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AI Driven QR Accident Alerts with Blockchain for Enhanced Security

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ABSTRACT

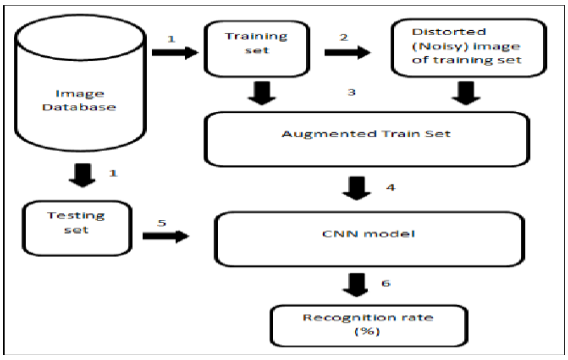
Now a days Road accidents are a major global concern, resulting in significant loss of life and property. Current emergency response systems often face challenges such as slow response times, inaccurate information, and privacy concerns i.e Data breaches, unauthorized access to personal information, and lack of user control over data sharing pose significant privacy risks. To address these challenges, we proposed a AI-Driven QR Accident Alerts with Block Chain. QR for road accident is an innovative communication platform that facilitates efficient and secure interaction between vehicle owners and the broader community. The platform serves as a responsive solution during critical situations, effectively tackling a spectrum of issues, from road accidents, and potential security threats. Our System deals with Message Alert, Reporter Authentication, Blockchain for storage.

This approach provides an ability for the public to inform the victim's family members at the time of road accidents using web application. This application motive is to make reach of information to the family members in short time span. This application will serves as an another approach to alert and identify the victim's family members during the failure of approaches facial based or fingerprint based recognition of victim's family for the police officials.

Keywords: Road accident, QR codes, Accident alerts, AI authentication, Blockchian storage,

I. INTRODUCTION

QR and Web based road accident alert uses the deep learning and blockchain for the secure authentication and storage of user's information. Deeplearning for the facial based authentication of the informer at the time of alerting the victim's family and Blockchain for the tamper-proof storage of the user's information. Using QR code for the quick and reliable identification of victim's information from broad number of users.



Road accidents are getting frequent due to faster movements of vehicles on roads, emergency accident alerts to the victim's family is crucial during road accidents, the reach information about the victim's to their family at time of road accidents may delay because of lack of enough information to contact. Authentication of informer is to avoid the mischievous alerts and Blockchain based storage to secure and immutable data storage of the app user's.

1. 1 PROBLEM STATEMENT

At the time of road accidents the time of reach of information to the victim's family is getting delay, using qr and web based system make reduce time delay and easy of alerting the victim's family about the person who met with an road accident for faster response using public.

1. 2 RESEARCH GAPS

- No Authentication of bystander while reporting the road accidents to emergency contacts.
- Not using blockchain database for secure
- storage of user's information.

- Not Providing an alternative approach to alert emergency contacts after road accidents occur for the public.
- Using non cost effective IOT devices to alert during road accidents.
- Chance of Unsuspectible alerts about the accidents.

II LITERATURE REVIEW

[1] Mr. Yash Chorwahe, et.al(2024): In this article, authors proposed an application and qr code to send alerts to hospitals, police and emergency contacts using bystanders during accidents.

[2] Dr. Vijaysinh, et.al (2024): In this article, authors proposed a platform serves as a responsive solution during critical situations, effectively tackling a spectrum of issues, from wrongful parking and road obstructions to abandoned vehicles, hit-and-run incidents, and potential security threats using a qr tags.

[3] Namballa Saikumar, et.al(2023): In this article, authors proposed a Android application in which the user can easily coordinate and maintain all of the relevant facts about a car (such as the registration certificate, insurance, and vehicle's Pollution Under Control Certificate) using a IOT device, For the vehicle's credentials the authority or public must scan a unique QR-Code issued separately for each vehicle to alert.

