Digital Help Services for Emergency Contingencies in Personalized Health Care

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Abstract
Today, cell phones are in every home and on every hand. People are using helpful mobile applications as a result to simplify their daily lives. The creation of a mobile application (app) to aid in the provision of an efficient healthcare system is the main topic of this study. People who use this app can take advantage of a wide range of benefits, including finding local hospital information, cabin information, booking a cabin with payment, intelligent suggestions on choosing the best hospital, finding a doctor, calling emergency services, first aid information, medication alarms, and a BMI calculator. Accidents can happen in our daily lives at any time or place. In addition, some people are unable to act quickly in such a circumstance, since they lack the abilities or knowledge required to provide first aid properly. Additionally, tak ng advantage of the fact that the majority of people carry smartphones, this study takes into account the interactivity advancement of a portable application that provides the side effects of illness and records of treatment that act as a rule for the end client can perform well, based on intuitive direction from the application. The two-dimensional activity was also designed to increase the client's ability to visualize the rule and to boost their sense of confidence by giving them. This application will be a helping hand for people who struggle to choose a hospital, book a cabin, schedule an appointment with a doctor, or get assistance in an emergency scenario.

Keywords: First aid, information, interactive application, mobile application, and therapy are some related terms.

I.INTRODUCTION

Large enterprises require an effective emergency response system due to the likelihood of accidents. Using cell phones and technology, effective emergency. To ensure a prompt reaction to accidents, responders would be useful. An accident-prevention strategy that is foolproof is the Emergency Situation Responder App. It is quick, completes all necessary tasks to ensure correct treatment of incidents, provides a precise location, first aid instructions, next steps, etc.
The methanol vapor leak accident that occurred at LG Polymers recently on May 7, 2020 [9] left 12 people dead and 585 people impacted. In the Delhi neighborhood of Anaj Madi, a factory fire resulted in the deaths of 43 persons and injuries of over 60 more [3]. Forty people died and hundreds were injured as a consequence of an explosion at the Feroze Gandhi coal-fired power plant in Uttar Pradesh on November 1st, 2017 [3]. All 40 victims of the incident at the Sivakasi fire factory in Tamil Nadu were workers [3]. There have been countless further accidents that have left a great number of people dead or injured. A survey found that industrial accidents during the years of 2014 and 2016 resulted in 3562 fatalities and more than 51000 injuries [3]. These statistics drive us to focus on developing an app that might potentially lower the number of accidents and fatalities caused by technology. So that incidents can be halted in their tracks and avoided from getting worse, we aim to assist as quickly as we can. As soon as a user enters an emergency alert, the program immediately alerts all users within the specified industry or region about the accident. People may intervene to stop an incident from getting worse and to make sure that it is controlled when it has to be as soon as they are made aware of it. Every first aid station receives a notification, allowing first assistance to be delivered immediately from the facility that is close to the event and has the required staff on hand. The software also includes information on first aid procedures and steps to take in the event of a specific accident, ensuring prompt and precise action and reducing the severity of mishaps. A guide for actions to take in the event of chemical mishaps is also available.

All surrounding emergency service facilities, such as ambulances, fire departments, police stations, etc., are alerted to the situation when an accident is extremely terrible so that prompt expert aid can be provided as well. A precise accident site will also be made available to everyone in the industry, first aid stations, and emergency response centers, coupled with a navigation option, to ensure that assistance can get to the accident scene swiftly. This was a simple introduction to the app; the paper will go into great detail on every little aspect of the app.

II.LITERATURE SURVEY

The four stages of emergency management are readiness, reaction, mitigation, and recovery. The response step is what this essay focuses on. The whole inventory of emergency response systems is first evaluated to the system. Han et al. discuss a person's compliance following an emergency notification in the paper [6]. The author claims that a simple implementation of an emergency notification system does not ensure its efficacy. The author researches students' compliance with receiving notifications from the system set up on the college campus. For this inquiry, the author employed a scenario-based survey methodology. A model created by Han et al. was put to the test in scenarios involving robberies, active shooter situations, building fires, and health-related issues. Almost 800 university students participated in this [6] poll to find out, Han et al. claim that the main factors encouraging students to comply right away are the subjective norm and the caliber of the material. [8]'s author proposes employing varying length vibrations to alert deaf people to different crises. Those who rely on vibration for notifications should consider the duration of vibratory signals, claim Harkins et al. Research is being done by the report's author [8] to understand consumer preferences for emergency warnings through vibration. Deaf persons might interpret patterned vibratory signals of sufficient length as an emergency alert, according to Harkins et al. Wong et al. investigate the variables

determining how teenagers may react to receiving emergency text messages from reliable sources in their article [13]. Seven in-depth interviews with individuals between the ages of 12 and 18 were done. They spoke about probable outcomes as well as warnings that had already been sent for events like floods and the finding of unexploded World War II bombs. The expected compliance with the notifications was high, according to Wong et al. [13]. These were simple polls designed to find out how respondents would react or comply with an emergency message.

