# e-Care: An Online Global Life Saving Solution

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***Abstract*—This paper aims at designing and development of An Online Global Life Saving Solution System i.e. e-Care which consists of mainly five modules: Crash detection module, GSM interface module, PRFC module, Universal Database Module and, the last and most important Web module. This system presents completely an innovative idea for prevention and detection of accidents and post-detection measures. Under this aspect, a person who becomes a part of our Universal database, can be treated anytime anywhere in the world with the help of our innovative idea of globalization of patient with the use of PRF (Patient Radio Frequency) card. In case of an accident, the Accident detection module detects it and informs to local EMS services through GSM interface module. The patient can be taken to any nearby hospital registered with our Web module with the help of his PRF card which is linked to our Universal database from where his previous medical history can be accessed which reduces the time of pre-treatment testing of various medical parameters.***

## I. INTRODUCTION

The disproportionately high fatality rate for highways and rural areas - (in general where immediate help cannot be given in case of some crash) crash victims have been attributed to several factors. The most prominent factor scientifically, ethically and statistically is undoubtedly delayed in delivery of emergency services to crash victims [5] as shown in "Fig. 1". Much has been said about these situations. A look on the remedial systems provides us with sophisticated systems. Some which are efficient in notifying the crash. Some talk about effective reaching of the place while the others clearly mention the after work performance when a crash occurs. But difficult to accept the strange fact is as many as thousands of life has been lost and are being lost in years even if we have many working organizations.

This paper aims at designing and development of e-Care- "An Online Global Life Saving Solution System" which provides online global medical care anywhere in the world. The service is integrated with the accident module to present a complete cost effective solution to the surface accidents.

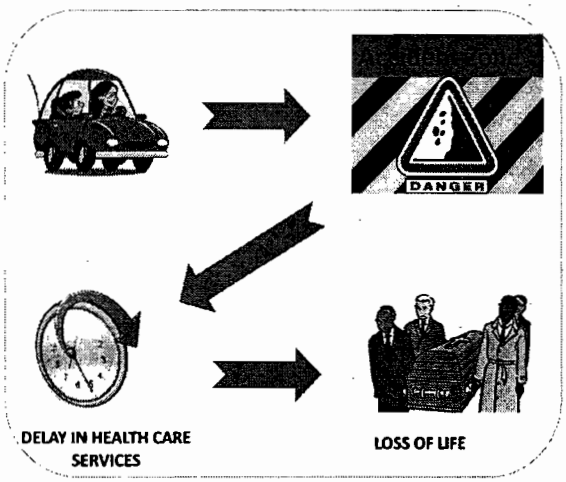


Figure 1. Existing solution

## II. MOTIVATION

There are different solutions for accident detection exists in market. In Developed countries like U.S, we found out that the solution existing for the same incorporates G.P.S (Global Positioning System) which needs satellite interaction [7]. This solution is clearly very costly and sophisticated. In short, these systems are not possible to be implemented in developing countries like India due to their very high cost and highly sophisticated mechanisms.

Secondly, whenever an accident takes place, the individual to be operated needs to be tested for his medical parameters [9] like blood group , anesthesia test , oxymeter test and others , which wastes a lot of time during the so called " Golden Hour " . We have come up with an idea of implementing a PRF Card which gives total medical history of the victim without any test needed. This saves lot of time in the critical period and the person is directly operated without any medical tests hassle. The idea is to have a totally innovative Global Database connected with our website which provides total safety to any person anywhere round the globe.

## III. ORGANIZATION OF THE PAPER

This paper consists of mainly five modules: Crash detection module, GSM interface module, PRFC module, Universal Database module and, the last and most important Web-based service module. This system, shown in "Fig. 2" presents completely an innovative idea for prevention and detection of accidents and post-detection measures. Initially, we have discussed the each module separately to give a good understanding of each module. And finally we have given the complete integrated system which gives the complete picture of the whole system.

## IV. A BRIEF OVERVIEW OF THE SYSTEM

Whenever some crash takes place, the Crash Detection Module fixed in the vehicle gets activated, thus activates the GSM Interface Module [3] and sends an automated voice message to nearest EMS services with the help of local cellular towers. Once the voice message has been transmitted, a communication link will be automatically established so that the Emergency unit dispatchers can verify the crash and the location. Using information from the crash vehicle, personnel at the nearest hospital can provide immediate assistance to the victims of the crash with the help of their individual PRF card.

