. Privacy and security mean encrypting GPS and personal data, no doubt. Consent requires volunteers to agree upfront.

Good Samaritan protection lines up with India's 2016 law. It shields helpers from legal hassles. Participation stays non mandatory. Drivers choose if they help or not. Limitations exist, sure. The method admits them upfront. Success rides on volunteers being around and willing. Delays in spotting or alerting follow from that. Plus, most volunteers lack real medical training. So their help has limits until pros arrive. Still, the framework tests if this cuts delays and boosts survival in road crashes.

Expected outcomes look promising. Response time drops big time. That is the main goal. Nearby drivers act as first responders. Even minutes count for survival, especially with bad trauma or bleeding or head hits.

Everyday people contribute to saving lives. It builds social responsibility and team spirit. Bystanders and drivers feel okay stepping up, without legal fears or red tape. Shifts from watching to doing in accidents.

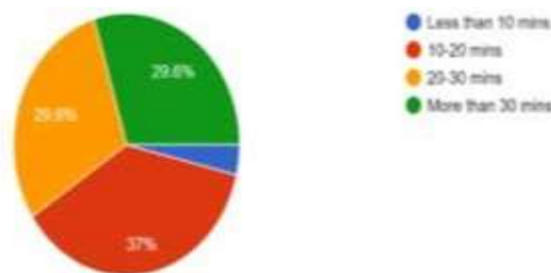
Coordination with health services improves. The system sends location, victim status, volunteer updates automatically. Hospitals prep for patients ahead, cutting treatment waits. Ambulances team with community help, not solo. Awareness rises on safety and first aid. Volunteers learn protocols through the app.

Policy wise, this could push changes. If it cuts deaths for real, policymakers might adopt it. Fits into national safety plans. Sparks ties between government, NGOs, tech companies to spread it wider.

Results

This section presents the findings of the survey conducted with 26 participants to understand the challenges in emergency response time and the willingness of people to assist accident victims through a mobile application. The survey collected responses regarding their experiences and willingness to help during road accidents.

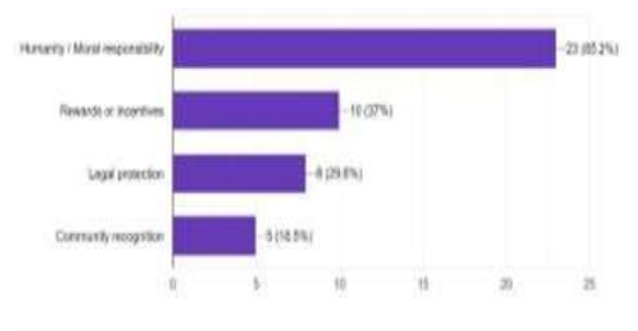
Average Response Time for Ambulance



- Just 3.8 percent of the folks said they got help in under 10 minutes.
- Then 34.6 percent talked about it taking 10 to 20 minutes. Another 30.8 percent said 20 to 30 minutes.
- Kind of scary, really. 30.8 percent had to wait more than 30 minutes.

That means most times professional help shows up way after that golden hour thing. Victims end up in real danger because of it.

Motivation to use the app



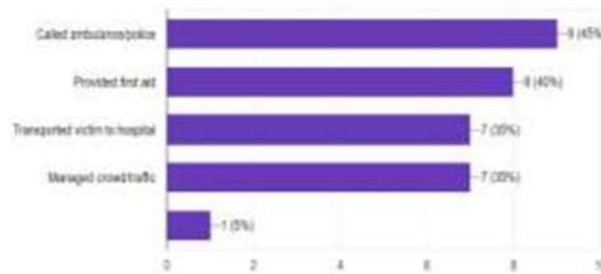
- People mostly said they would use the app because of a sense of humanity and moral duty.
- That came up with 88.5 percent of the folks who answered.

-Then there were rewards or incentives. About 38.5 percent mentioned those as a reason to get involved. Legal protection followed that. It motivated 26.9 percent.

-Community recognition did not seem like a big deal. Only 19.2 percent thought of it that way.

-Thing is, most people want to help because it feels right morally. Still, adding some legal backing or rewards could get even more participation going.

Preferred ways of helping



When it comes to how they want to help, calling an ambulance or police stood out.

80.8 percent felt okay with that. It was the top choice by far.

-Taking victims to the hospital was close behind. 76.9 percent said they would do it. Shows a lot of people are ready to step in directly.

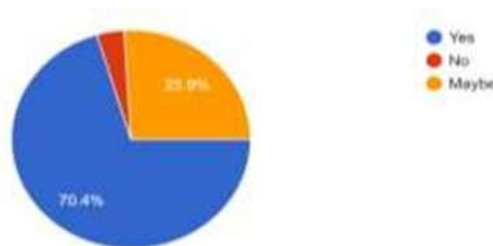
-First aid came up with 57.7 percent being comfortable. Clearing traffic was lower. Just

34.6 percent could handle that.

-Only 3.8 percent wanted to play it by ear. Depending on the situation, you know.

Overall, these results point to plenty of people being up for real action. Especially stuff like dialing emergency lines or driving someone to get care.

