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A Review Paper on: Design and Development of Volunteer Based Artificial Intelligent Powered Post Accident Alert System

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Abstract

In current scenario the mobility of vehicles increases in the proportion of the population. Due to the traffic congestion, the accidents are also increasing day by day. This causes the loss of life or traumatic injuries and disfigurements due to the delay in the arrival of ambulances to the accident spot or from the accident spot to the hospital. The main idea is to build an application that makes adoption of the smart phones, embedded system and Artificial Intelligence. For detecting any collision if there is a sudden external disturbance in the speed with the help of the Sensors based Algorithm will act. The application continually reads the data from the smartphone's sensors and sends the data to the cloud. If the alert message is unattended for more than 10 seconds, the" request for help" message will be sent to the volunteers, Ambulance, police and family members. The proposed system comprises two phases: Accident detection and Notification phase. For the accident detection phase, a smartphone application has been fully implemented. For the notification phase whenever an accident occurs, the website receives the information regarding the accident. The website shows the details of the accident such as the information of driver and vehicle. A web-based system has been implemented for use by hospitals. The programming part is an Android application introduced in drivers Smartphones which is used to get the location point by point based on longitudes and latitudes.

Keywords: *Artificial Intelligence, Post Accident Alert, cloud storage, GPS Integration.*

1. Introduction

A Life-Saving Initiative Road accidents are among the leading causes of death in the world, resulting in massive loss of life, economic burdens, and emotional trauma.This project will bridge this gap by developing a Volunteer-Based AI-Powered Post-Accident Alert System, which will utilize advanced technology and community involvement to ensure timely intervention. The system will work on two levels: the phase of accident detection, then the activation of responses. The AI-powered algorithms analyze sensor data from sensors, smartphones, and infrastructure in general, including CCTV cameras. It detects an accident based on identifying sudden deceleration or sharp impacts of objects. This has a greater degree of accuracy for lessening false alarms, hence enabling prompt identification. Jagatheesaperumal et al. (2024) demonstrated how AIoT enhances smart city transportation safety through real-time monitoring, predictive analytics, and intelligent decision-making. [1] Aboualola et al. (2023) surveyed the integration of edge technologies with disas ter management systems, focusing on the role of social media and AI. [2] Reddy et al. (2024) proposed a novel AI-based emergency response and disaster management system. [3] Martin and Free land (2021) examined the advent of artificial intelligence in space activities, identifying new legal challenges in their study. [4] Gharghan and Hashim (2024) provided a comprehensive review on elderly fall de tection using wireless communication and AI techniques. [5] Chengula et al. (2024) discussed the enhancement of advanced driver assistance sys tems (ADAS) through explainable AI for driver anomaly detection. [6] Giannakidou et al. (2024) conducted a comprehensive survey on the utilization of AI and IoT in forest fire prevention, detection, and restoration. [7] Chenais et al. (2023) examined the applications of artificial intelligence in emergency

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medicine. [8] Yang and Kar (2023) focused on the application of artificial intelligence and ma chine learning in the early detection of adverse drug reactions (ADRs) and drug induced toxicity. [9] Bol´on-Canedo et al. (2024) provided a comprehensive review of green artificial intelligence, exploring how AI can be designed and implemented to promote sustain ability. [10] Mu et al. (2024) explored the integration of artificial intelligence, big data, and the Internet of Things (IoT) in food safety systems.[19] [24] [25]

1.1.Accident Detection Through Sensors

Gyroscope Readings: The gyroscope measure angular velocity based on the Coriolis effect. In a MEMS gyroscope, when rotated, a vibrating mass is dis placed, which is proportional to the angular velocity. This displacement is measured using either a capacitive or piezoelectric method.

Formula:

Impact Force: The impact force during an accident is very important for the detection of crashes, as it indicates sudden deceleration. High impact forces due to sudden changes in velocity signal severe collisions.

Formula:

$$F = m \cdot a$$

Velocity Calculation: The calculation of velocity in accident detection helps in assessing the severity and nature of collisions.

Formula:

$$v = u + a \cdot t$$

Kinetic Energy: Calculating kinetic energy in accident detection helps assess the severity of a collision. Kinetic energy, which depends on vehicle speed and mass, determines the force involved in the impact. By analyzing this energy, safety systems can predict potential damage, trigger protective measures like airbags, and optimize crash response strategies.

Formula [9-11]

Distance Using GPS Coordinates: Calculating distance using GPS coordinates in accident detection helps in giving the accurate location of the site where a crash occurred.