Earlier systems were based on the function of alerting the public. With the help of the user-friendly program AlertMedia [4], the administrator may quickly alert the public to any incidents, keeping them safe and informed. Users will also be able to report their whereabouts, request assistance, and respond to admin messages. On any device, including desktops, laptops, and mobile phones, [4] may be installed to enable voice calls, social media notifications, and emails. Systems like [10] Blueworx Virtual Response system, which employs AI to replace call center employees, have been developed due to the rapid advancement of artificial intelligence. As there is a huge desire for assistance, AI technology looks to be quite useful. AI systems and voice assistants don't just talk to callers; they also use the caller's demeanor to determine the location, the seriousness of the crisis, or the urgency. They also prioritize the calls depending on their priority and translate or transcribe the language. Blueworx also offers proactive notifications, unified messaging, interactive voice response, and intelligent call routing [3]. The effectiveness of this tactic is lessened in emergencies where the user cannot use the phone for more than a few seconds. [12] In order Toate emergency messages, Gautam et al. offers a proximity tracing technique using Bluetooth and wireless networks. Yet, it is not realistic to cover the full area of activity with a wireless network in a commercial context. Moreover, the headsets' normal Bluetooth range is about 100 meters, which is inadequate for most use scenarios.
Two main modules make up the system. One for the general users and one for the administrators. Information about hospitals and cabins can be created and updated in the administrator section. And the other half offers several notable features for the general public so they can access rapid and efficient medical care. Although the program can be used offline, it requires internet access to update and synchronize.

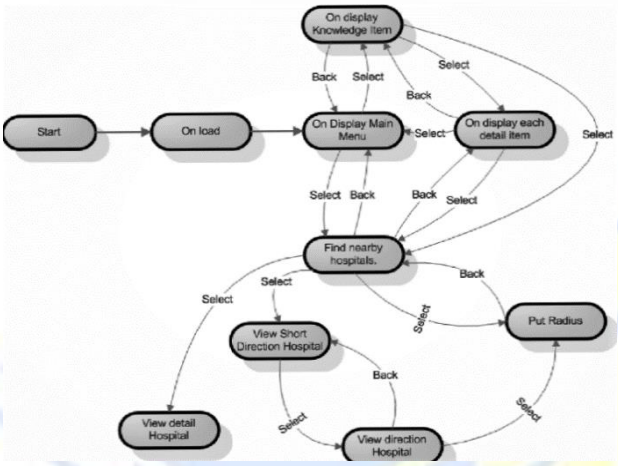

Fig.1 System Design of navigation functionalities of whole system

III.PROPOSED METHODOLOGY

A. *Mobile App*

There is a chance of unpleasant occurrences and accidents at work and in factories, particularly in industries where the machinery is large and a single piece runs for miles. In this case, there will be a death if help is not offered to the accident victim right soon.

The technique tries to shorten the time needed to alert the right authorities and the time it takes for relief to arrive. To make this simpler, the system includes a mobile application that enables the employee or employees in the sector to request assistance. Moreover, the system aims to improve the effectiveness of all threat and incident response procedures. The method assists in estimating the size or severity of the accident's damage. The characteristics of the mobile application are as follows: -

a) When logging in, the user's position is obtained and kept in the database to minimize proximity tracking errors. The database will thereafter often be updated with the location.

b) The user logs into the system using both Google Sign and his employment identity number. The user is required to supply all necessary data, including blood type, medical background, and emergency contact information.

c) Depending on the application's use case, as soon as the user initiates an SOS request, all employees/workers within a preset radius of the user are informed about the incident and provided the location of the user seeking assistance so they may acquire walking instructions to the area. Together with the location, the warning also includes the name of the specific sector where the event occurred. Also, a notification is delivered to a central monitoring system, where a decision on whether to call nearby law police and emergency medical services may be made. The user's emergency contacts are also alerted in the case of a personal injury.

d) The mobile application's home screen has an SOS Button that may be used in an emergency to send out an SOS signal. The user's profile should be accessible so that they may update it as needed.

e) In case rapid access to expert help is not possible, the program also demonstrates a variety of first-aid procedures.

f) Users nearby can find the users' position by using the alert that was given to them. The system makes use of the Google Maps application, which is now commonly found on most systems.

g)If a user can walk to the nearest first-aid facility on their own, they can view it after pressing the SOS button and find out how far it is from there.