Every PRF card number is associated to the Universal database through the online software from where that particular individual's information can be accessed of a registered person. This allows updating of the particular person's database whenever he or she meets the doctor and some new medical prescriptions is given to him/her so that latest information about the person should be available in the database. So, with the help of this PRF Module, whole previous medical parameters will be known. Thus, instead of wasting time in checking his/her medical parameters; treatment can be started directly in minimum time. Once again parameters can be updated in his/her database after treatment.

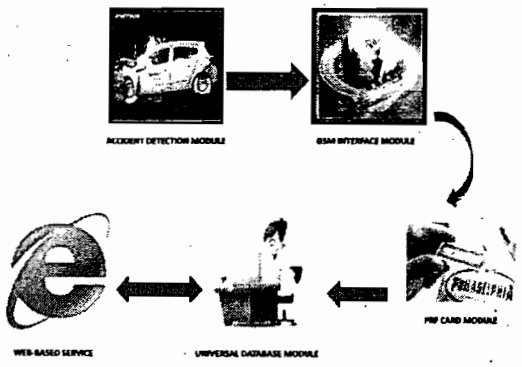

Figure 2. Module description

## V. ARCHITECTURE OF THE SYSTEM

It uses fundamental 3-tier architecture as described in "Fig. 3" for the implementation of the desired system design. Various forms of schema levels are being instilled for the interfacing of different type of users.

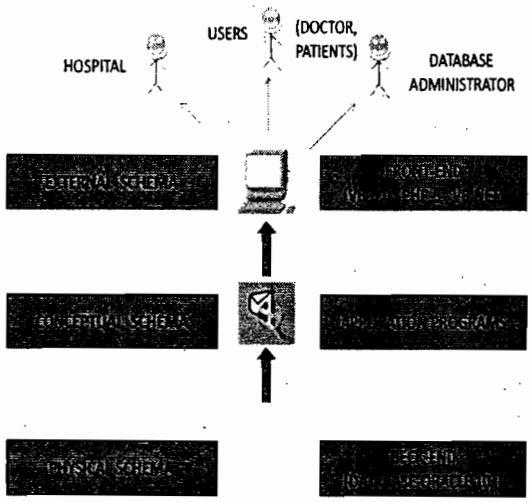


Figure 3. 3-Tier Architecture

### A. *Accident Detection Module*

In our design, which is shown in "Fig. 4", this GMR sensor is placed on the automobile shaft to give the measure of speed in terms of voltage. This voltage in turn is converted into a digital value by connecting it to a micro-controller PIC16F877A. This PIC16F877A has got an upper hand as compared to other micro-controllers and that lies in the fact that it has an in-built ADC unit and supports only 35 instructions to execute any program.

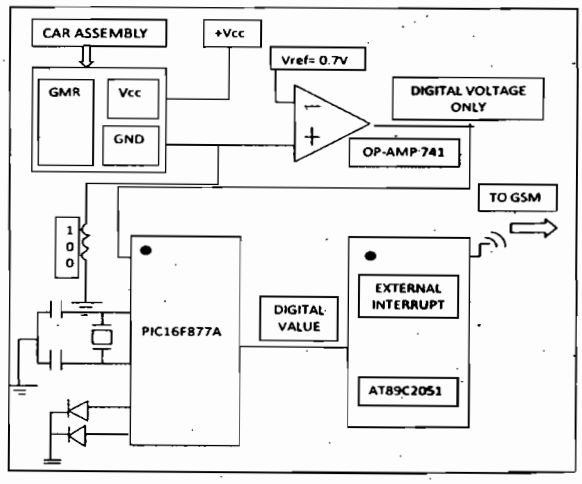


Figure 4. Accident Detection Module

*B. GSM Interface Module*

Once we get the digital value of the signal, it is then fed to another micro-controller – AT89C2051 that waits for an interrupt (in case of any collision). Incase of any crash, the Interrupt Service Routine (ISR) of the micro-controller runs [17], which in turn activates a GSM interface and a message, in the form of text, is sent to the Patrolling Services/ Emergency Medical Services (EMS), for emergency help. The path of GSM alert is displayed in "Fig. 5".