Formula (Haversine equation)

$$d = 2 \cdot R \cdot \arcsin\left(\sqrt{\sin^2\left(\frac{\Delta\phi}{2}\right) + \cos(\phi_1) \cdot \cos(\phi_2) \cdot \sin^2\left(\frac{\Delta\lambda}{2}\right)}\right)$$

1.2.Mobile Messaging Service

It needs advanced sensors like gyroscopes and accelerometers that basically monitor any weird movement or impact that may define an accident. These sensors will detect sudden changes in orientation or abnormal acceleration of the vehicle, which could potentially trigger an alert. AI algorithms will analyze this sensor data to differentiate between normal vehicle activity from accident-like conditions.

1.3.Figures

The SMS is delivered automatically, ensuring rapid and precise communication with emergency responders or contacts.In case the victim is not in a position to convey information, the system will ensure help reaches the right place. (Figure 1) [13-15]

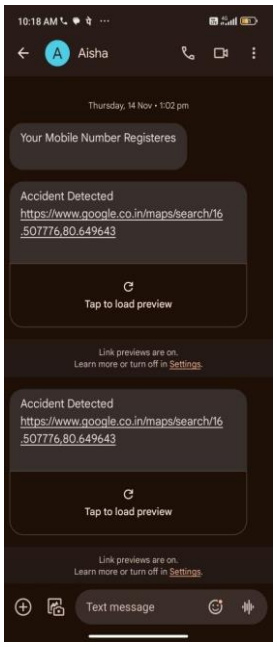

Figure 1 MMS Alert to Volunteer

2. Results and Discussion

2.1.Results

The post-crash alert system provides an integrated solution to the fast notification of emergency contacts and responders in case of a crash. Equipped with advanced sensors like gyroscopes and accelerometers, the system continuously monitors the movement of the vehicle to detect any irregularity that may suggest an accident. [15-17]

2.2.Discussion

The Volunteer-Based Artificial Intelligent Powered PostAccident Alert System epitomizes the new ways

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of filling huge gaps in accident response mechanisms. Advanced artificial intelligence, embedded hardware, mobile technologies, and community-driven participation for immediate, scalable, and efficient emergency response merge into one in this project. Successes and challenges with regard to the holistic impact on lifesaving and emergency management were discussed in the following discussion, while looking at future opportunities.Furthermore, because its clear emphasis is on volunteer-driven assistance, it is a more cost-effective alternative for resource-poor regions. (Figure 2) [18-19]

Figure 2 Live Location Tracking via Mobile

Conclusion

The volunteer-based AI-powered post-accident alert system is bound to change the face of road safety. Using AI and IoT technologies, the system can quickly detect accidents and send trained volunteers to the site for immediate assistance. This will reduce response times by a significant margin, thus reducing injuries and fatalities. Moreover, the system will be able to collect vital data regarding accident patterns that would aid in data-driven strategies for the improvement of road safety. It also builds further on civic responsibility and knits closer ties within the community. [20-22]

Acknowledgements

The novelty of such a system encourages further developments in related technologies for different fields. Furthermore, the model relying on volunteers creates a low-cost solution that optimizes resources by reducing operational costs.

References

The References section must include all relevant published works, and all listed references must be cited in the text. References should be written in the order of they appear in the text. (E.g., W. Mu, G. A. Kleter, Y. Bouzembrak, E. Dupouy, L. J. Frewer, F. N. Radwan Al Natour, and H. Marvin, “Making food systems more resilient to food safety risks by including artificial intelligence, big data, and internet of things into food safety early warning and emerging risk identification tools,” Comprehensive Reviews in Food Science and Food Safety, vol. 23, no. 1, p. e13296, 2025.)

Journal Reference Style

[1]. S. K. Jagatheesaperumal, S. E. Bibri, J. Huang, J. Rajapandian, and B. Parthiban, “Artificial intelligence of things for smart cities: advanced solutions for enhancing transportation safety,” Computational Urban Science, vol. 4, no. 1, p. 10, 2024.

[2]. M. Aboualola, K. Abualsaud, T. Khattab, N. Zorba, and H. S. Hassanein,“Edge technologies for disaster management: A survey of social media and artificial intelligence integration,” IEEE Access, 2023.

[3]. M. S. Reddy, C. Vamsi, and P. Kathambari, “Rescue me: Ai emergency response and disaster management system,” in 2024 2nd International Conference on Artificial Intelligence and Machine Learning Applications Theme: Healthcare and Internet of Things (AIMLA). IEEE, 2024, pp. 1–5.

[4]. N. Papyan, M. Kulhandjian, H. Kulhandjian, and L. Aslanyan, “Ai-based drone assisted human rescue in disaster environments: Challenges and opportunities,” Pattern Recognition and Image Analysis, vol. 34, no. 1, pp. 169–186, 2024.

