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SHISTI - An Automated First Aid Application

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Abstract: *The technological advances in the recent past have been enormous and has led to a huge rise in the number of mobile users. Nowadays smart phones have reached each and every hand. As a result, people are making use of the beneficial mobile applications to make their everyday life easier. This paper focuses on development of a mobile application(app) by providing an effective help for First Aid. Nowadays, people use mobile phones and internet for all kinds of thing like- from getting basic needs delivered home, online shopping, online tutorials etc... But the sad part of today's world is that in spite of having all the knowledge at our disposal, we often struggle to help people in case of emergencies. Using these technological advances in Mobile application and Data Science, we are proposing an idea for getting the First Aid help on hand by using Mobile application and to assist the user with personalized instructions (chatbot) to be followed in case of emergencies to save lives. The proposed system also concentrates on automated ambulance calling, collecting GPS location of user, sending image of injured person with the details of the person location and chat transcripts to doctors and volunteers for immediate help.*

Keywords: *Pattern matching algorithm, Intent classification, chatbot, .*

I. INTRODUCTION

In a country with more than 1 billion people, and almost 70% of them residing in rural areas, first aid treatment is very essential to save lives in case of emergency. With cities ridden with traffic, remoteness of villages and lack of availability of good medical ambulances, we may not always get the desired emergency help when needed. This makes first aid more important. The by-stander or a person in the vicinity with appropriate first aid knowledge is a gift from heaven. But this is not always the case, there may be possibility that the methods they use to treat the victims may lead to more severe condition of victim. More than 73% of Indians are not aware of the basics of first aid and hence fail to help in the hour of need. This calls for the need of trained individuals(volunteers) who can provide basic emergency help to keep the patient alive when the actual medical help is delayed.

The emergencies in day to day life can generally be classified into 5 categories,

- A. The injuries that might hurt, and might keep hurting for days, but are unlikely to kill you, no matter how long help takes to arrive. Bumps and bruises, sprains, hairline fractures, cuts and small wounds that will stop bleeding on their own, etc.
- B. The injuries that need care and attention, but probably won't kill you as long as you stay put and aren't extricated roughly by untrained people. Broken bones, actual or possible neck and spine injuries, etc fall under this category.
- C. The injuries that need attention, and might kill you if left for a really long time. Bruises to internal organs, minor head injuries, and perhaps some underlying medical conditions that could *cause* the crash, like something that causes you to black out.
- D. The injuries that actually will kill you in a short time if we don't do something about them - more severe trauma, blood loss, cardiac arrest, stroke, etc.
- E. Things that we can't do nothing about, because they already killed you basically instantly on impact. If your heart was ripped off your aorta by the extreme deceleration force and cases similar.

The number of fatal and disabling road accidents are increasing day by day and is a real public health challenge for all the concerned agencies. The approach to implement the rules and regulations available to prevent road accidents is often ineffective and half-hearted. Awareness creation, strict implementation of traffic rules, and scientific engineering measures are the need of the hour to prevent this public health catastrophe.

Many models have been proposed in this direction to provide first aid instructions or provide the information about the hospitals nearby. An application that can provide live emergency help when and where required is not available. Our application aims at integrating the two and providing a live emergency support. SHISTI means "help" in Sanskrit. This application is developed in order to provide help during emergency situations. Shisti is a personal emergency help application wherein it serves to help the individuals or the passerby in any emergency situation. It provides personalized treatment instructions based on the description to save lives of many.

