PATIENT ALERTING USING THE FUSION OF EXISTING MEDICAL AND IT TECHNOLOGIES

CHIDDARWAR R.K. AND VYAS M.S.

P.R. Patil College Of engineering, Amravati, MS, India.
*Corresponding Author: Email- chiddarwar.riteshk@gmail.com and madhavvyasit@gmail.com

Abstract- Today's Scientific era have visualized the need of Information Technology entering in Medical science zone. The ascending technologies along with the increasing numbers of medical emergencies cases calls for an immediate fusion of these two fields. The world has shrunked and the time has shortened because of IT sectors Inventions. While the situation can be unpredictable so even a motion of our body is guaranteed to seek for some help at such point. The fusion of existing IT technologies like GPS, SOS, and pulse detection system is going to be a fruitful invention. The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and Track it. Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX).
A gadget having a pulse detector would be on the wrist of the patient. It will mark the pulse and if it goes abnormally Low or High, An emergency message will be send by SOS to its contacts and nearest medical center for immediate help. It won't require even a pressing a key, as the pulse level would initiate the trigger. The GPS technology would track its position and sent the emergency message along with patient's exact location making it easy for the person to get FIRST-AID Services in shortest possible time.
Keywords- Global Positioning System, Information Technology, Medical science, OCX, SOS

Introduction

Technology has affected society and its surroundings in a number of ways. Technology has helped to develop more advanced and the distinction between science, engineering and technology is not always clear. Science is the reasoned investigation or study of phenomena and aimed at discovering enduring principles technique. The present invention is on their own capturing area and specified field .And medical field also vast in their own technology, captured it a new innovative idea and become a strong. But not make up and not alert with the fusion of different technologies yet. Patient alerting system to make it more powerful fusion of Medical and Information Technology. In this fusion of medical and Information technology, very helpful for harm of human that he not known, but achieve it and avoid that type harm uses the in innovation of System called be a "Patient Alerting Using The Fusion Of Existing Medical and IT Technologies" . Making it one A gadget having a pulse detector would be on the wrist of the patient. It will sense the pulse and vary with their respective inbuilt program, to check it, if it goes abnormally Low or High, An emergency message will be send by SOS to its contacts and nearest medical center for immediate help. It won't require even a pressing a key, as the pulse level would initiate the trigger.

The GPS technology would track its position and sent the emergency message along with patient's exact location. And provides the Services in shortest possible time.

Pulse

The pulse is the number of heart beats per minute.
How The Test Is Performed:
The pulse is measured at the-
- Back of the knees
- Groin

- Neck
- Temple
- Top or inner side of the foot
- Wrist

In these areas, an artery passes close to the skin. To measure the pulse at the wrist, place the index and middle finger over the underside of the opposite wrist, below the base of the thumb. Press firmly with flat fingers until you feel the pulse.

To measure the pulse on the neck, place the index and middle finger just to the side of the Adam's apple, in the soft, hollow area. Press firmly until you locate the pulse. Once you find the pulse, count the beats for 1 full minute, or for 30 seconds and multiply by 2. This will give the beats per minute.

Why the Test is Performed

Measuring the pulse can give very important information about your health. Any change from normal heart rate can indicate a medical condition. Fast pulse may signal an infection or dehydration. In emergency situations, the pulse rate can help determine if the patient's heart is pumping. The pulse measurement has other uses as well. During exercise or immediately after exercise, the pulse rate can give information about your fitness level and health.

Normal Results For Resting Heart Rate Table:

Table 1-

Sr. No.	CATEGORY	PULSE-RATE
1	Newborns (0-30 days old)	70-190 beats minute
2	Infants (1 - 11 months old)	80-120 beats per minute
3	Children 1 to 10 years	70-130 beats per minute
4	Children over 10 and adults (including seniors)	100 beats per minute
5	Well-trained athletes	40-60 beats /min

What Abnormal Results Mean

Resting heart rates that are consistently high may indicate a problem, and you should consult a health care provider. Discuss resting heart rates that are below the normal values (bradycardia) with your health care provider. The strength of the pulse can also be reported:

- 0 = Absent
- 1 = Barely palpable
- 2 = Easily palpable
- 3 = Full
- 4 = Aneurismal or Bounding pulse

Fig. 1- Pulse sense

Also, discuss a pulse that is very firm bounding pulse and that lasts for more than a few minutes with your health care provider. An irregular pulse can also indicate a problem. A pulse that is hard to feel may indicate blockages in the artery. These blockages are common in people with diabetes from high cholesterol. Your health care provider may order a test known as a Doppler study to evaluate this potentially serious situation.

"Maternal mortality remains a persistent and preventable global health challenge in many parts of the world," said Don Casey, WWHI's CEO. "The Institute recognizes the need and the opportunity to address this challenge with a uniquely engineered solution that leverages low-cost technologies. The ability to monitor both maternal and fetal wellbeing – at home, at work, wherever a patient may be during the course of the day – creates a far more complete picture of their condition. Ultimately, we want to help this population stay healthy and avert a preventable crisis." Women with high-risk pregnancies require monitoring several times each week during the last months of pregnancy, and must often alter job and family responsibilities for repeated visits to a provider. In many areas of the world, the burden is exacerbated by long distances to the nearest clinical facility. Sense4BabyTM is designed to create ease and convenience for the patient, while improving the provider's ability to access data anywhere the patient resides.

