

Real Time Emergency Vehicle Response System for Smart City Applications

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Abstract: The city applications and services are targeting how to frame the upcoming Internet of things (IoT) based applications and services for the perspective of the smart city. The acceptance, arrangement, and execution of cutting-edge wireless services and applications have to be designed in the manner to allow facing the difficulties of smart cities. There is intelligence, analytical and conduct automation that permit the influencing better policy and smart deployment. Nowadays various work is going on to detect health disease, accident, crime and fire for achieving the goal of smart cities. There are many individuals in the world be alive if speedy notice would have given to emergency services. This detection system provides only alert to the respective authorities or their relatives but not able to implement real-time lifesaver services. The objective regarding this paper is to provide online cloud services to various emergency detection devices so that with the help of these devices life can also be saved. The smartphone has become important an instrument in our life, with the help of a global position system (GPS) or cell phone location mobile human can be tracked. This work mainly deals with emergency vehicle networks for an ambulance, fire brigade; police vehicles like online cab services. In this work, a mobile application is proposed which is immediately triggered after detection of emergencies and provides real-time vehicle services for the nearby hospital, police control room and fire brigade.

Keywords: Cloud services, Emergency Vehicle Response Network, Mobile Application, and Google Map.

1.1. Introduction

Emergency vehicle armada dispatching and the board assume a significant job in occurrence reaction times and the nature of administration offered to end-clients. The viability of the management procedure is important to limit the effect of

occurrences on human lives and properties. Exact and opportune choices are along these lines required.

The key segment for crisis trade reaction scheme is the choice of stream ways for vehicles and materials, by the reason for wellbeing and brief time, moving, however, countless particular and vehicles influenced site could be expected under the circumstances is one of the instinctive models to quantify the plausibility of the arrangement [1]. Simultaneously, the city's unique street organize has just come to fruition; however, the development pace of vehicles is a lot quicker than that of new streets [2]. The connection between organic market reversals prompts the standardization and expanding the seriousness of urban clog.

The underdevelopment of data assortment innovation and the bother of data transmission and dissemination will all lead that coordinators of crisis reaction can't take correct countermeasures; voyagers can't acquire convenient, right and valuable data to choose the ideal way for departure; salvage powers can't convey alleviation supplies to the scene in time [3] - [5].

To beat these issues, we propose a Real-Time Emergency Vehicle Response System, which gives ongoing administrations to penniless people, accommodating for diminishing the demise because of mishap cause, deferring of rescue vehicle administrations, police administrations.

1.2. Related Work

One commonly applied to use safe for vehicular ways are forms that recognize crisis channels. Such a request can reduce mishap risks through crisis effect hallucinations and help additional important time. They diagram a far-reaching structure of such a crisis channel warning structure that utilizes channel communication, yet additionally involves roadside foundation alike traffic lights. Within this structure, different vehicles do not only warned about moving toward crisis vehicles; they likewise get nitty-gritty course data. Given the data, the favorable and proper acknowledgment of various operators is understandable. A representation of this structure has been proposed in a rush-hour gridlock condition including crisis vehicles and traffic lights. To recognize prerequisites and assess the framework, this additionally led a point by point investigation of recordings from crisis reaction trips and a specialist review among individuals from a neighborhood crisis reaction association [6].

Urban crises are difficult to maintain a strategic distance from. Traffic crisis reaction after an episode assumes a significant job in decreasing misfortunes and is a key connection in urban crisis the executives. The framework, for the most part, incorporates sub-frameworks, for example, staff clearing information assortment framework, vehicle activity information assortment framework, salvage material conveyance information assortment framework, faculty settlement place information assortment framework, traffic pike wise distinguishing proof

framework, and so on. It likewise devises the working projects for order the executives, faculty clearing and catastrophe transfer if there should arise an occurrence of crisis, and improves the urban crisis bolster the board framework. Accompanied by the Internet of everything and the details extract innovation, the trade crisis reaction framework is auspicious as well as precisely check streaming data for faculty and motor vehicles, rapidly with helpfully immigrate staff in addition to motor vehicle, adequately complete review salvage tasks, successfully upgrade salvage proficiency with enhancing the degree for the city administration [7] - [9].