[4] Vinu Sherimon, et.al(2023): In this article, authors proposed a deep learning algorithms using MLP (Multilayer Perceptron), CNN (Convolutional Neural Network), and models such as DenseNet, Inception V3, LSTM (Long short-term memory), YOLO (You Only Look Once), and RNN (Recurrent Neural Network) to spot accidents quickly and correctly and communicate important information to emergency contacts.

[5] Dr. C. K. Gomathy, et.al(2022): In this article, authors proposed system to alert the nearby medical center about the accident to provide immediate medical aid using accelerometer in the vehicle, a heartbeat sensor on the user's body senses the abnormality of the heartbeat to understand the seriousness of the accident and GPS sensor in mobile phones.

[6] Amal Hussain Alkhaiwani, et.al (2022): In this article, authors proposed an intelligent security framework and an Internet-of-Things-based system is proposed for immediate accident detection with highest level of security and privacy to maintain the user's privacy. This identify accidents through an accelerometer and GPS in conjunction with a smartphone of user's.

[7] Prof. Chandrasekhar Seregara, et.al(2021): In this article, authors proposed a system which can detect road accidents sends the notification to the rescue team or control station by covering geographical coordinates through the GSM module, GPS module, MEMS sensor.

[8] B Sumathy, et.al,(2021): In this article, authors proposed a system which can detect road accidents and sends the alerts to emergency contacts using integration of devices arduino, GPS module, MEMS sensor attached to the vehicle.

[9] Emre Rifat Yıldız, et.al (2020): In this article, authors proposed a Smart Emergency Notification System (SENS) is proposed for both emergency responders and the community. SENS detects single/multiple emergency case(s) (i.e. road accident, fire, and injury) automatically from images sent by a smartphone via the Internet by the proposed promising approach; afterward, it notifies the police, fire brigade, and/or ambulance. The SENS has three modules: the mobile application SENSdroid, the Web application WebSENS, and the software agent NotiSENS, which uses the proposed approach.

[10] Dilipkumar A. Borikar, et.al(2020): In this article, authors proposed real-time accident detection and alerting system that uses smartphones. Every smartphone has number of sensors embedded in its design. System makes use of few of these commonly available sensors across all smartphones to build a web application for remote monitoring.

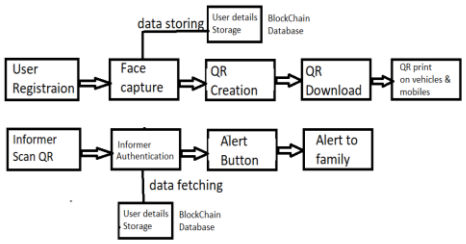
S.No	Year	Author's	Article Title	Key Findings
1	2024	Mr. Yash Chorwahe, et.al	ACCIDENT QR SYSTEM	• A responsive solution during critical situations, effectively tackling a spectrum of issues, from wrongful parking and road obstructions to abandoned vehicles, hit-and-run incidents, and potential security threats • User-centric approach and proactive alert using qr system
2	2024	Dr. Vijaysinh, et.al	QR Code Based Accident Notification System	• A responsive solution during critical situations, effectively tackling a spectrum of issues, from wrongful parking and road obstructions to abandoned vehicles, hit-and-run incidents, and potential security threats. • Notifying vehicle owners and relevant contacts in emergencies
3	2023	Namballa Saikumar, et.al	VEHICLE ACCIDENT DETECTION AND QR CODE BASED INFORMATION SYSTEM	• Accident detection using Vanet and IoT • Android application in which the user can easily coordinate and maintain all of the relevant facts about a car (such as the registration certificate, insurance, and vehicle's Pollution Under Control Certificate)
4	2023	Vinu Sherimon, et.al	An Overview of Different Deep Learning Techniques Used in Road Accident Detection	• Used MLP (Multilayer Perceptron), CNN (Convolutional Neural Network), and models such as DenseNet, Inception V3, LSTM (Long short-term memory), YOLO (You

