International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 04 | Apr 2020 www.irjet.net p-ISSN: 2395-0072

Wearable Location Tracker During Disaster

Soumya Dipta Boral[1], Abhisek Das[1], Aditya Khare[1], Ambalika Gupta[1], Chaitali Bhattacharyya[1] Susmita Das[2]

[1]B.Tech Student, Dept. of Electronics and Instrumentation Engineering, Narula Institute of Technology, West Bengal, India
[2]Assistant Professor, Dept. of Electronics and Instrumentation Engineering, Narula Institute of Technology, West Bengal, India

---

Abstract - *Location is one of the common things that is always in search as the location of a particular person, a vehicle or a particular place also. People always look for them for their own needs at different moments. GPS (Global Positioning System) is a network of orbiting satellites that send precise details of their position back to the Earth and track the exact location of the GPS receiver. If it is mounted on a vehicle or even on a person in the form of wearable things, then tracking of the location in times of need or even disasters are possible. The motive is to set a GPS receiver module with Arduino interfacing board and set a RF (Radio Frequency) transmitter receiver module as well to send the coordinates from the GPS receiver from one part to another. The receiving part will be containing another Arduino board with an LCD (Liquid Crystal Display) attached to it such that the coordinates will travel along and be received by the receiver. The Arduino will display the coordinates on the LCD screen*.

Key Words: **GPS, Location, RF, Disaster**

1. INTRODUCTION

The Global Positioning System (GPS) originally NAVSTAR GPS is a satellite-based radio navigation system owned by United States Government & operated by the United States Space Force. It is one of the Global Navigation Satellite Systems (GNSS) that provides geo-location & time information to a GPS receiver anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. Obstacles such as mountains and buildings block the relatively weak GPS signals. GPS trackers are used in almost every communication technology such as mobile phones, watches and in some computers also. Location is one of the important aspects of any living being on Earth and it is highly necessary during any disastrous situations which raises the question of life and death for a certain person. Trackers should be inbuilt in some specific device which should be available to all of us. In times of earthquakes, fires, collapsing of buildings and bridges or any medical emergencies a person should be tracked during the above conditions. The particular device could be mini watches or should be installed in our wearable such as wrist bands, neck ties or waist belts etc.

2. METHODOLOGY

The following process must be fulfilled as the prerequisite condition of every victim with the particular wearable tracker.

1. Information collection from the nearest area of disaster.
2. Departure of the rescue team with essential materials and equipment.
3. The team must carry the device receiving the location of the individual trackers worn by the victims which will display the exact location of the live persons during disaster.
4. Tracking of the victims in the particular destination.
5. Rescuing the tracked victims from the area of disaster.
6. Re-searching the area of disaster for any further victimized person.
7. Establishing the area as null and reconstruction will be going to take place henceforth.

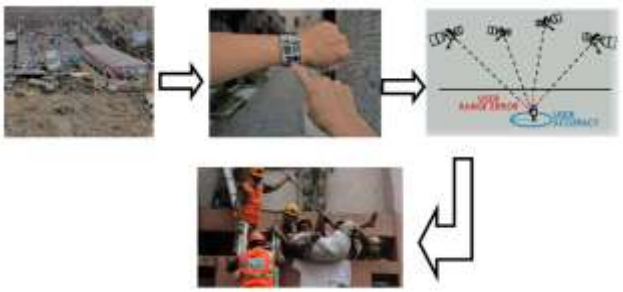

Fig. 1: Pictorial Representation of the Prototype

In this world of uncertainty, disasters may happen anytime. A disaster can be natural (Tsunami in Japan,2011) or can be manmade (Bhopal gas leakage,1984). But ultimately it can cause serious harm to mankind. So, in these cases rescue of victims can be done very fast with the help of GPS. For this purpose, a GPS trans-receiver pair should be attached to both the victim and the rescue team. At the time of disaster or after the victim should press a button to transmit a special signal. This signal will be received through a receiver module at the center of rescue team. By analyzing that signal, the rescue team will start searching for rescue operation. The location of the disaster will be found by the signal

transmitted by the victim. The rescue team will also get some signal sent by the local publics of the area of the disaster. In this way the accuracy of the signal will be increased. A GPS tracking system, for example may be placed in a vehicle, on a cell phone, or on special GPS devices which can either be a fixed or a portable unit. GPS works by providing information of exact location. It can also track the movement of a vehicle or a person. So, for example, a GPS tacking system can be used by a company to monitor the route and the progress of a delivery truck, and by parents to check on the location of their children, or even to monitor high-valued assets in transit. GPS provides special satellite signals, which are processed by a receiver. These GPS receivers not only track the exact location but also can compute velocity and time. The positions can even be computed in three dimensional views with the help of four GPS satellite signals. The Space Segment of GPS consists of 27 Earth orbiting GPS satellites. There are 24 operational and 3 extra (in case anyone fails) satellites that move round the earth each 12 hours and send radio signals from space that are received by the GPS receiver. The control of positioning system consists of different tracking stations located across the globe. These monitoring stations help in tracking signals from the GPS satellites that are continuously orbiting the earth. Space vehicles transmit microwave carrier signals. The users of Global Positioning System have GPS receivers that convert these satellite signals so that one can estimate the actual position, velocity and time. The operation of the system is based on simple mathematical principle called Trilateration. Trilateration can be of two types. 2D Trilateration & 3D Trilateration. In order to make the simple mathematical calculation the GPS receiver must know two things. First, it must know the location of the place to be traced by at least three satellites above the place. Second, it must know the distance between the place and each of those space vehicles. Units that have multiple receivers that pick-up signals at a same time. These radio waves are Electromagnetic energy that travels at the speed of light.

