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Information System for Exigency using Internet of Things

Ganesh Balaraman* **and Harisudha. K****

Abstract: The reconnoiter of the internet of things has to the surge in development of new applications. This paper discusses about the unmitigated information system that can be embedded into ambulance information system. For a person in a disparaging trauma due to road accident, a nitpicking information system is set up. When the ambulance starts from the accident point, it fixes the destination(to which hospital the patient will taken to). The system also collects the intuited data of iris and fingerprint. A face recognition mechanism is also performed to identify who the individual with the help of the public database and also the current status of the patient i.e., accident location and hospital to which the individual is taken is also shared to the individual reference that is given alongside the public database. Also blood pressure level, sugar level, pulse rate is also sense and shared to the destination hospital.

Keywords: Internet of things, Information system, Fingerprint recognition, Iris scan, facial recognition.

1. INTRODUCTION

The Internet today is full of data collected, collated, curated and manipulated by people with the help of computers.

The Internet of Things, is a global network of contemporary physical devices, which collect, process, and upload data into the cloud database where it can be further processed into meaningful, and maneuverable information. Ensnared the disparity? To Us Internet means computers, tablets and smartphones. Think of lights, fans, refrigerators, washing machines, music systems and the like, which are equipped with sensors to detect their own internal state or surroundings, which are connected to the Internet. That is the "Internet of Things". Contemporary objects which can connect to the Internet and can identify themselves to other objects are really digital representations of the object. The object relates not just to the user, but is now connected to the surrounding objects and data in databases. When such a network acts in unison, they develop "ambient intelligence". The predominant step is the idiosyncratic identification of objects and therefore, IoT is closely related to RFID technologies. In fact, Kevin Ashton, who coined the term IoT, was a pioneer in RFID. However, in reality, RFID is just one technology that can be used for identification and communication. Many other sensor technologies, like QR codes, etc., are commonly used in most of the upcoming applications. A connotation that is gaining acceptance among experts is one by Vermesan & Friess used in their book "Internet of Things – Global, Technological and Societal Trends".

We are all constantly bombarded by hype on technology trends, but there are two genuine technology tsunamis heading our way right now, namely the Internet of Things and Smart Machines. When these two forces collide with one another and with us, they will create an exponential growth of new opportunities in areas as diverse as entertainment, healthcare, disaster management and smart cities. If you thought the mobile revolution has had a huge impact on individuals and businesses, you haven't seen anything yet!

* PG Scholar, Department of Telecommunication Engineering, SRM University, Tamil Nadu, India. *Email: ganesh_bala@srmuniv.edu.in*
** Assistant Professor, Department of Telecommunication Engineering, SRM University, Tamil Nadu, India. *Email: harisudha.k@ktr.srmuniv.ac.in*

2. SENSING UNITS

A. Face Recognition System

Face detection is the process of automatically locating human faces in visual media (digital images or video). A face that is detected is reported at a position with an associated size and orientation. Once a face is detected, it can be searched for landmarks such as the eyes and nose.

Here are some of the terms that we use in discussing face detection and the various functionalities of the Mobile Vision API.

Face recognition automatically determines if two faces are likely to correspond to the same person. At this juncture note that, the Google Face API only provides functionality for face detection and **not** face recognition.

Face tracking extends face detection in video sequences. Any face appearing in a video for any length of time can be tracked. That is, faces that are detected in consecutive video frames can be identified as being the same person. Note that this is not a form of face recognition; this mechanism just makes inferences based on the position and motion of the face(s) in a video sequence.

A landmark is a point of interest within a face. The left eye, right eye, and nose base are all examples of landmarks. The Face API provides the ability to find landmarks on a detected face.

Classification is determining whether a certain facial characteristic is present. For example, a face can be classified with regards to whether its eyes are open or closed. Another example is whether the face is smiling or not.

Figure 1:Face Recognition

B. Iris Scanning

Iris scanning can seem very futuristic, but at the heart of the system is a simple CCD digital camera. It uses both visible and near-infrared light to take a clear, high-contrast picture of a person's iris. Near-infrared light makes a person's pupil pitch black, making it easy for the computer to isolate the pupil and iris.