B. System Description and Design

Emergency Situation Responder employs the MVC Architecture and is divided into three separate levels: User Interface, Logic Operations, and Database. When the user presses the SOS Buttons, three things happen: an alert is sent to the workspace's emergency services and security, an alert is issued to all system users nearby, and, if the user so wishes, an alert is sent to the user's emergency contacts.

Figure 1 depicts the architecture of the system. The user's identity is confirmed using Firebase Authentication. Only individuals who work in the industry are allowed access. In addition to sending SOS Alerts and responding to other users alarms, the user may search nearby First Aid Stations. The user's geolocation is gathered using Google's FusedLocationProvider API to ascertain where they are within the business.

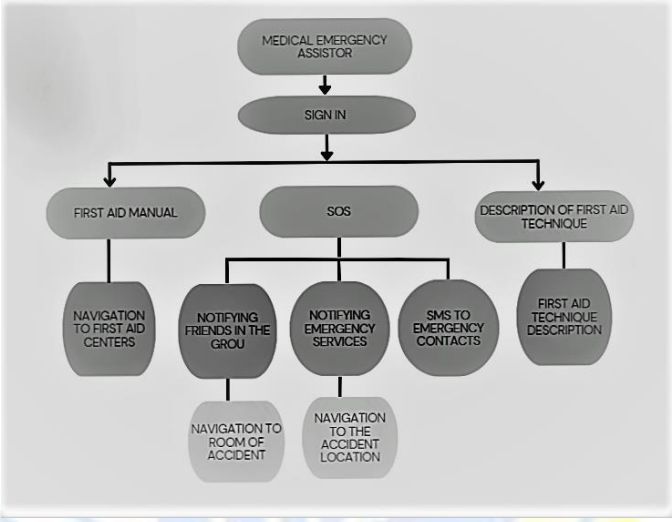

Fig.2 System Architecture of finding nearby hospitals and displaying information.

The Firebase Realtime Database, which is also used to locate FirstAid stations, is where users' sensitive data is stored. Cloud-based features are employed to locate and alert nearby users. Block-based navigation is provided in Fig. 2, which provides a detailed illustration of the whole system. The user can choose to press the SOS button after logging in, which starts the emergency procedures depicted in the diagram. The user has the option of looking up the nearest first aid facilities on a map or consulting the first aid guidebook as necessary. Figure 2 provides a systematic understanding of the app's navigation and features.

C. Firebase Database

With a hierarchical structure, the Firebase database maintains all the data about users, alerts generated, first-aid locations, geofenced business regions, and first-aid locations:

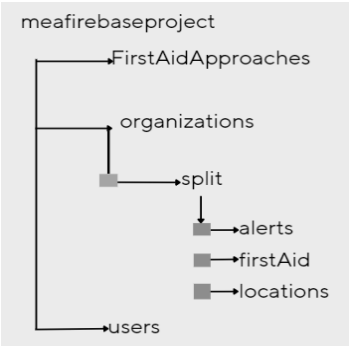

Fig.3 Database Structure

Several First-Aid Technique notifications are included in firstAidTechnique: Includes details on the warnings that have been sent out within the company during the last week; this information is used by the regional authorities using the central monitoring system.

FirstAid: List the locations of the organization's first-aid facilities.

Locations: Comprised of the geocoded locations of the fencing points used to demarcate specific industry areas.

Users: Holds information specific to each user, such as medical and emergency contact numbers.
With the data about the warnings that are saved in the database, businesses may enhance security and safety procedures in areas where fatalities occur often.

D. Forewarn and geo-tracking app
Pushing the SOS button on a mobile device causes a mobile application to transmit a request and the user's location to a server. By assessing if the location is inside the geo-fencing of that region, the server utilizes the geocoded position to map the location to the predefined industrial section.
A notification comprising the geo-location and the factory's information, section is then sent to all users within a set radius of the user by the server. The Firebase Cloud Functions of Firebaoffer the a server-side deployment of this application, and the Firebase Messaging Service sends notifications to users. These services use Transfer Control or Internet protocol to transport information and guarantee message delivery.