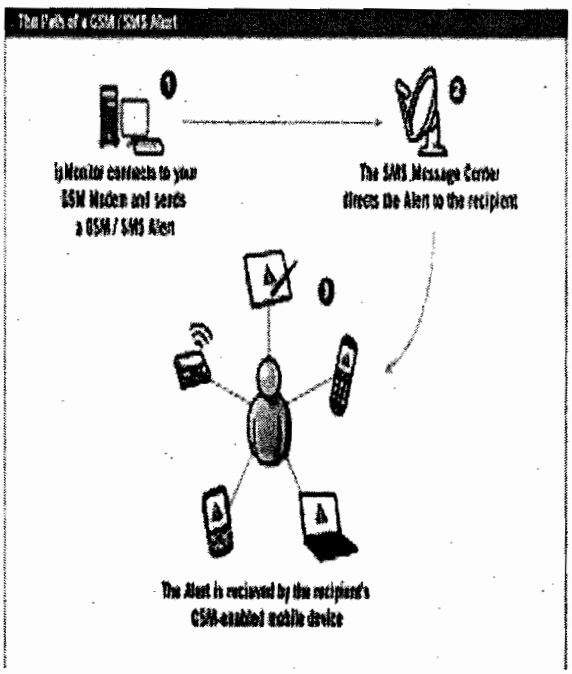


Figure 5. Path of GSM Alert

*C. PRF (Patient Radio Frequency) Module*

Every registered patient is issued a PRF card (inner structure is shown in "Fig. 6") which when sensed by the RFID reader [14] will open the patient's database link in the Universal database. With the help of this PRF card, his previous medical details can be accessed which actually help the new doctor to start his treatment in minimum time without wasting time in checking his medical parameters like blood group, blood pressure, breathing rate, anesthesia dosage, etc. Software for the RFID reader has been designed in Visual Basic 6.0.

*D. Universal Database Module*

This is the main focus of this paper because here only each and every details of every member of our system will be stored whether it is a hospital, doctor or a patient. Proper management of this module is very important for successful working of this whole system. This module has been designed using VB.net in front end (for administrator access) and Oracle 10g in back end.

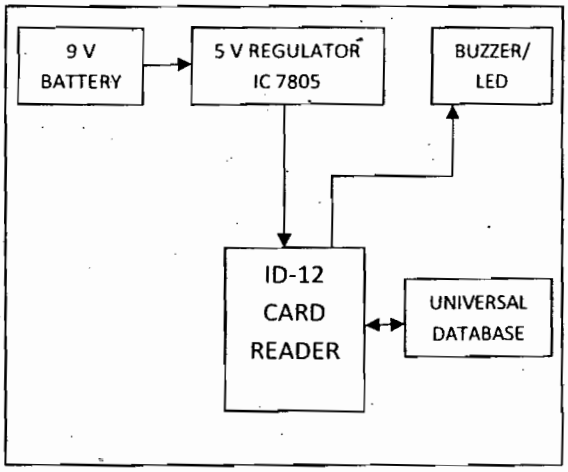


Figure 6. PRF (Patient Radio Frequency) Card

*E. Web-based Service Module*

This module is online software which is having the options for the hospitals, doctors and patients to register themselves with their complete details. Thus, it is actually controlling a Universal database of hospitals, doctors and patients. The whole database will be controlled by the administrator. This software will be floated online where any one can register themselves with some minimum charge and can utilize the services of getting treated anytime anywhere in the world. This website provides opportunity to discuss one's problems and get their solutions through our "**Forum section**". It also boasts of updating with the new technological advancements in Medical sciences in the section **"What's New"**.

- This software has been designed using PHP-5.0 in front end and Oracle 10g in back end.
- There is a need for an organization to come forward to manage and control this large amount of database.

## VI. INTEGRATED SYSTEM

The "Fig. 7" given below shows the complete integrated system. The accident detection module along with GSM interface detects and notifies the accident to local EMS services (indicated by ambulance). Then, the victim is operated in the hospital after accessing his details through his PRF card.