When the person looks into an iris scanner, either the camera focuses automatically or a mirror is used or audible feedback from the system to make sure that you are positioned correctly. Usually, the eye is positioned 3 to 10 inches from the camera.

Iris scanners are becoming more common in high-security applications because the eye is unique for every individual (the chance of mistaking one iris code for another is 1 in 10 to the 78th power. They also allow more than 200 points of reference for comparison, as opposed to 60 or 70 points in fingerprints.

The iris is a visible but protected structure which does not usually change over time / due to surgery, making it an ideal feature for biometric identification. Even Visually disabled people can use iris scanners as long as their eyes have irises. Eyeglasses and contact lenses typically do not interfere or cause discrepancies.

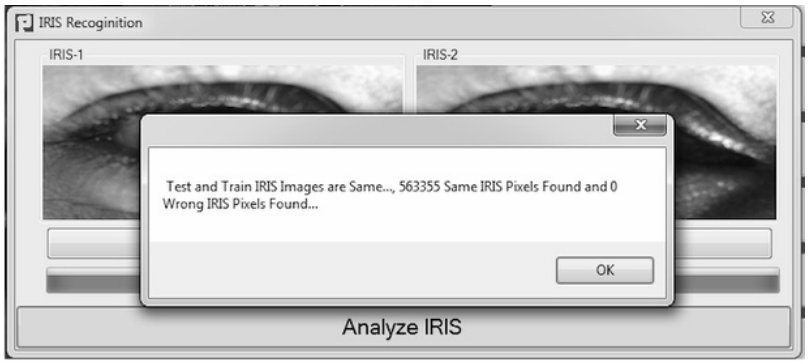


Figure 2: Iris Recognition

C. Fingerprint Recognition

Fingerprint biometrics is the most popular, widespread, reliable and efficient biometric technology available today. Due to its versatility, fingerprint biometrics is applicable in almost all areas that require clear identification.

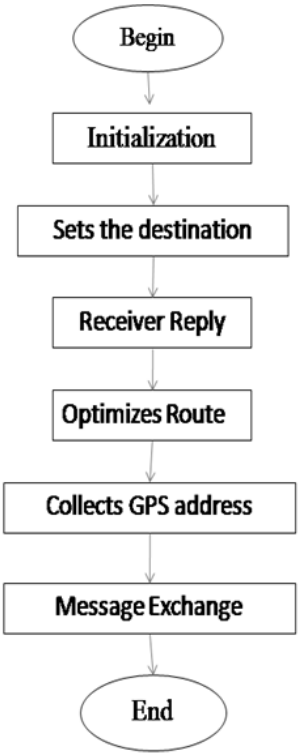
Fingerprints are distinct to each person thanks to the unique papillary features and are different even in twins. Fingerprint patterns remain unchanged throughout the entire adult life and are easily produced for identification.

Figure 3: Fingerprint Scanning

3. PROPOSED SYSTEM

The system is proposed for the ambulance to identify the person who has been taken into it during the exigency. Further the system is supported by another application which inclines to communicate with other vehicles. The ambulance is routed to the nearest hospital using V2V communication with GSM. When the ambulance starts from the accident spot, the system is instigated by connecting to the internet. The destination is plunked on the device and a reply from the receiver is anticipated. Once the reply is received,

the system optimizes the routes and collects the GPS address of the destination. The messages are then exchanged between the vehicles on the route (the route that is fixed by the driver). The messages are sent as text message where all the other vehicles are expected to use the same application which is enabled with Google maps. The messages are expected to make a coverage upto 1 km to other vehicles which are ahead of this ambulance, hence making the traffic congestion to get optimized. This function takes over between ambulance and other vehicles. The flow chart below describes the concept on how all of the other vehicles are being reached by the ambulance.