E.Analyzing user activity for potential life threats
The risk to life caused by any kind of emergency must be evaluated. Emergency actions are taken based on how seriously human life is at risk. Understanding the user's physical state is crucial before sending an SOS warning. The user may not be conscious if they are not moving, but their level of consciousness can be ascertained if they are.

This activity can be recognised by the mobile phone's numerous sensors. With the use of these detectors, data may be gathered and analysed to determine the user's movements. For this particular functionality, the user takes benefit of the ActivityRecognitionClient API. Data is initially recorded and then asynchronously transmitted to the central monitoring system when a user sends an SOS alarm. With the assistance of this warning and data on the user's activities, the Central Monitoring System can evaluate the situation and get in touch with the necessary emergency services.

F. System for Central Monitoring
The Central Monitoring System gets all of the alerts from the various system users. The supervisor evaluates the alerts and may check the crucial data, such as the user's location and medical information.The application also receives information on user activity, which it uses to assess the danger level of the scene and the victim's degree of consciousness.The Supervisor may then decide whether to contact the relevant local authorities and emergency services. In addition to receiving the section code and the user's location, the system the section's surveillance stream in order to learn more about the scenario.

IV. Results and Discussions

The system was developed using Android Studioand the basic sotware and hardware requirements used in developing this application is listed below.

1) Basic system requirements for Android Studio--- Microsoft, Windows, Mac, Linux.
2) Operating System Versio--- Microsoft Windows 7/8/10 (32- or 64-bit).
3) The Android Emulator only supports 64-bit Windows Mac OS X 10.10 (Yosemite) or higher, only up to 10.14 (macOS Mojave)
4) GNOME or KDE desktop Tested on Linux based on Debian (4.19.67-2 rodete2).
5) Random Access Memory (RAM)--- 4 GB RAM minimum; 8 GB RAM recommended.
6) Free digital storage--- 2 GB of available digital storage minimum, 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image).
7) Minimum required--- JDK version Java Development Kit 8
8) Minimum screen--- resolution 1280 x 800

Everybody should know how to manage first aid because it is one of the most valuable skills we can ever have. However, not all of us would endeavor to have first aid certification and most would probably think that they don't need to be certified. After all, common situations like a child falling down would just entail a mother cleaning up the wound and applying a plaster to the wound. But these are just the very basic first aid techniques that everyone knows how to do.

The root cause for developing this application is,
1)To develop an application that gives first aid knowledge to the user by using this application.
2)To provide a global positioning system (GPS) to the nearest hospital.
3)To test the user knowledge of first aid by providing tests for some situations in the application. At this point, it makes sense for everyone to learn first aid skills and require having this knowledge so we can help each other. All we need to do is take advantage of them.

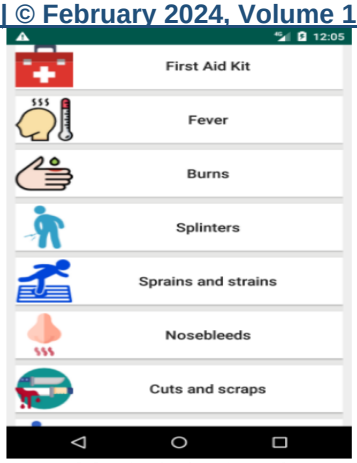

Fig.3 Display of different types of illness

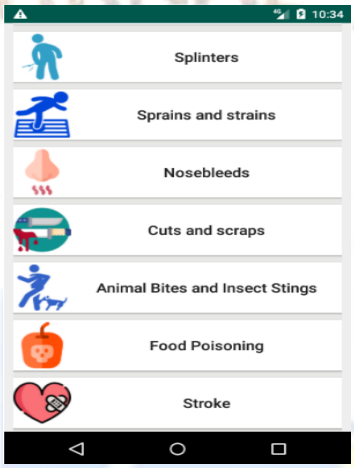

Fig.4 Major emergencies screen

Figures 3 and 4 display the major emergencies screen. This includes all the types of accidents and illnesses in which each of them has a detailed explanation of after-accident actions or steps to take. The explanation is manageable and also uncomplicated, which can be understood even by an amateur. Each of the section has options to choose whether the accident or the situation is “major” or “minor”. Based on the data, the app provides the necessary actions to be taken.