3. RESULTS AND DISCUSSION

A GPS tracking system can work in various ways. From a commercial perspective, GPS devices are generally used to record the position of vehicles as they make their journeys. Some systems will store the data within the GPS tracking system itself (known as passive tracking) and some send the information to a centralized database or system via a modem within the GPS system unit on a regular basis (known as active tracking) or 2-way GPS. A passive GPS tracking system will monitor the location and will store its data based on certain types of events.

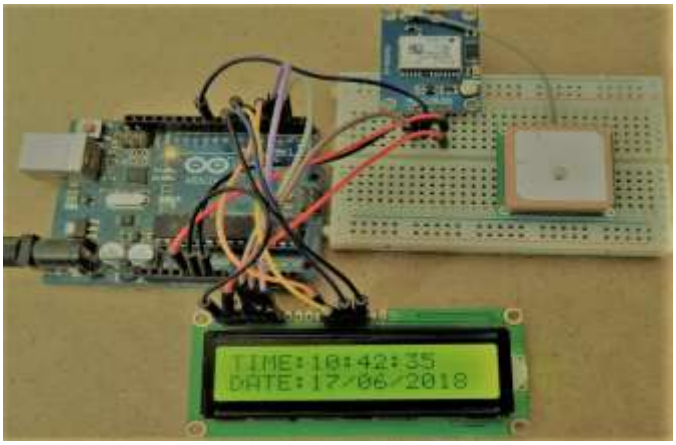

Fig 2 : Pictorial Representation of the Prototype

An active GPS tracking system is also known as real-time system as this method automatically sends the information on the GPS system to a central tracking portal or system as it happens. This system is more suitable for commercial use of GPS.

4. RECENT DEVELOPMENTS

1. Vehicles nowadays incorporate a technologically advanced GPS tracker as a part of the electronic package. This tracking device allows the vehicle to transmit its current location to a centralized database management system. Thus, it helps the owner from getting stolen his vehicle.
2. Nowadays almost every mobile phone feature GPS capability and incorporate a GPS tracker to allow the quick location of the phone in case of its lost or stolen.
3. Most recent technical breakthrough in GPS research have concerned the ways to acquire the signal and locate the GPS tracking device more accurately and quickly.

5. CONCLUSION

Nowadays rescuing the victims from the site of disaster has become easier and more sophisticated. Nowadays starting a rescue operation is very well planned. Rescue team is always ready to start the operation. Our endeavor is to help the rescue operation be more feasible. This is for welfare of the human beings and to face the challenging and emerging needs of our society. In the future, this technology can be modified and customized to be more specific about the location. Using latitudes and longitudes for providing exact location or position of any person or any object. This will help us in tracking lost objects more easily and more conveniently through stored database.

REFERENCES

[1] Prof. (Dr.) Bharati Wukkadada, Allan Fernandes2, "Vehicle Tracking System using GSM and GPS Technologies", IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661,p-ISSN: 2278-8727 PP 05-08.

[2] Kafi, K. M., Shafri, H. Z. M., and Shariff, A. B. M. 2014. „An analysis of LULC change detection using remotely sensed data; A Case study of Bauchi City‟. In IOP Conference Series: Earth and Environmental Science (Vol. 20, No. 1, p.012056). IOP Publishing

[3] Westlund, S. (2010). The Use of Geospatial Technology in Disaster Management. International Journal of Applied Geospatial Research (IJAGR), 1(3), 17-30. doi:10.4018/jagr.2010070102.

[4] Wang-Kun Chen, "A Fuzzy Intelligent Decision Support System for Typhoon Disaster Management", IEEE International Conference on Fuzzy Systems (FUZZ), 2011.

[5] Shatha K. Jawad, "A Multipurpose Child Tracking System Design and Implementation", International Journal of Soft Computing Applications, ISSN: 1453-2277 Issue 4 (2009), pp.57-68, Euro Journals Publishing, Inc. 2009.

[6] Omarah Omar Alharaki, "The Integration of GPS Navigator Device with Vehicles Tracking System for Rental Cars Firm", International journal of Computer Science and Information Security, September 2008.

[7] B. Hofmann-Wellenhof, H. Lichtenegger, and J. Collins. "Global positioning system: Theory and practice", second edition. Springer-Verlag.