				Only Look Once), and 5RNN (Recurrent Neural Network) • Models using artificial neural networks, convolutional neural networks (CNN), and object detection algorithms to improve road accident detection
5	2022	Dr. C. K. Gomathy, et.al	ACCIDENT DETECTION AND ALERT SYSTEM	• Alert the nearby medical center about the accident to provide immediate medical aid • Accelerometer in the vehicle senses the tilt of the vehicle and the a heartbeat sensor on the user's body senses the abnormality of the heartbeat to understand the seriousness of the accident • Sensors based programmed accident detection system
6	2022	Amal Hussain Alkhaiwani, et.al	A Framework and IoT-Based Accident Detection System to Securely Report an Accident and the Driver's Private Information	• Internet-of-Things-based system is proposed for immediate accident detection • Message is encrypted using Elliptic Curve Integrated Encryption and sent through Message Queuing Telemetry Transport over GSM • RSA-based cryptosystems
7	2021	Prof. Chandrasekhar Seregara, et.al	VEHICLE ACCIDENT ALERT SYSTEM USING GSM, GPS AND MEMS	• Micro electro mechanical system (MEMS) sensor will analyze the signal and this signal to Arduino for alert.
8	2021	B Sumathy, et.al	Vehicle Accident Emergency Alert System	• Sends the notification to the rescue team or control station by covering geographical coordinates

9	2020	Emre Rifat Yıldız, et.al	A Smart Emergency Notification System for Road Accident, Fire, and Injury Cases	• Uses machine learning techniques along with Google Cloud Vision API to detect the emergency case(s) on images • SENSdroid, the Web application WebSENS
10	2020	Dilipkumar A. Borikar, et.al	Accident Detection and Emergency Alerting System for Road Safety	• System collected parameters from the smartphone sensors detects the accident • Use of smartphone sensors like accelerometer to decide whether or not the emergent situation is an accident

III. METHODOLOGY

A web application which handles the operations those are qr code generation, qr code scanning, bystander authentication, emergency alerts to family and secure storage, Using web application the users will register and generates a qr code with their details, then user is provided to download the generated qr code to stick on vehicles, whenever road accident occurs, bystander can scan the qr and alert the emergency contacts about the accidents instantly.



3. 1 OBJECTIVES

- Immediate road accident alert to emergency contacts using web and QR Code based system.
- Deeplearning and Blockchain for authenticated alert and secure storage.
- Make use of QR Code to make quick and reliable alerts after road accidents.
- Reducing time delay of reaching the road accident information to family after accident occurs.
- To empower the social culture in public for helping others after the accidents.

3. 2 USED METHODOLOGY

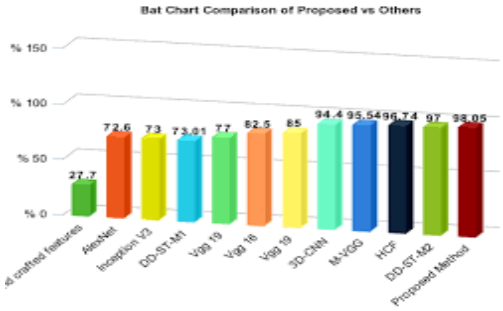
Python qrcode library is used for the qr generation, Python pyzbar library is used for the qr code scanning, Facial recognition model FaceNet is used for bystander authentication , Smartcontracts are used for secure and transparent storage of data, ExpressJS and NodeJS are used for web application development, Twilio is used for sending emergency alerts via SMS.

IV. RESULTS AND DISCUSSIONS

The results are analyzed to evaluate the system's effectiveness in reducing response times, the accuracy of the deep learning authentication model, and the security of the blockchain-based data storage.

The results demonstrate a significant reduction in response times when using the QR Code system compared to traditional methods. This reduction is attributed to the immediate notification of family members and the ability of bystanders to quickly report accidents.

A bar chart comparing the accuracy of different deep learning models.



The CNN model exhibited the highest accuracy in authenticating informers, indicating its effectiveness in preventing false alarms and ensuring the reliability of the system.

The blockchain-based system demonstrated superior data security compared to traditional methods. The immutability and decentralization of blockchain technology provide robust protection against data tampering and loss, while also enhancing user privacy.