Emergency circumstances require exact and opportune choices to lessen delay and the extra effect of episodes on human lives and common properties. Nonetheless, basic leadership in urban emergency circumstances is a difficult assignment because of the number of factors impacting the procedure and the unusual difference in some of them. This procedure trademark necessitates that leaders screen and changes their choices for all time. In this manner, data accessibility and trade are basic to improve the basic leadership process. Despite refined enhancement commitments in unique emergency vehicle dispatching issue, not many of them have thought about their combination in Intelligent Transportation Systems (ITS). In this unique circumstance, dynamic occasions and non-intermittent blockage could be better tended to. In this paper, we consider the dynamic crisis vehicles dispatching issues utilizing real-time data (DEVDP-RT). We propose a responsive methodology for vehicle dispatching dependent on a setting mindful and reconfigurable design. Our methodology is planned to help apportion emergency vehicles to urban crises and modify their courses as indicated by up and coming changes and unforeseeable occasions. Recreation results feature the advantages of the proposed dispatching model in improving the crisis reaction time and lessening delay [10].

Another framework identified with the traffic observing framework has been suggested by creators. During venture, the group planned cutting edge trade checking framework as long as enhancing street trade stream accompanied by the point of gathering present and coming times essential requirements for street move. The framework expands this effectiveness of checking street trade conditions at giving permanent information on weather forecasting parameters of various areas. The article didn't consider safety concerns by this cutting edge trade observing framework [11] [12].

Intelligent Transportation Systems is the whole common significant use of every Internet of Everything empowered bright towns. It is dependent on a green wave framework that has been exhibited, which empowers the trade sign framework to use some signed field during a crisis channel moves toward those trade signs. As a result of using these signed fields, a crisis channel gains every single green sign into the path. Creators exhibited this being a developing flow over a crisis channel. During the responsibility, this trade sign framework can identify any taken channel that goes through each developing sign. This significant burden from that growing surge means that, if this synchronization from this movement sign remains upset,

this package produces an enormous road turned parking lot (over-immersion). To diminish the effect like non-having appropriate integration, RFID locate trade controller framework has been prescribed [13] - [15].

1.3. Proposed System

Google Mobile Services (GMS) is a collection of Google applications and application program interfaces that help support functionality across devices. The proposed system using the cloud, database, and goggle services for the emergency vehicle response platform. Smartphone and internet are the common prominent things using by the people and becomes very important in this era. The Fig.1.1 shows the system architecture of Real-Time Emergency Vehicle Response (RTEVR). In this left, side all the sensor devices for emergency detection, which are already available in the market. All the registered users having these devices with the android phone having an emergency calling application installed, when the sensor sends a request to our cloud system, which is middle of Fig.1.1 shown, detects emergency. The computing system of the cloud server classifies the emergency response and generates a broadcasting message for the corresponding vehicle response network e.g. health type request nearest available ambulance driver will be called, similarly for fire and police. The GMS provides the path to the driver to the victim using a real-time google map and the nearest hospital. Our proposed system stores all the records in the database e.g. driver's detail, user's detail, journey time, hospital database, etc.