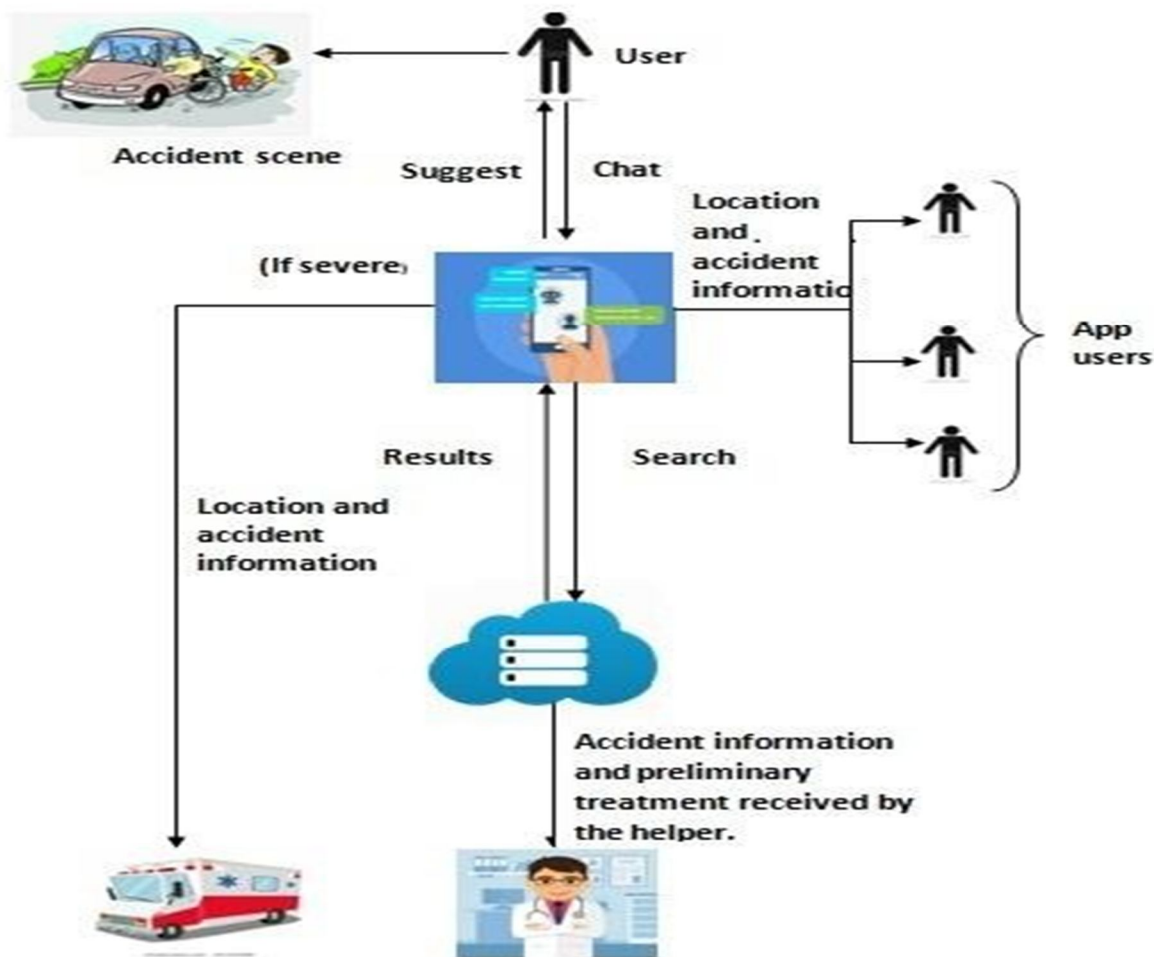
II. RELATED WORK

Sl.no.	Paper	Content	Year	Findings
1	Automated First Aid and Medication System for Burn Victims (IEEE International Advance Computing Conference (IACC))	<ul style="list-style-type: none"> providing first aid information by recognizing degree of the burn. sending the victim's information and image of burn to the cloud interface which is also connected to one or more burn trauma centres seeking the experts advice, and making the cloud learn from this data. <p><u>Methods used:</u></p> <ul style="list-style-type: none"> Image processing techniques can be used to assess the burn. Based on the image we try to detect the severity of the burn and suggest correct first aid for the same(burn). Sending victim's information and burnt body part image provided by the user to our cloud server which is also connected to major burn trauma centers. Here a burn practitioner verifies the burn by visual inspection and then tells the correct way to proceed. The system on the cloud saves the 	2014	<ul style="list-style-type: none"> Collecting victims information. Sending the collected information to experts , and suggest correct first aid. Tracking victims location using GPS and providing them the location of nearest hospitals . Also sending the information to nearest trainer.

		<p>data for future reference.</p> <ul style="list-style-type: none"> Accessing victim's current location using GPS. By using this we will display him/her the nearest hospital with the direction. 		
2	A Smartphone based Application to Improve the Health Care System of Bangladesh (IEEE)	<ul style="list-style-type: none"> Information about facilities of hospitals and their locations. Provide assistance to the user to make an emergency call for an ambulance or health care service Intelligent suggestion of hospitals based on cost and quality Information about the doctor's chamber in a city, a way to make an appointment with the doctor An alert system to take medicines in a fixed time. The application will alert the user for taking medicine in proper time. Body Mass Index (BMI) calculator. 	2016	<ul style="list-style-type: none"> Information about facilities of hospitals and their locations. Assistance to the user to make an emergency call for an ambulance or health care service

3	First Aid Instructional Media using Android Platform (IEEE)	<input type="checkbox"/> Providing first aid training and emergency instructions using instructional media. <input type="checkbox"/> The instructional media is in the form of text and graphics. <input type="checkbox"/> Visual graphics used as media for illustrating first aid measures for 13 types of wounds and injuries.	2017	<ul style="list-style-type: none"> • Providing training to user through instructional media
4	First Aid Application on Mobile Device (World Academy of Science, Engineering and Technology International Journal of Computer and Information Engineering)	<ul style="list-style-type: none"> • First aid instructions for various types of injuries and wounds such as muscles and bones injuries, skin injuries, respiratory disease, viscera injuries, injuries from toxic and other injuries. • Retrieving GPS location of the victim and displaying nearest hospitals. • Allowing the user to select a hospital from the given choices and guide them to that hospital through the shortest path possible. 	2013	<ul style="list-style-type: none"> • Retrieving GPS location of the victim and displaying nearest hospitals

III. METHODOLOGY



Many models have been proposed in this field, but most of them focus more on giving just the first-aid instructions in the form of text or animations. None of the existing applications provide a way for the user to interact with the application and get help regarding first-aid treatment during emergencies.

