

INTEGRATED AMBULANCE SERVICE WITH ADVANCED REAL TIME TRAFFIC CONTROL SYSTEMS

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Abstract - Effective and efficient public service delivery like healthcare services are very important in today's society. Traffic jams is one of the crucial issues in India due to which ambulance services get affected on large amount. Due to delay in its services, patients may lose their life and number of these scenarios are getting increased day by day. "Green Corridor" is the concept by which patient will get needed treatment on time. Imagine being in a medical emergency and pulling out your phone, opening an app and requesting the nearest idle ambulance with appropriate equipment come pick you up. As solution to the existing and unpleasant challenges faced by various patients in accessing needed medical facilities, we have designed and implemented a mobile-based medical emergency ambulance system that is integrated with a Location based Service (LBS) which is accessible via the Internet and wireless network on mobile device. This mobile application also provides

an on-demand, non-emergency medical transportation. The application not only connects users with the nearby idle medical transportation vehicles, but also with en-route medical crews through text, phone and video calls, to keep them updated on developments. Thus, integrating mobile communication into the healthcare system can transform healthcare to a greater height. Our proposed model integrates both the advanced functionalities required for a Smart ambulance as well as coordinating various Non-emergency medical transport systems at the same time.

Index Terms – Ambulance, Green Corridor, Healthcare Services, Traffic, Transportation.

I. INTRODUCTION

One of the widely affected service due to traffic jams is that of an ambulance. Many times, ambulance consist of emergency or critical patients which needs to be taken to the hospital in minimum amount of time providing proper treatment to the

patient so that chances of surviving increases in critical condition. A Patient may lose his life if there is delay in reaching of ambulance to the hospital. According to the surveys 95% of the heart attacks cases can be treated, if the ambulance can reach the hospital at current time without getting stuck into the traffic. For this, it is needed that the vehicles on the road to make way for the ambulance.

We designed and implemented a system integrated with a mobile application and a location-based service (LBS) to bridge the communication gap between healthcare providers and patients residing in the rural areas. The focal point are the rural communities. With this system, patients in need of medical attention unavailable in the rural area of residence can perform tasks such as make an appointment or book for consultation in a hospital, access the services of ambulance transportation quickly, as well as predicting its arrival time. Furthermore, it will assist paramedics to locate the current or actual position of the patient and other healthcare providers like nurses and doctors who will attend to the patients in time. To this end, smart mobile devices are utilized for the efficient and effective operations.

The objective of this paper is therefore, to improve the quality of healthcare services in the rural areas where modern hospitals are not found. We believe that having such systems where needed healthcare systems can't be found could go a long way to save the lives of millions of poor citizens that are in critical conditions

II. LITERATURE REVIEW

This paper designed and implemented a system integrated with a mobile application and a location-based service (LBS) to bridge the communication gap between healthcare providers and patients. With this system, patients in need of medical attention can perform tasks such as make an appointment or book for consultation in a hospital, access the services of ambulance transportation quickly, as well as predicting its arrival time. Furthermore, it will assist paramedics to locate the current or actual position of the patient and other healthcare providers like nurses and doctors who will attend to the patients in time. To this end, smart mobile devices are utilized for the efficient and effective operations. The objective of this paper is therefore, to improve the quality of healthcare services. Also having such systems where needed healthcare systems can't be found could go a long way to save the lives of millions of poor citizens that are in critical conditions. Moreover, coupled to the limited ambulance issues are the bad roads and inadequate transport in terms of regularity, reliability and cost as well as structured addresses. Bad roads have led to minimal investment in public transports as well as accessibility of ambulances. Consequently, people have to walk long distances waiting and looking for transport to take them to the hospital or other places of interest. The situation is even worse during bad weather when patients and or their caregivers will have to wait in pain or even die before they could reach the hospital. Also, majority of the residence are elderly people and children who are sometimes unaware of their exact location due to

several reasons which may include a serious injury, shock or a criminal attack. In some cases, even if public transports or ambulances are contacted, they fail to reach their destination, or the longest routes are always taken whilst there are available shorter alternatives. Even when ambulances struggled to find the specific dwelling, unstructured addresses also pose an impediment to the ambulance drivers since the communities are geographically dispersed. In spite of these challenges, there is an availability of network coverage for effective communication. Therefore, to bridge the communication gap when it comes to accessing needed healthcare in terms of availability of ambulances and the quick location of patient's position, it is cost-effective to take advantage of the benefits offered by ICT tools like the smartphones. This is considered important because, we believe that almost every household has a phone and can access the Internet. Thus, having application system that run on mobile devices which can easily be used by patients could go a long way helping people. As solution to the existing and unpleasant challenges in accessing needed medical facilities, this paper designed and implemented a mobile-based medical emergency ambulance scheduling system that is integrated with an LBS which is accessible via the Internet and wireless network on mobile device. Thus, integrating mobile communication into the healthcare system can transform healthcare in the rural areas to a greater height.