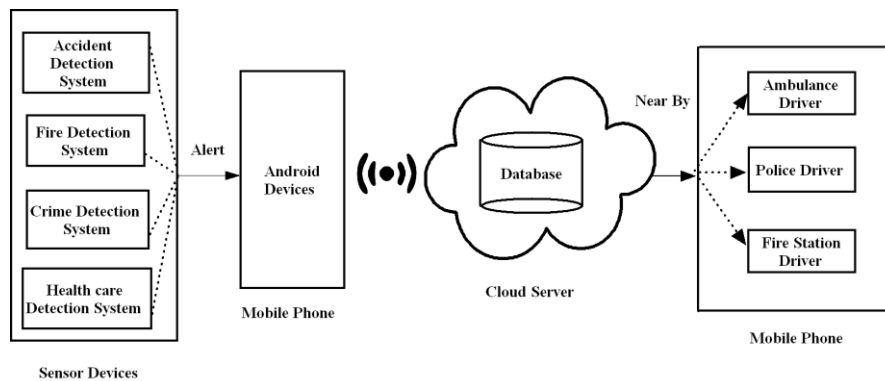
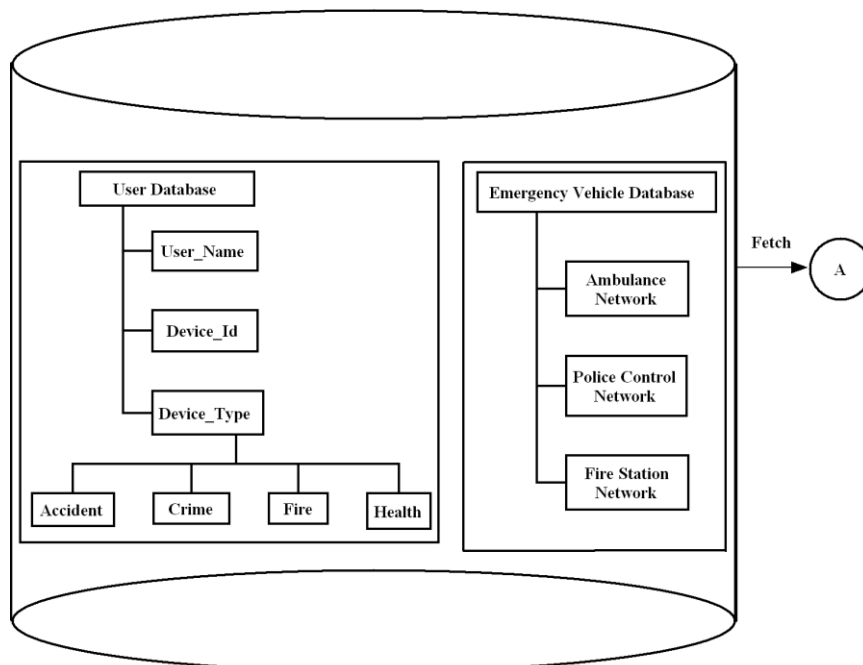


Fig.1.1. System Architecture of RTEVR

Transportation of emergency supply is dynamic. The system built up a numerical model to depict the issue and afterward built up a database of the emergency organize on the base of the model. The database is the most significant piece of the product that shows dynamic transportation. Therefore, the paper portrays the

plan of the database insistently. The database is the base of the emergency response system. It very well may be utilized to store, recover, and review the information shown in Fig.1.2 so the emergency system can obtain information from it precisely. The information, which is associated with the paper, is examined through cluster hubs and associating sides, the database structure of the essential system. The proposed system uses MongoDB and Firebase database. MongoDB is the NoSQL database therefore, the system can handle a huge amount of data and it is easy to interface with google services, an Android platform using the Atlas cloud or Parse server, this system uses parse server for communicating with Android to MongoDB. The system uses Firebase as a secondary data for providing an interface to sensor devices in the proper format because the microcontroller can't directly communicate with MongoDB, therefore firebase is a middleware between our system and emergency detection devices.



Cloud Server

Fig.1.2. Database Design of RTEVR

In Fig. 1.2 User and Emergency vehicle driver's data is shown. The User database having data field user name, device ID, device type. The system uses the Mac address of sensor devices as device ID for classification of device type. The Emergency vehicle database consists of all the vehicle driver details e.g. application ID, mobile number, name and type in corresponding networks.

Among the emergency organize, the most significant of all components are the logins and connecting sides. The Fig. 1.3 depicts the data processing unit of RTEVR, for data to be transmitted from one platform to another need of protocols and computation unit therefor in the proposed system Amazon cloud is used as a computing platform and cloud services are using for communication between database and user interface i.e. android system or maybe web interface.



Fig.1.3. Data Processing of RTEVR

1.4. Results and Discussion

Given the scientific model, the database of crisis organize is planned effectively. The product that is on the base of the scientific model above has been created. As indicated by the trademark and property of each component in the crisis arrange, we made a comparing element relationship model, and tried information with MongoDB server database, at last, built up the database of a crisis organize. The achievement of the database demonstrated the exactness and sensibility.

Fig. 1.4 shows the entire registered user's database, it consists of a user type field, which indicates user as driver or victim, also his gender.

objectId	String	Gender	String	CurrentPosition	GeoPoint	emailVerified	Boolean	UserType	String	GpsEnable	Boolean
<input type="checkbox"/>	VNYhkFWJM2	Female	(22.2507179, 84.9017347)	True	Normal	True					
<input type="checkbox"/>	LqXeQ2IeR	Male	(22.2505111, 84.9012445)	True	Driver	True					
<input type="checkbox"/>	P8ZI0889pd	Male	(22.250699, 84.9019369)	True	Driver	True					
<input type="checkbox"/>	zyjgjqxamu	Female	(22.2602006, 84.902221)	True	Driver	True					
<input type="checkbox"/>	M1Xxfwz10K	Male	(20.3348, 85.8229983)	True	Driver	True					
<input type="checkbox"/>	rFPaB0FDVY	Male	(20.3406967, 85.81914)	True	Driver	True					
<input type="checkbox"/>	g2p33yf1jl	Female	(22.2483408, 84.899996)	True	Driver	True					
<input type="checkbox"/>	GVS40freeB	Female	(22.2507228, 84.9018765)	True	Driver	True					
<input type="checkbox"/>	AIWTtmpAm	Female	(20.340969, 85.8209169)	True	Normal	True					

