To study the utility of hybrid model of IoT in vehicle accident reporting system in India.

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Abstract: In India, each region has different natural structures and social systems, which makes it a big challenge to implement any modern computing technology in the road system. We know from studies that lives of people in road accidents could have been saved if they had been helped within the first hour. Therefore, the combined work of IoT and related technologies such as IoV (connecting vehicles to the Internet) and cloud computing (storage) is useful. The Hon'ble Supreme Court gave a judgment on March 30, 2016 that the police should not harass in any way the people (good Samaritans) who help the injured in road accidents and the cooperation of people present at the scene is essential to increase the victim's chances of survival, especially during the 'golden hour', that is, the first hour after the injury. According to the World Health Organization (WHO) recommendations for India, 50% of victims die within the first 15 minutes due to severe cardiac or neurological injuries. The National Highways Authority of India has launched a toll-free "1033" helpline number to assist in road emergencies. Furthermore, the Government of India is to launch an Integrated Emergency Response System (ERSS). There will be only one emergency number 112. ERSS tracks rescue and service vehicles of all services (Police-100, Fire-101, Health-108 etc.) in real time on a digital map of the State/UT. The Ministry of Electronics and Information Technology (MeitY) launched this draft in the year 2015, which is a robust governance framework aimed at overall implementation and execution of IoT related policies. This policy was the main policy governing IoT in India. Studies show that those who rescue injured people on the road are now legally protected, while in the event of a vehicle accident, help can be sought using traditional mobile or phone calls. Since IoT technology (IoV and Cloud Computing) is effective in automatically sending reports in case of a vehicle accident, hence in our research paper we are drawing attention towards the need of such hybrid model in India.

Keywords: Vehicle Accident system, Legal Aspects IoT, IoV and Cloud

Introduction: If we study in the context of India, we see that the lives of people in road accidents could have been saved if they had been helped on time and their treatment had been started on time. Looking at another aspect, the natural structure and social system in every region of India is different, which makes it a big challenge to implement any modern computing technology in the road system. When an accident occurs on the road, people do not help, many of them are afraid of the legal process. Therefore, in India, an accident can be reported to the police or medical care, so that the injured can be treated as soon as possible, increasing the chances of survival and can also save the victim from disability. We will study what kind of models are currently active in India for helping road accident victims, and what are the arrangements for transmitting useful intimation or report. The Honourable Supreme Court's decision and the Indian government's decision to provide legal protection to those who help the injured is a very good step.

Accident cases require fastest care and rescue which could be provided by those closest to the scene of the accident. Bystanders clear support is essential to enhance the chances of survival of victim in the 'Golden Hour' i.e. the first hour of the injury. As per the WHO India Recommendations, 50% of the victims die in the first 15 minutes due to serious cardiovascular or nervous system injuries and the rest can be saved through by providing basic life support during the 'Golden Hour'. [1]1As per Motor Vehicle Act section 2(12A) "golden hour" means the time period lasting one hour following a traumatic injury during which there is highest likelihood of preventing death by providing prompt medical care. [2]1 In the last ten years, road crashes have killed over 13 lakh people in India. According to the Law Commission of India, 50% of these victims died of preventable injuries and could have been saved if they had received care on time. [3]1

Accident Data Collection and Traditional Vehicle Accident Reporting System in India: Central Government makes orders "Motor Vehicles (Vehicle Location Tracking Device and Emergency Button) Order, 2018" to specify such standard for equipping or fitment of VLTD in all public service vehicles. Every public transport vehicle (four-wheeler or more) must have AIS 140 compliant GPS device (VLTD) whose registration is done on or after 01.01.2019. [4] Any person can dial 112 to report an accident on any category of road. To effect quick transfer of the victim to the nearest

empanelled hospital, States / UTs shall ensure strengthening of the ambulance ecosystem and maximum convergence of 112 with the associated helplines viz.108, 102, 1033, or any Central / State-specific helplines. [5] Advanced Traffic Management System (ATMS) has provisions for various electronic enforcement devices which help in speedy identification of incidents on the highway stretches and effectively monitor the highways, thereby improving the response time of the on-site assistance. [6]1 NHAI has launched the Toll Free "1033" Helpline Number to provide 24x7x365 assistance to road users on NHAI's tolled stretches in case of Emergency/Non-Emergency issues. The 1033 Helpline provide multilingual support service to road users and integrated with the other highway operations facilities such as toll plaza Ambulance, Patrol Vehicle, Crane, etc. depending on the need. Non-emergency issues addressed include FASTag related complaints/queries, feedback about facilities / amenities available at the Toll Plazas and along the National Highways, road conditions, potholes, street light and toll charges related issues etc. [7] Traditionally, vehicle accident victims have sought assistance by calling government-designated contact numbers via mobile. The following contact numbers have been instituted:

24×7 National Highway Helpline 1033: Recognizing the importance of improving safe travel along National Highways and to help NHAI in taking preventive measures & improve maintenance of road and facilitate to serve the road users, NHAI has launched the Toll Free "1033" Helpline Number to provide 24x7x365 assistance to road users on NHAI's tolled stretches in case of Emergency/Non-Emergency issues. [8]

Emergency Response Support System (ERSS): It is the vision of Govt. of India to launch an integrated emergency response system with a single emergency number 112, to address different emergencies of citizens. ERSS is designed to address all emergency signals received from citizens through voice call, SMS, e-mail, panic SOS signal, ERSS web portal etc. ERSS tracks the rescue and service vehicles of all services (Police-100, Fire101, Health-108 etc) in real-time on a digital map of the State/ UT and hence it will be possible to direct the right vehicle(s) to reach the service requestor and provide necessary support immediately. [9]

IoT in India: As per the Telecom Regulatory Authority of India (TRAI)'s latest report there were approximately 936.16 million internet users in December 2023. More gadgets in the home and workplace are getting connected to the internet and this is a call for a concern of digital security of the Internet of Things (IoT). At the cornerstone of data protection in India lies the Information Technology Act, 2000 (ITA), the Reasonable Practices and Procedures and Sensitive Personal Data or Information Rules, 2011, the "Code of Practice for Securing Consumer Internet of Things (IoT)", 2022 and the Digital Personal Data Protection Bill (DPDPA), 2023 released by Ministry of Electronics & Information Technology (MeitY). The first draft of the policy on IoT was released in the year 2015. MeitY launched this draft in 2015 which is a strong governance framework that aims at holistic implementation and execution of policies related to IoT. This policy is the main policy governing the IoT in India. [10]1

Literature of Review: Accident cases require fastest care and rescue which could be provided by those closest to the scene of the accident. Bystanders clear support is essential to enhance the chances of survival of victim in the 'Golden Hour' i.e. the first hour of the injury. As per the WHO India Recommendations, 50% of the victims die in the first 15 minutes due to serious cardiovascular or nervous system injuries and the rest can be saved through by providing basic life support during the 'Golden Hour'. Right to life is enshrined under Article 21 which includes right to safety of persons while travelling on the road and the immediate medical assistance as a necessary corollary is required to be provided and also adequate legal protection and prevention from harassment to good Samaritans. The Ministry of Health and Family Welfare shall issue guidelines stating that all registered public and private hospitals are not to detain bystander or good Samaritan or demand payment for registration and admission costs, unless the good Samaritan is a family member or relative of the injured and the injured is to be treated immediately in pursuance of the order of the Hon'ble Supreme Court in Pt. Parmanand Katara vs Union of India & Ors [1989] 4 SCC 286. [1]2

A Good Samaritan is a person who, in good faith, without expectation of payment or reward and without any duty of care or special relationship, voluntarily comes forward to administer immediate assistance or emergency care to a person injured in an accident, or crash, or emergency medical condition, or emergency situation. In the last ten years, road crashes have killed over 13 lakh people in India. According to the Law Commission of India, 50% of these victims died of preventable injuries and could have been saved if they had received care on time. The role of the bystander is critical in providing emergency care to the victim. Yet, in India, bystanders have been hesitant to help the injured for fear of legal repercussions and procedural hassles. In 2012, a Public Interest Litigation (PIL) was filed in the Supreme Court of India, requesting the Hon'ble court to safeguard Good Samaritans who come forward to help the injured. Road

crashes claimed more than 200,000 lives in India alone and contributed to the economic loss of approximately 3% GDP. 17 people die every hour on Indian roads and around 4.07 LAC. [3][2] It is mentioned that as per provisions under section 134(A) of the Motor vehicles (Amendment) Act,2019, Rules of Good Samaritans have been notified by the Ministry vide Notification G.S.R. 594(E) dated 29th September, 2020 (Annexure II). Basically, the rules provide legal protection to people who give reasonable assistance to those who are, or who they believe to be, injured, ill, in peril, or otherwise incapacitated. [11]

Definition of Golden Hour: As per Motor Vehicle Act section 2(12A) "golden hour" means the time period lasting one hour following a traumatic injury during which there is highest likelihood of preventing death by providing prompt medical care. [2][2]

Approximately 1.19 million people die each year as a result of road traffic crashes, which are the leading cause of death for children and young adults aged 5-29 years with 92% of the world's fatalities on the roads occurring in low- and middle-income countries, even though these countries have around 60% of the world's vehicles (adapted from UNECE, Eurostat, ITF, 2019 and WHO, 2023a). [12]

Road traffic crashes cost most countries 3% of their gross domestic product. The United Nations General Assembly has set an ambitious target of halving the global number of deaths and injuries from road traffic crashes by 2030 (A/RES/74/299). [13]