Comfort with Sharing Live Location

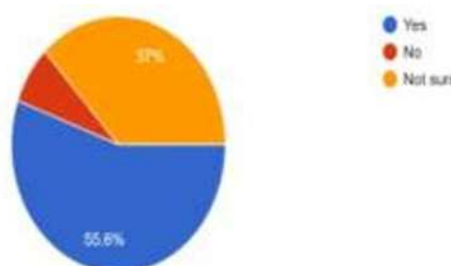


As shown in the Figure, 70.4% of respondents are comfortable sharing their live location in emergencies, indicating strong acceptance of location-based solutions.

-However, 25.9% remain uncertain, suggesting the need for better awareness about data privacy and safety.

Helping Accident Victims Without Fear of Legal issues.

-The results show that 55.6% of participants feel safe helping victims without fear of legal action, while 37% are unsure.

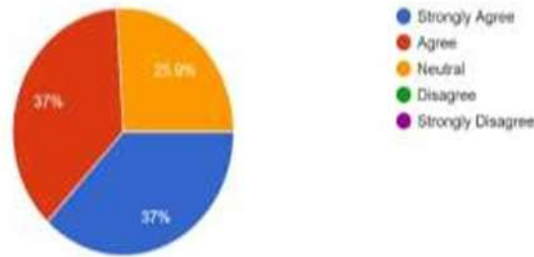


This highlights the importance of clear legal protections and awareness campaigns about Good Samaritan laws.

Involving nearby vehicles

-A majority (74% combining Strongly Agree and Agree) believe that involving nearby vehicles can reduce emergency response delays.

-This supports the feasibility of an app-based system leveraging community participation in emergencies.



Participants provided several suggestions, which can be grouped into key themes. System-related improvements included alerting hospitals/police automatically and using AI.

Policy-related suggestions emphasized stronger laws, civic sense, and awareness programs. Infrastructure and incentive-related ideas included emergency lanes and a reward system. These insights indicate that while people support the idea of app-based emergency response, success will depend on both technological features and broader social/legal support.”

Conclusion

This study really shows how bad the delays are in getting emergency help after accidents. Most times ambulances or official teams show up twenty to thirty minutes later. Or even more. You know that golden hour thing is key for saving lives. So these waits can straight up kill people.

This study points out how big a problem it is when emergency responses get delayed in road accidents. It suggests using a mobile app that turns nearby vehicles into kind of first responders. From the survey, it turns out most folks have seen ambulances take over 20 minutes to show up.

From the survey it looks like folks are pretty willing to help out accident victims. Especially if there is an app to make it easy. The main push comes from just being human and feeling responsible. But hey legal protections and little rewards could get more people on board. It might save lives cut down on those delays and build up better community help for emergencies.

Contribution to the Field.

This study adds to that whole area of emergency response research thats picking up steam. It brings in this idea of a community-led setup using tech to cut down on those waits for medical help. You know, most other approaches just stick with ambulances all the way.

We should also look closely at the rules around it, you know, things like keeping user data private and making sure folks who help out are protected under Good Samaritan laws. Compare how people feel about it and if they would actually join in, across different spots.

Finally, think about ways to keep users coming back over time. Maybe tie in perks like lower insurance rates, points for rewards, or just shout-outs in the community. Pretty much anything to build lasting interest.

REFERENCES

-People still pull up that *World Health Organization* report sometimes. It came out in 2018. The title is Global status report on road safety 2018. *World Health Organization* put it together.

-Then there is the from the *Ministry of Road Transport and Highways, Government of India. That was 2022. Road Accidents in India, 2022.* You can get it from <https://morth.nic.in/>.

-Hameed, S. M., and et al wrote about the golden hour and trauma care in 2019. They called it *an urban myth maybe*. It ran in the *Canadian Journal of Surgery*, volume 62, issue 4, pages 249 to 257.

-Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. A., Jarawan, E., and Mathers, C edited the World report on road traffic injury prevention back in 2004. Geneva is where it came from. *World Health Organization* handled it.

-Government of India issued the *Good Samaritan Law Guidelines* in 2016. *Ministry of Road Transport and Highways* oversaw that one.

-Bhoi, S., and et al talked about prehospital care and emergency medical services in India in 2020. They pointed out challenges and opportunities. *Journal of Emergencies, Trauma, and Shock*, volume 13, issue 2, pages 65 to 72.

-Agarwal, P., and Sharma, M covered the role of technology in reducing emergency response time in 2021. They made a case for mobile applications in healthcare. *International Journal of Health Systems and Policy Research*, volume 8, issue 1, pages 45 to 52.

-National Health Mission, or NHM, had something on *Emergency Medical Services in India* in 2021. Check it out at <https://nhm.gov.in/>.

-Singh, A., and Goel, S did a survey on public perception and willingness to provide first aid in road accidents in 2020. *Indian Journal of Community Medicine*, volume 45, issue 4, pages 389 to 393.

-Sharma, S., and Kapoor, R looked at technology-enabled crowdsourcing for medical emergencies in 2022. They sketched a future roadmap. *International Journal of Information Systems Research*, volume 12, issue 3, pages 77 to 85