[5]. S. K. Gharghan and H. A. Hashim, “A comprehensive review of elderly fall detection using wireless communication and artificial intelligence techniques,” Measurement, p. 114186, 2024.

[6]. T. J. Chengula, J. Mwakalonge, G. Comert, M. Sulle, S. Siuhi, and E. Osei, “Enhancing advanced driver assistance systems through explainable artificial intelligence for driver anomaly detection,” Machine Learning with Applications, vol. 17, p. 100580, 2024.

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https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2025.0343

[7]. S. Giannakidou, P. Radoglou-Grammatikis, T. Lagkas, V. Argyriou, S. Goudos, E. K. Markakis, and P. Sarigiannidis, "Leveraging the power of internet of things and artificial intelligence in forest fire prevention, detection, and restoration: A comprehensive survey," Internet of Things, vol. 26, p. 101171, 2024.

[8]. G. Chenais, E. Lagarde, and C. Gil-Jardine, "Artificial intelligence in´ emergency medicine: viewpoint of current applications and foreseeable opportunities and challenges," Journal of Medical Internet Research, vol. 25, p. e40031, 2023.

[9]. S. Yang and S. Kar, "Application of artificial intelligence and machine learning in early detection of adverse drug reactions (adrs) and druginduced toxicity," Artificial Intelligence Chemistry, p. 100011, 2023.

[10]. V. Bolon-Canedo, L. Mor´ an-Fern´ andez, B. Cancela, and A. Alonso-´ Betanzos, "A review of green artificial intelligence: Towards a more sustainable future," Neurocomputing, p. 128096, 2024.

[11]. W. Mu, G. A. Kleter, Y. Bouzembrak, E. Dupouy, L. J. Frewer, F. N. Radwan Al Natour, and H. Marvin, "Making food systems more resilient to food safety risks by including artificial intelligence, big data, and internet of things into food safety early warning and emerging risk identification tools," Comprehensive Reviews in Food Science and Food Safety, vol. 23, no. 1, p. e13296, 2024.

[12]. R. Gupta, S. Kumari, A. Senapati, R. K. Ambasta, and P. Kumar, "New era of artificial intelligence and machine learning-based detection, diagnosis, and therapeutics in parkinson's disease," Ageing research reviews, p. 102013, 2023.

[13]. D. Patil, N. Rane, and J. Rane, "Emerging and future opportunities with chatgpt and generative artificial intelligence in various business sectors," The Future Impact of ChatGPT on Several Business Sectors, pp. 242– 293, 2024.

[14]. F. K. Sufi and I. Khalil, "Automated disaster monitoring from social media posts using ai-based location intelligence and sentiment analysis," IEEE Transactions on Computational Social Systems, 2022.

[15]. S. Divya, S. Panda, S. Hajra, R. Jeyaraj, A. Paul, S. H. Park, H. J. Kim, and T. H. Oh, "Smart data processing for energy harvesting systems using artificial intelligence," Nano Energy, vol. 106, p. 108084, 2023.

[16]. C. Surianarayanan, J. J. Lawrence, P. R. Chelliah, E. Prakash, and C. Hewage, "Convergence of artificial intelligence and neuroscience towards the diagnosis of neurological disorders—a scoping review," Sensors, vol. 23, no. 6, p. 3062, 2023.

[17]. Ishtiaq, Z. Saeed, M. U. Khan, A. Samer, M. Shabbir, and W. Ahmad, "Fall detection, wearable sensors & artificial intelligence: A short review," JAREE (Journal on Advanced Research in Electrical Engineering), vol. 6, no. 2, 2022.

[18]. K. F. Bram-Larbi, V. Charissis, S. Khan, D. K. Harrison, and D. Drikakis, "Improving emergency vehicles' response times with the use of augmented reality and artificial intelligence," in HCI International 2020–Late Breaking Papers: Digital Human Modeling and Ergonomics,

[19]. Mobility and Intelligent Environments: 22nd HCI International Conference, HCII 2020, Copenhagen, Denmark, July 19–24, 2020, Proceedings 22. Springer, 2020, pp. 24–39.

[20]. A.-S. Martin and S. Freeland, "The advent of artificial intelligence in space activities: New legal challenges," Space Policy, vol. 55, p. 101408, 2021.

[21]. S. Bharati, M. R. H. Mondal, P. Podder, and U. Kose, "Explainable artificial intelligence (xai) with ioht for smart healthcare: A review," Interpretable Cognitive Internet of Things for Healthcare, pp. 1–24, 2023.

[22]. S. de Vries, F. van Oost, H. Smaling, N. de Knegt, P. Cluitmans, R. Smits, and E. Meinders, "Real-time stress detection based on artificial