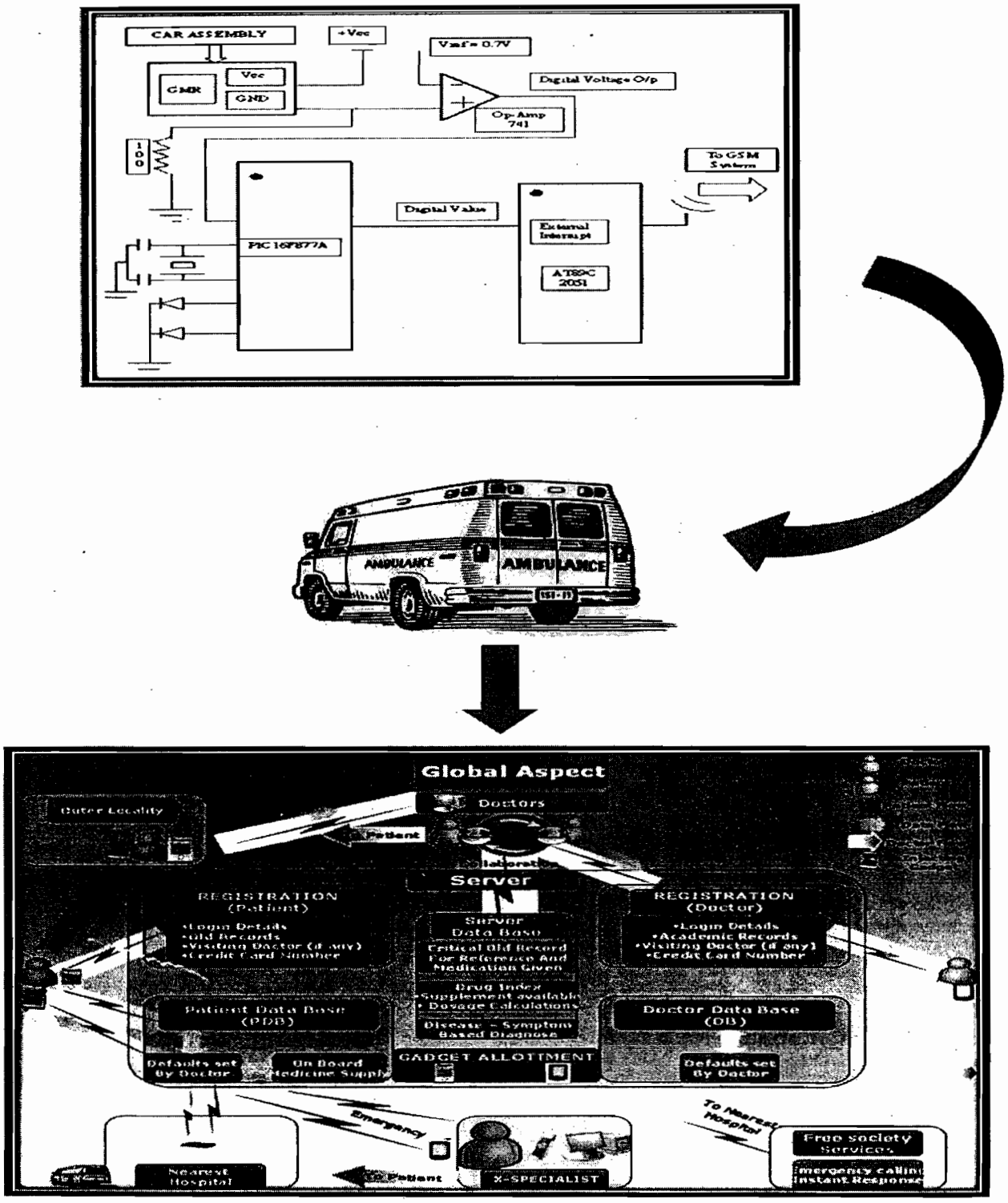


Figure 7. Detailed design of the system

## VII. CONCLUSION

This technology will be very helpful in case when the patient moves out of his/her native location. In case if he/she meets with some accident and needed urgent medical care, he/she can be easily treated in any of the nearest available hospitals with the help of his PRF card which is connected with our software.

There are some issues which need to be taken care. Firstly, the governments of different countries will have to go for a collaboration to provide instant medical services anywhere in the world. Secondly, to make it successful, maximum hospitals and emergency medical services will have to come forward to join with us and provide service to the world.

To prove the credentials of the web-based service, a test website named www.vcare.uni.cc has been launched.

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