The findings of this research highlight the potential of QR Code-based road accident alert systems in improving emergency response times and enhancing data security. The reduced response times can significantly impact the outcomes of accidents, potentially saving lives and minimizing injuries. The accurate authentication mechanism ensures the reliability of the system and prevents the misuse of the platform. Additionally, the secure storage of user data on the blockchain provides a high level of confidence in the system's integrity.

V. CONCLUSION

In conclusion, our system will provide an approach to send alerts whenever road accidents occurs, with an AI driven and Blockchain approach will helps to send authenticated and secure alerts to emergency contacts quickly. The findings indicate that the system effectively reduces response times compared to traditional methods. The deep learning-based authentication model demonstrates high accuracy in verifying the authenticity of accident reports. To further enhance the system's impact**,** Real-world Deployment and Large-Scale Testing Integration with Existing Emergency Response Systems Community, Engagement and Education.

VI. REFERENCES

[1] Dr. Vijaysinh G. Chavan*1, Ms. Aarya Saypur*2, Ms. Tirumala Fulpati*3, Ms. Vaishnavi Kodmur*4,
Ms. Shreya Dasi*5, Ms. Shruti Jalnapure, “QR Code Based Accident Notification System”, IEEE,
Volume 11 Issue 7, ISSN: 2349-600.

[2] Mr. Yash Chorwahe*1, Ms. Komal Kumre*2, Ms. Gauri Bhange*3, Mr. Shreyash Lichade*4, Ms. Sneha Dhande*5” “ACCIDENT QR SYSTEM”, International Research Journal of Modernization in Engineering Technology and Science, Volume:06 Issue:05/May-2024**,** doi: 10.56726/IRJMETS56492.

[3] Namballa Saikumar1 ,Dr.M.Uma Devi2 , Mr.G Vijay Kumar, “VEHICLE ACCIDENT DETECTION AND QR CODE BASED INFORMATION SYSTEM”, IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES ISSN PRINT 2319 1775 Online 2320 7876.

[4] Vinu Sherimon1, Sherimon P.C.2, Alaa Ismaeel3, Alex Babu4, Sajina Rose Wilson5, Sarin Abraham6, Johnsymol Joy7, “An Overview of Different Deep Learning Techniques Used in Road Accident Detection”, (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 14, No. 11, 2023.

[5] Dr. C. K. Gomathy1, K Rohan2 , Bandi Mani Kiran Reddy3, Dr. V Geetha4, “ACCIDENT DETECTION AND ALERT SYSTEM”, JOURNAL OF ENGINEERING, COMPUTING & ARCHITECTURE Volume 12, Issue 3, MARCH – 2022 ISSN NO:1934-7197.

[6] Amal Hussain Alkhaiwani 1 and Badr Soliman Alsamani 2, “A Framework and IoT-Based Accident Detection System to Securely Report an Accident and the Driver’s Private Information”, Sustainability 2023, 15, 8314. https://doi.org/10.3390/su15108314.

[7] Prof. Chandrasekhar Seregara*1, Ambresh Duddgi*2, Puneet Pawar*3, Savitri Padasalgi*4, Bhagyajyoti Hugar*5, "VEHICLE ACCIDENT ALERT SYSTEM USING GSM, GPS AND MEMS", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 08 Issue: 08 | Aug 2021 p-ISSN: 2395-0072.

[8] B Sumathy1* , L Sundari2 , S Janani Priyadharshini2 , G Jayavarshini2, "Vehicle Accident Emergency Alert System", IOP Conf. Series: Materials Science and Engineering 1012 (2021) 012042 doi:10.1088/1757-899X/1012/1/012042.

[9] Emre Rifat Yıldız and Yıltan Bitirim, "A Smart Emergency Notification System for Road Accident, Fire, and Injury Cases", Journal of Imaging Science and Technology R 64(3): 030506-1–030506-10, 2020. c Society for Imaging Science and Technology 2020.

[10] Dilipkumar A. Borikar1* and Manoj B. Chandak2, "Accident Detection and Emergency Alerting System for Road Safety", Biosc.Biotech.Res.omm. pecial Issue Vol 13 o 14 (2020) Pp-256-259.