They also do not have any kind of automated system to either call emergency services without user intervention or to seek help from the nearby users by sending some kind of message.

St John Ambulance First Aid is an android app developed by St. John's Ambulance first aid that presents the users with only the first aid instructions and schematics.

This app does not provide any personalized instructions to the users' needs and situations. The paper "Automated First Aid and Medication System for Burn Victims" provides personalized information to users in case of burns but the application is not available for other accidents. One more limitation of "Automated First Aid and Medication System for Burn Victims" is that it does not allow the users to seek help from the nearby app users. Our system is designed after considering limited computational power and also personalization for the naïve user.

A smart-phone with an active internet connection is prerequisite for this system. The app without an internet connection will still support the app but will only work for limited functionalities. Functionalities like viewing first aid course material and chatbot interaction will work even without internet connectivity. Other functionalities like automated ambulance calling and pushing notifications would require data connectivity.

The application proposed here provides personalized first aid treatment instructions based on the type of accident and the injuries incurred. This is achieved by providing the users with a chance to interact with a chatbot designed specifically to handle emergencies.

The chatbot when engaged would ask the users some basic questions to start with and try to assess the situation. The user can then enter his query in the chatbot to get responses. The chat responses are extracted from the database using pattern matching algorithm and Intent Classification.

When the chatbot is clear with what kind of emergency the user is dealing with, it will go on giving the appropriate directions to be taken with respect to providing first aid treatment. The chatbot will guide the user in treating the patient in a procedural manner. Once the procedure is complete, the user will be prompted to rate the chatbot's efficiency and based on the rating the chatbot will be updates to serve the users better. The chat transcripts will be stored in the database to further train the chatbot for better efficiency and accuracy.

The chatbot described above may not be able to handle every possible situation. In some cases the patient may need immediate expert emergency care. In these cases the usually the people present in the scene tend to call ambulance service, describe the situation and guide the ambulance to the location. This way of calling emergency services may take a lot of time which may be better utilized in treating the patient. This is fine when there is sufficient number of people around. But in certain scenarios where there is only one person present in the location, it may consume a lot of time and increases the risk worsening the injuries due of lack of proper treatment on time. So the application proposed is equipped with an automated calling system which will call ambulance to the accident scene. This is done by accessing the user's location and would require both GPS (Global Positioning System) and internet connectivity to be active on the smart-phone. The extracted location along with some information about the type of injury incurred will then be sent to the emergency centers. The information about the kind of emergency is extracted from the chat transcripts of the chatbot.

As discussed earlier, there may be some situations where the person present in the accident scene may not be able to handle and treat the patient on his own. These are the times where some extra assistance go a long way in making a difference. The presence of trained professionals or even some other people can come in handy. Not only can they help in the treatment process, they can also help calm down the person attending the victim and help in other task as well. Keeping this in mind we have designed a system which can request help from the nearby app users. This is done by sending push notifications to the users present nearby. The message will consist of the name, contact number, the location of the person seeking help and the images of the injuries incurred by the patient during the accident.

The message sent will also contain the type of situation that is being dealt with. The users, whom we are addressing as volunteers or helpers, can then accept the request and proceed towards the scene to help the person in need. The same notification can also be pushed to the doctors registered in our app so they can respond to the situation and help the caretaker attending the person by directed him/her on phone call.

IV. FEATURES OF PROPOSED SYSTEM

Various works have been carried out in respect to giving guidelines to the users for first aid treatment. In such applications, the user has to use their intelligence to analyse and then decide what is to be done. This may sometimes worsen the situation in case the user is unable to analyze the situation correctly. The alternative is surfing the internet to get appropriate first aid instructions. However, surfing the internet is a tedious task and involve lot of time. Moreover, in some cases, the data provided may be unreliable or unrelated. Our proposed system provides the provision to describe the situation via a chatbot which enables proper analysis of the situation. Based on the analysis of the description of the situation provided by the user, the application provides appropriate first aid instructions. Moreover, our application provides provision to call ambulance or an emergency number automatically and seek help from volunteers nearby. Based on the severity of the situation, the application calls the emergency number which will help the user get proper treatment in time once the ambulance arrives to the vicinity. Getting instant help from the volunteers having knowledge of first aid will save lives of people in case the user does not have confidence in providing first aid treatment. Our proposed system thus will save lives of many by providing reliable instructions through a personalized bot, by contacting ambulance automatically and by notifying volunteers in the vicinity about the situation.

V. CONCLUSION

The rapid evolutions of science and technology are helping people are getting easier and convenient solve their everyday problems. The health care is also getting attention of the scientist and researchers, and they are developing a helpful system to save life and care for life. In this paper we are proposing an idea of developing an android system(SHISTI) which helps the user for getting the First Aid help on hand by using Mobile application and to assist the user with personalized instructions to be followed in case of emergencies to save lives. The proposal application will provide automated ambulance calling, collecting GPS location of user, sending the collected location and the chat transcript details to doctor and volunteer for their help to speed up the service in case of emergency.

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