According to the Ministry of Road Transport and Highways Report-2022, a total of 4,61,312 road accidents has been recorded in the country during the year 2022 by the police departments of the states and union territories. In which 1,68,491 people lost their lives and 4,43,366 people were injured. During 2022, a total of 4,61,312 accidents were recorded in the country, out of which 1,51,997 (32.9%) accidents occurred on National Highways (including Expressways), 1,06,682 (23.1%) accidents occurred on State Highways (SH) and the remaining 2,02,633 (43.9%) accidents occurred on other roads, out of the total 1,68,491 deaths recorded in the year 2022, 61,038 (36.2%) occurred on national highways, 41,012 (24.3%) on state highways and 66,441 (39.4%) on other roads. Out of the total 1,55,781 fatal accidents recorded in the year 2022, 55,571 (35.7%) occurred on National Highways, 37,861 (24.3%) occurred on State Highways and 62,349 (40%) occurred on other roads. [14] Issued notification dated 25th February, 2022 mandating the procedure for detailed investigation of road accidents, the Electronic Detailed Accident Report (eDAR) and its reporting, along with timelines for different stakeholders and for faster settlements of claims by the Motor Accident Claim Tribunal (MACT). Claims are filed at Motor Accident Claims Tribunals at State Level. Also notified rules for the Central Motor Vehicles (Motor Vehicle Accident Fund) Rules, 2022 vide notification dated 25th February, 2022. Advanced Traffic Management System (ATMS) is installed in high traffic density National Highways and National Expressways such as Delhi-Meerut Expressway, Trans-Haryana, Eastern Peripheral Expressway etc. by National Highways Authority of India (NHAI). Advanced Traffic Management System (ATMS) has provisions for various electronic enforcement devices which help in speedy identification of incidents on the highway stretches and effectively monitor the highways, thereby improving the response time of the on-site assistance. [6][2] The internet user base has expanded exponentially in the past decade in India. As per the Telecom Regulatory Authority of India (TRAI)'s latest report there were approximately 936.16 million internet users in December 2023. More gadgets in the home and workplace are getting connected to the internet and this is a call for a concern of digital security of the Internet of Things (IoT). More smart devices are connected with edge gateways and cloud platforms. IoT, while streamlining data sharing through sensors, also produces a large amount of data, more than any other emerging technology. At the cornerstone of data protection in India lies the Information Technology Act, 2000 (ITA), the Reasonable Practices and Procedures and Sensitive Personal Data or Information Rules, 2011, the "Code of Practice for Securing Consumer Internet of Things (IoT)", 2022 and the Digital Personal Data Protection Bill (DPDPA), 2023 released by Ministry of Electronics & Information Technology (MeitY). These legislative instruments define the responsibilities of entities handling personal data and establish mechanisms for accountability in case of breaches. The new Telecommunications Bill of 2023 clearly emphasises on the new age technologies and particularly all the aspects of the IoT. This bill is a comprehensive collection of all the provisions related to IoT in India. The bill includes all the necessary provisions that can regulate all the necessary items that come under the IoT. This bill is imperative due to the fact that the technological landscape is undergoing a major revolution worldwide which has a significant impact on India. [10][2]Experts predict that the number of linked IoT devices will

increase to 19.9 billion by 2023 and 22 billion by 2025, up from 13.1 billion today. IoT is a novel concept that combines a variety of smart methodologies, foundations, smart tools, and sensors (Srivastava & Pandey, 2022). [15]Study: Here in the study, we have found an important fact that as per the decision passed by the Hon'ble Court, it is easy to save the life of the injured person in the 'Golden Hour' accident and now the good Samaritan has

been given legal protection and the police cannot harass the good Samaritan in any way.

The purpose of the study of the research paper here is also that in India, if an injured or unconscious person is not helped by a good Samaritan in his 'golden hour', then he will die. To help road accident victims in India, there is a need for an automated accident reporting system based on IoT technology or a hybrid model.

Conclusion: When victims are unavailable, it becomes difficult for them to survive. Therefore, in this research paper, we emphasize the need for such a system in India, which automatically sends the report or intimation related to the vehicle accident to a designated help centre so that the injured person can get help and save his life. Because unless some good Samaritan calls the helpline 1033 or 112 and asks for help, it becomes difficult to get help. We also find from this study that in the traditional emergency helpline service on the road or highway, the person stranded on the road has to depend on others and in such a situation, there is a possibility of the injured person dying due to not getting help. Therefore, India needs a hybrid model based on IoT (connecting vehicles to the internet) and cloud computing (storing data). Here we present the "Digital Good Samaritan" as a supporting tool in a future digital approach to hybrid models for vehicle accident assistance.

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