Effective emergency (such as a hurricane, a building on fire, and so on) response requires accurate, relevant, timely, and location-aware information (e.g., environmental information, health

records, and so on). Acquiring information in such critical situations encounters substantial challenges, such as large volume of data processing, unstructured data, privacy, authorized data access, and so forth. Among the issues, access authorization has received little attention. Existing solutions for data authorization either do not scale well or merely consider a Break-the-Glass concept in which a master key is provided to the first responders (FRs) to decrypt the corresponding ciphertext. This may not only enable unauthorized users to access information, but it may also overwhelm FRs by the large volume of accessible data. To jointly address the aforementioned issues, this paper proposes a location-aware authorization scheme that enables FRs to access information provided that they are within a predefined distance from data owners at the time of an emergency. We innovatively integrate attribute-based encryption with broadcast encryption to incorporate dynamic attributes (i.e., location and time) into an access policy. Such attributes act as filters to eliminate data irrelevant to an ongoing emergency. As a result, our scheme provides authorized access to accurate, relevant, timely, and location-aware information. We provide extensive security analysis and performance evaluations to demonstrate the effectiveness of our scheme. The analysis shows that the scheme imposes constant communication and computation overheads.

One of the most important health care services is emergency medical service as it plays a vital role in saving people's lives and reducing the rate of mortality and morbidity. The importance and sensitivity of decision making in the Emergency

Medical Services (EMS) field have been recognized by operations research scientists, EMS planners, and health care practitioners. The structure of our review is based on the concept of Emergency Care Pathway (ECP). In doing so, we follow the current trend in health care systems, i.e., shifting the central role from health care providers to patients. The main concept of Clinical Pathways (CPs) in health care systems shifts the attention from single departments to the entire health care chain, which increases patient's safety and satisfaction, and optimizes the use of resources. The ECP starts when the EMS receives an emergency request. After determining the urgency of the incident, an ambulance is dispatched. The ambulance should reach the emergency scene as soon as possible to provide first-aid and to transport the patient to the ED of a hospital. Once the patient is discharged from the hospital, the ECP finishes. One of the prerequisites to guarantee an efficient and fair management of the entire ECP is a good forecast of, for example, emergency demand, travel time and workload. These forecasts are needed to ensure that enough resources are available to fulfil the emergency demand. These resources consist of, for example, EMS vehicles, paramedics and medical doctors. Composing sufficient workforces and determining proper rosters is essential to deliver high quality health care. Equity is one of the most challenging concerns in the healthcare sector and especially in EMS systems, since it evaluates the fairness of how resources (notably EMS vehicles) are allocated to patients. Since the main aim of EMS planners is to provide early response, equity is usually expressed as a

function of distance or Response Time (RT) travelled by EMS vehicles.

It determines how ambulance transportation is associated with resource use in the emergency department (ED). The phenomena of emergency department (ED) overcrowding and resultant ambulance diversion are closely linked to a hospital's resource constraints. Some of the resource shortages, such as those affecting critical care and psychiatric secure beds, are associated with significant ambulance diversions. These document the impact of patients transported by ambulance to the ED. It deals with the number of ambulance arrivals at an ED associated with the overall length of stay of patients in the ED at that time. Certain facts reveal that elder patients, a traditionally resource intensive population, were more likely to arrive by ambulance. Studies demonstrate that ambulance transported patients tend to be of lower socio-economic status (SES) than ambulatory patients and indicating an increased need for social services among ambulance users. More precise knowledge of the differences between ambulance and non-ambulance patients could further elucidate their respective impacts on the ED. The characteristics of ambulance and non-ambulance patient visits arriving at an ED were compared and determined the relation of ambulance transportation to the use of various types of resources in the ED. The disproportionate use of resources for ambulance visits indicates the extent to which ambulance visits may drive hospital resource crises, resultant ED overcrowding and underscores the need to better accommodate this demanding subset of the ED

population. This preliminary study indicates that patients arriving at the ED by ambulance use significantly more resources than their walk-in counterparts.

EXISTING SYSTEM:

A mobile transportation system was developed to improve the hours of service needs and reduce the waiting time for transports. The system allows passengers to check if there is any transport coming as well as the availability of other passengers on the way and space. The system's performance was evaluated, proving 50% improved earnings due to operational efficiency

In a similar system, that provides medical advisory services, security and emergency flights worldwide employed the use of satellite communication to help remote patients in need of emergency services. It employed a satellite phone and one can subscribe. However, the person would have to inform the authority of their existing health problems so that it can be kept in their files as well as being given a first aid bag. In the event of emergency, by communicating via a satellite phone, the patient can be told on what to do using the equipment in the first aid bag, and evacuation to a hospital can be arranged if needed.