Flow chart of Ambulance to other Vehicle Intimation

And the below figure(4) represents the snapshots of the application which takes the current location and destination location is given by the user. It also counsels the best possible and shortest routes along with an estimated time to reach the destination. The application is built in such manner that it can find out nearest hospital around and also the user is allowed to change the destination point on his respective regard.

Simultaneously on the other side, the identification of the patient who was brought inside the ambulance takes place along with the first aid process. The biometric sensing will take place as an automated process, such that the first aid process is not affected. With the combination of the three biometrics as described above, the patient detail can be identified which is similar to that of the data present in Public Database (AADHAR database). The condition of the patient will be intimated to his/her relative which is mentioned in the public data card through SMS or voice initiated call and a personal mail is also sent. The patient's reference person will get information about the patient details and the hospital where the patient has been admitted. A minimal information about the patient, such as pulse rate, blood group, blood pressure, sugar level is intimated to the hospital via GSM, before the ambulance reaches the destination, to prepare the hospital for giving necessary first aid. The complete analysis is done with the help of an automated system which can be built inside the ambulance. With the help of the GSM system, all the above sensing analysis is made and identity is deciphered. On a default scenario, apart from the referential person, the observed

details are shared only to the destination hospital . This system works in a smarter mechanism, making it an Internet of Things.