Fig.5 Treating fever in an adult with text

Fig.6 Treating food poisoning

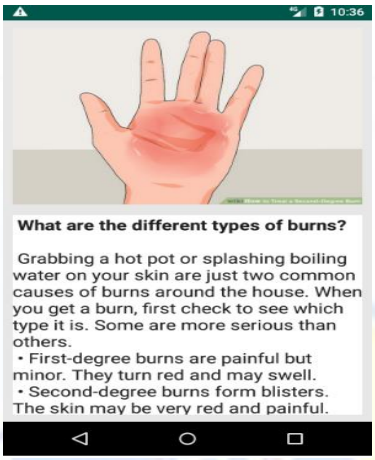

Fig .7 Treating different types of burns

Figures 5,6,7 describes different types of treatments given based on the accidents. This has a detailed explanation of performing various treatments based on the accidents. By means of text and pictures all the treatments are scripted clearly. This can be used even when the internet is off. Do's and Don'ts are also mentioned in the text. Reason for the disorders and also the further symptoms are also mentioned for clarification and to be aware in future. Step by Step procedures are given by which one can treat the injured better.

In the event of significant incidents, local Emergency Service centers are notified and given directions to the scene so that assistance can arrive quickly. In order to alert them of the an text messages is delivered to the victim's emergency contacts in the event of an accident..Ten people were used in the user pool throughout the app testing, and they were spread out in both nearby and distant locations. The test user sends an emergency notice to all other users. Although the warning was perceived to be received by everybody, the delivery time changed based on the network access and device condition of the recipients. Alerts were successfully sent four out of the five times this experiment was done with different network receptions. Even when there is a poor connection of GPS and the internet,still the messages are alerted to nearby people and contacts and the monitoring of the system runs in real time. When the system is throttled and scaled, limited network connectivity and delays are detected. A large delay may also be brought on by the queueing of warnings on the receivers. Yet, there will be additional infrastructure and maintenance costs. In that situation, a cost-benefit analysis is required, taking into account the expense of the infrastructure and the demand for accuracy.

Table 1, shows the different types of case study based on different applications like Navigation system , First Aid Guide App and the App being developed. Here, location is tracked using the navigation system, while the information is provided by the First Aid App, but the app that is being developed has all the features like Navigation , Information providing and also Video Animations for convinence and understanding.

TABLE I
COMPARISON OF CASE STUDY WITH THE APPLICATION BEING DEVELOPED

CASE STUDY	INFORMATION AND STEP FOR TREATMENT	PROVIDE OF LOCATION OF MEDICAL FACILITIES	VIDEO OR ANIMATION FOR MEDICAL TREATMENT
NAVIGATION SYSTEM	x	/	x
ASSISTOR GUIDE MOBILE APPLICATION	/	x	x
APP BEING DEVELOP	/	/	/

V. CONCLUSION

Every industry or location benefits greatly from the Medical Emergency Assistor. A Medical Emergency Assistor's main job is to deliver precise, effective, and intuitive support to businesses in distant locations while making sure that all essential emergency measures are performed to deal with the crisis. Large industries are more likely to experience accidents, and there is a lesser possibility that aid will reach the scene of the accident promptly. As can be observed from the findings, the app may be used in any significant industry and correctly fulfills the application's stated needs. The community grows larger and larger as the app's user base expands. As personnel in large firms would be dispersed and unable to receive prompt assistance in an emergency, this software is quite useful. As a result, the Medical Emergency Assistor would aid the staff in assisting their coworkers who were stranded in an emergency.

Smartphones are now a necessary component of everyone's life and the number of users is steadily rising. Almost everyone has a smartphone these days. The outcome is the release of a mobile platform that enables the user to alert the people nearby the area, first aid stations, and necessary officials in a situation that requires assistance. As can be seen from the outcome, the software makes sure that in the event of an accident, prompt and precise emergency procedures are implemented. Also, elements like navigation, videos of emergency medical techniques, and steps to take in these situations will be offered to the victim for the convenience of other users who wish to assist the sufferer. As it is simple to use and covers all potential accident situations, the programme entirely fulfils its purpose of assisting businesses or organisations in the event of an accident.. If specific circumstances are met, the app assures the effectiveness of the functionality. It is believed that the operational region has strong network connectivity throughout.

A.Future Improvement

1. A sensitivity function to the app can be added in future so that if the phone jerks violently or the temperature rises unusually, a pop-up will ask the user if they are okay, and if they don't react, an automatic emergency notification will be sent out.This might be useful in situations where the user is unable to quickly access their phone.t it can be handled more effectively.

2. Presently, the victim must post the acute problem so that others may read it and respond appropriately. If the victim is unable to type, they can just push the SOS button, and users will be notified. The app will then utilise the video to describe the incident in depth. As a result, we want to provide users with the choice to snap an image or a clip of the situation. To address the problem more efficiently, the app will also share an image or footage of it with other users and emergency assistance centers.

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