The sensor used in the study is Wristwatch, which has the look and feel of a normal wristwatch, but acts as both a motion sensor and a pulse sensor designed to identify a patient in cardiac arrest, and features built-in fall detection.

The study included 34 patients 24 hospitalized and 10 presenting for implantable cardioverter defibrillator (ICD) testing. Overall, the Wristwatch was worn for a total of 561.2 minutes. Pulse lessens was present for 5.8 minutes. The sensitivity of the watch to detect pulse status (based on 15 second intervals) was 99.9% and the specificity 90.3%, leading to the conclusion that the Wristwatch is a "novel device that shows promise as a tool to hasten activation of emergency medical systems and facilitate early defibrillation in patients with cardiac arrest". About 295K people die from sudden cardiac arrest each year in the US. Death occurs within minutes and often within moments of symptom onset. Cardiac arrest is the abrupt loss of heart function in a person who may or may not have diagnosed heart disease. It may be reversed if CPR is performed or a defibrillator is used to shock the heart and restore a normal heart rhythm within a few minutes, which is where the Wristwatch hopes to step in and provide automated alert and maximize potential for lifesaving action to be taken.

GPS Technology

Global Positioning System satellites transmit signals to equipment on the ground. GPS receivers passively receive satellite signals; they do not transmit. GPS receivers require an unobstructed view of the sky, so they are used only outdoors and they often do not perform well within forested areas or near tall buildings. GPS operations depend on a very accurate time reference, which is provided by atomic clocks at the U.S. Naval Observatory. Each GPS satellite has atomic clocks on board.

Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at the same instant. The

signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are farther away than others. The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver. When the receiver estimates the distance to at least four GPS satellites, it can calculate its position in three dimensions. There are at least 24 operational GPS satellites at all times. The satellites, operated by the U.S. Air Force, orbit with a period of 12 hours. Ground stations are used to precisely track each satellite's orbit.

Determining Position

A GPS receiver "knows" the location of the satellites, because that information is included in satellite transmissions. By estimating how far away a satellite is, the receiver also "knows" it is located somewhere on the surface of an imaginary sphere centered at the satellite. It then determines the sizes of several spheres, one for each satellite. The receiver is located where these spheres intersect.

GPS Accuracy

The accuracy of a position determined with GPS depends on the type of receiver. Most hand-held GPS units have about 10-20 meter accuracy. Other types of receivers use a method called Differential GPS (DGPS) to obtain much higher accuracy. DGPS requires an additional receiver fixed at a known location nearby. Observations made by the stationary receiver are used to correct positions recorded by the roving units, producing an accuracy greater than 1 meter.

Fig. 2- Gadget Tracking Device

GPS Wildlife Tracking

It is a process whereby biologists, scientific researchers or conservation agencies can remotely observe relatively fine-scale movement or migratory patterns in a free-ranging wild animal using the Global Positioning System and optional environmental sensors or automated data-retrieval technologies such as Argos satellite uplink, mobile data telephony or GPRS and a range of analytical software tools. A GPS-enabled device will normally record and store location data at a pre-determined interval or on interrupt by an environmental sensor. These data may be stored pending recovery of the device or relayed to a central data store or internet -connected computer using an embedded cellular (GPRS), radio, or satellite modem. The animal's location can then be plotted against a map or chart in near real-time or, when analyzing the track later, using a GIS package or custom software.

SOS

It is the emergency situation helping technology that enables us to send emergency messages to the people in our contact that we have chosen should receive the message. Along with it we the message is sent to a nearest medical center. For sending an SOS we need to press a combination of certain characters or a single key multiple times to initiate the message sending.

In popular usage, SOS became associated with such phrases as "save our ship", "save our souls" and "send out succor". These may be regarded as mnemonics, but SOS is not an abbreviation, acronym or initialize. According to the Oxford English Dictionary (2nd ed.), the letters were chosen because they are easily transmitted in Morse code.

Implementation of the Technologies Fusion

Now, we have seen the working of the technologies mentioned above in the paper. It can be visualized as a gateway to the development of a new tool which works on the principles of GPS,SOS & Pulse Detector technology. IT will have a look of a wristwatch which is easy to wear and all the chips will be embedded in it.

Fig. 3- Gadget (Wristwatch Gadget)

The Wristwatch is a novel device that shows promise as a tool to hasten activation of emergency medical systems and facilitate early defibrillation in patients with pulse rate The working begins with the pulse detector checking the pulse range every fixed interval of time, which makes the detector a guardian for the person Wearing the gadget even if he/she is alone. It will contain the options of the configuration mode likewise depending upon the age and profession from the pulse range mentioned above. Once the mode is fixed, then the detector now knows the range what is normal for the person and if something abnormal fluctuation is observed in the pulse rate then the SOS system is triggered. Here the SOS is activated even without the pressing of any key. It sends the message of pulse rate of the person along with "Help me at _" message. The underscore field "_" is filed with the location of the person tracked by the GPS technology. The location is also available with the person whom we think should come for our help. In this way we their combinational actions lead to a medical y efficient Information technology tool which can be used as a life saving device.

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