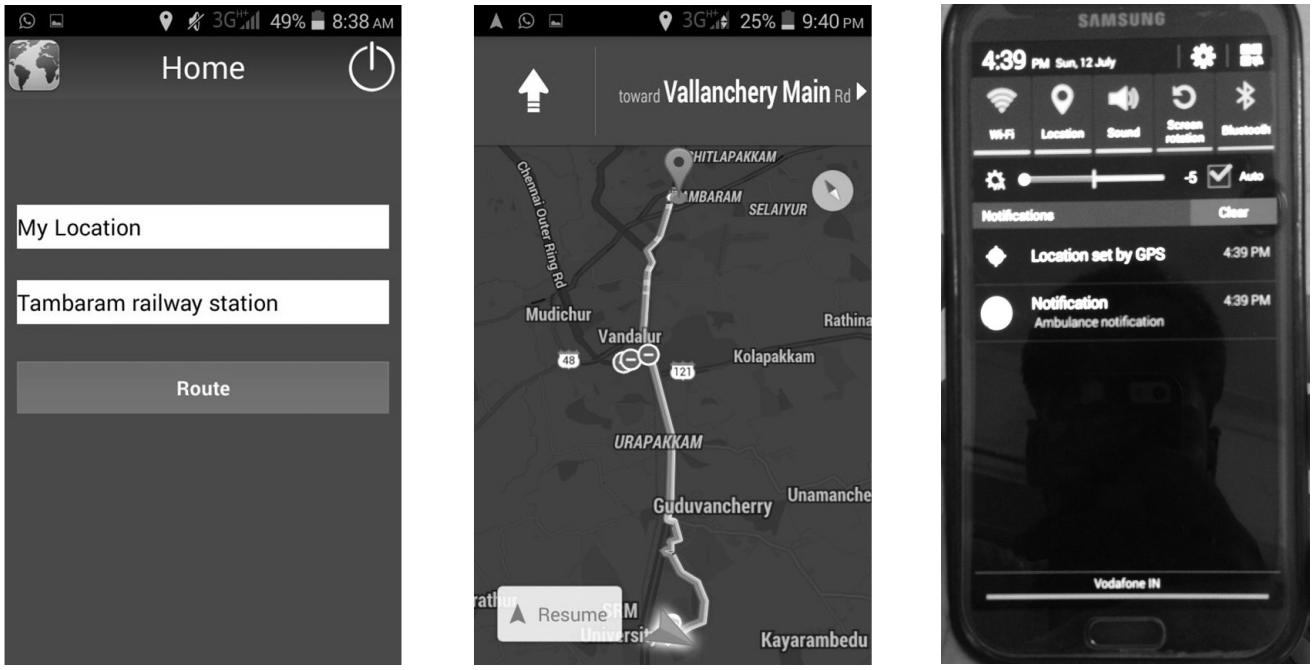
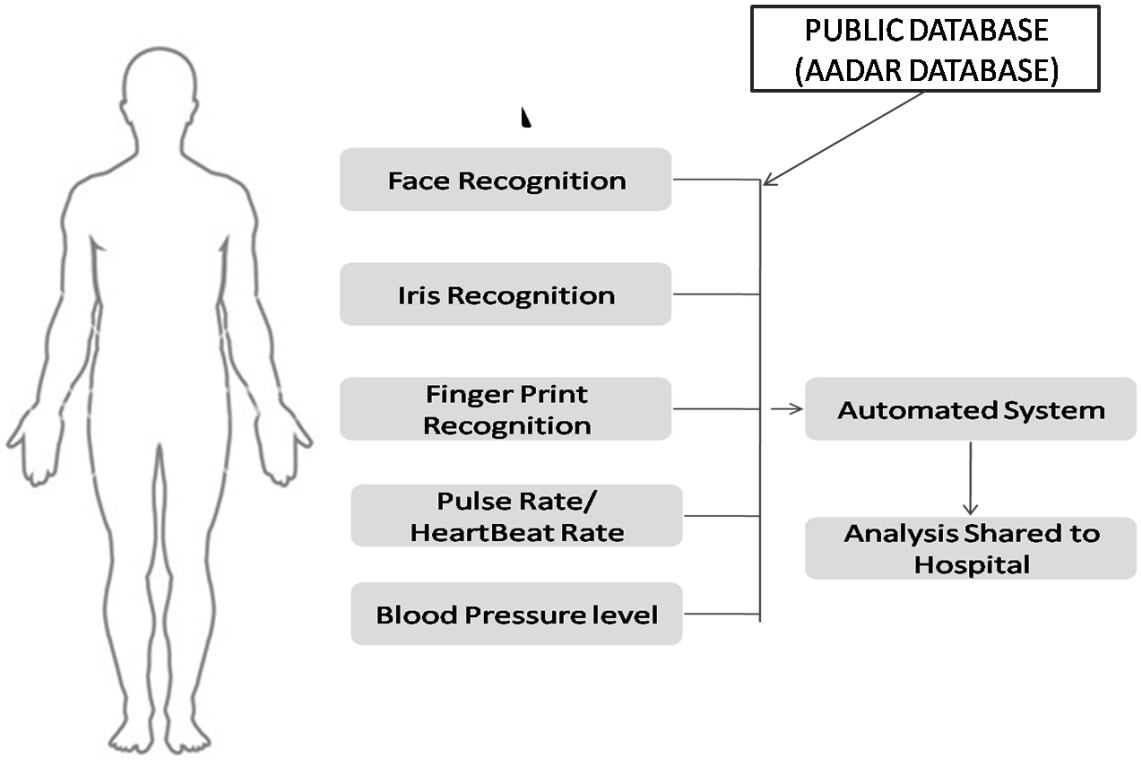


Figure 4: Routes Selection and Message Intimation



Overview of all sensing Units that is to be shared to Monitor System

Below is the output generated once after the above sensing are done. Once, after the identity confirmation the generated output system is shared as an attachment to the reference associated to the individual through the mail. The below listed latitude and longitude values represents the location of the accident taken place.

Generated Mail and its attachment

4. CHALLENGES AND SECURITY

For any type of an internet based application, it is obvious that it is highly insecure. Hence the praxis of cloud storage resources would strengthen the security of the data that are stored and used during the process. At this juncture, it must be noted that the operating system can provide a much efficient firewall to provide additional security from online threats to these online applications. On the other side of the automated system, building the addition sensing units could also be a major challenge as it should not affect the current system.

5. CONCLUSION

This system can revolutionize to dewy and upgraded information system that can be built inside the Ambulance. With the adoption of above ideology to the system, it becomes very ideal to diagnose the person whose is at critical trauma. This type of prototype for the information system help to embed many other possible devices like X-Ray machine, scanning machine, blood type detector etc. The biggest advantage that we have is that it is purely embedded to an automated system which helps the further attachment of above listed possible devices.

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