Another similar system put in place a cost-effective ambulance service that utilized mobile phones and geographical positioning system (GPS) tracking. It was established to assist women to have prompt access to emergency obstetric care. It manages about 66 ambulances scattered throughout the city and an ambulance desk near Hospital

entrance. For efficiency and quality of service, each ambulance in the network is equipped with a GPS tracking device to enable the dispatchers to determine which driver can reach a given patient with greatest ease and speed

DISADVANTAGES OF EXISTING SYSTEM:

Its primary focus was on improving public transportation and not the health services or ambulance transportation services. It supports only few text characters and if immediate medical assistance is needed, the texting doesn't work very efficiently. The system does not offer direct communication between the patients or relatives and the paramedics.

It is not a continuous monitoring system, a bit of delay in transmission of successive data (1sec). Use of multiple receiver sections at the chowk due to unavailability of centralized signalling system. Necessary feedback can be given back to GSM unit regarding the status at the hospital.

PROPOSED SYSTEM:

In this system, we used the technologies of mobile and cloud computing to provide a cost-effective means of communication between healthcare service providers and the patients. The system uses mobile (android) application coupled with GPS service to allow patients that need emergency services to request for ambulance and even book for hospital consultations. When used, the system has the capability to inform patients of predicted ambulance arrival time, reduce schedule

preparation time, and improve communication between ambulance transport providers and the patients. This system is also intended to enhance ambulance transport operator and patient security by allowing quick location of the emergency scene and faster response. It also allows the patient to communicate with the healthcare providers or paramedics on their way to the rescue location. Moreover, the system has the benefits of reducing the long queues and waiting hours in hospitals which is based on appointments.

1) Computer system :-

This consist of the system components found at the local unit of the hospital. They include the computer which is connected to the cloud-based server via the Internet. Also, a web-based application software installed in the computer that provides interfaces with the functionalities that is needed to operate the system effectively. The software is integrated with GPS functionality using google maps to compute the distance between the patience and the ambulance or hospital and the optimal routes. Moreover, an operator called the administrator operates the system to effectively schedule available ambulances and paramedics during emergency situations.

2) Client software :-

This is the mobile application software that is installed on the client's smart or android phones. With this application, patients are able to request for urgent ambulance service, book for hospital consultation and receive immediate feedback in terms of arrival time, delay time, and so on. This is

done taking advantage of the mobile 3G/4G wireless network connection.

3) Cloud-based server :-

This is mainly a server that is located in the cloud where information is stored when patients ordered for ambulance or book for consultations using their phone. The computer in the local unit of the hospital always maintain active connection with the server to access patients request on real-time basis. Also, it allows ambulance drivers and paramedics to access patients request even if they are not in the hospital premises or if the local network in the hospital is down.

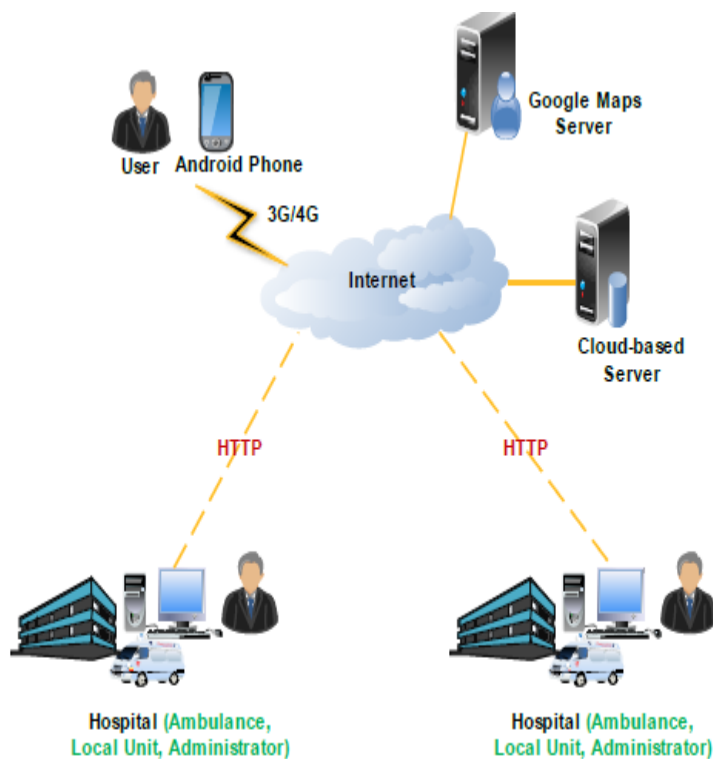
MODIFICATION

Live Tracking of patient and driver. Improved features in ambulance services like

- Advanced Life Support (ALS)
- Basic Life Support (BLS)
- Non-Emergency (NE)

III. HELPFUL HINTS

A. Proposed System Architecture



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