Fig. 1.4. User database field

Similarly, Fig. 1.5 shows emergency type vehicles database field which classifies the request type for ambulance, police and fire brigade and also respected linked driver details e.g. e-mail, contact number.

objectId	RequestState	DriverId	AcceptToStartDura...	StartToPatientLoca...	CarrierType
0Id7LbbnAL	FINISH	zyjgjqxamu	8680	34	AMBULANCE
SI0QAXcVUL	REQUESTED	RDpwQjEUzJ	12892	5478	AMBULANCE
nReakzTVUf	FINISH	RDpwQjEUzJ	4812	339358	AMBULANCE
UUfUq1pygg	FINISH	pEdITOYuri	8225	2693	POLICE
qE7HLDxG9G	FINISH	pEdITOYuri	19684	736	AMBULANCE
sDtQYWLUM	FINISH	1obPeZ7RZG	7432	5347	FIRE BRIGADE
hz43TWpbnx	FINISH	7WnWyYmUhX	8036	3411	AMBULANCE
goYQxmA3aF	STARTEDTFORHOSPITAL	RDpwQjEUzJ	1277	3076	AMBULANCE

Fig. 1.5. Emergency type vehicles database field

Fig. 1.6 indicate Device ID database field link with a user profile for the respected emergency alert device for accident, crime, fire or healthcare. The Emergency Service Dashboard is displayed in Fig1.7, all the requests are severd by response system using the query dashboard i.e. all the sensor devices are linked and responded through the emergency dashboard.

objectId	createdAt	updatedAt	ACL	DeviceId	OwnerId	DeviceName
1gaZpK72a2	20 Aug 2019 at 07:...	20 Aug 2019 at 07:...	Public Read + Write	12345	Mc40mPjU2g	Heart123
N6hY1WLxz	17 Apr 2019 at 07:...	17 Apr 2019 at 07:...	Public Read + Write	b8:27:eb:20:9e:9c	vTToSCNCX8	Accident Detection
qHOHbZBST2	31 Jan 2019 at 07:...	31 Jan 2019 at 07:...	Public Read + Write	23#e45	S844UYf6UA	My Device
rTYas98FKc	28 Aug 2018 at 08:...	28 Aug 2018 at 08:...	Public Read + Write	Test555	vTToSCNCX8	Crime Test
AXdwXX1EK	23 Aug 2018 at 07:...	23 Aug 2018 at 07:...	Public Read + Write	60:01:94:5E:46:94	vTToSCNCX8	Fire Detection
aQTR7G2m60	2 Aug 2018 at 13:0...	2 Aug 2018 at 13:0...	Public Read + Write	2C:3A:E8:35:D1:85	vTToSCNCX8	Fall Detection

Fig. 1.6. Device ID database field link with User

Send a test query

Try out some queries, and take a look at what they return.

What type of request?	GET
Which endpoint? Not sure what endpoint you need? Take a look at our REST API guide .	classes/_User
Use Master Key? This will bypass any ACL/CLPs.	No <input checked="" type="checkbox"/> Yes
Run as... Send your query as a specific user. You can use their username or Object ID.	Username or ID
Query parameters Learn more about query parameters in our REST API guide .	where={"username": "johndoe"}

Fig. 1.7. Emergency Service Dashboard

1.5. Conclusion

During the evaluation, we developed the incident ID and mind-blowing salvage structure, which produces emergency alert and send it to the closest emergency communicator and will comparably send an SMS to emergency connection containing area addresses of the mishap. By consistent region following for both hurt person and communicator, the structure will develop the determination step of an event stunning misfortune by giving crisis assistant during the time. The framework will additionally assist in many crises, for example, when firing, crimes, and different prosperity associated crises. Urgency communicator directions are gifted branch location monstrous misfortune's region toward a google chart coherently.

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