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An Innovation in Wearables

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ABSTRACT: *My idea is to combine spo2 technology with GPS technology to make wearables do more functions than just monitoring the health condition. Using the GPS technology can help in tracking and locating the nearest ambulance and alerts him when the person's health condition wearing the device gets critical. If succeeded, this device can help some people live more life on this earth.*

Keywords: wearables, spo2, GPS, tracking, ambulances..

I. INTRODUCTION

If we observe today world, technology is playing a very important role in corporate sector and also in human personal life. Eventually, technology may replace the human at workplace, this is termed as "technological disruption".

Though there is a great shift in working techniques and conditions, people who are working especially in corporate sector are exposed to high levels of stress and are indirectly exposed to fatal cardiac diseases. These diseases kill people silently, they kill them from inside. So there should be some device which always stay with the person and monitors his body's inside activities. Not only monitoring his body conditions, but also should try to rescue him from unforeseen worse health conditions.

My device will combine health band with GPS technology to monitor person's health condition and warns the nearest ambulance or doctor who have registered his location and details with the company. If this dream comes true, the number of persons dying of cardiac arrests due to heavy stress or the case may be can be noticeably decreased.

II. KEY CONCEPTS

1. Fitness tracking bands:

These are wearable devices which are commonly used to monitor the fitness conditions of a person. Generally these devices monitor the heart rate, oxygen saturation, no. of hours person sleeps, distance travelled by the person on foot etc. These smart devices are usually used by the people when they go out for jogging, running and when doing body workout.

Figure 1: Fitness tracking wearable smart devices.

2. Pulse Oximeter/Pulse oximetry (SPO2):

It is the technology used to monitor the heart rate and the oxygen saturation in the haemoglobin in the red blood cells of a person. These can be monitored by attaching SPO2 device to the person's finger or toe. The lower heart rate (<72 bpm) is known as "Bradycardia" and the low level of oxygen is known as "hypoxia". The extreme condition of Brady cardia or Hypoxia is fatal and may lead to death of a person.

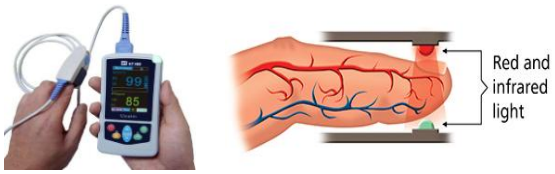

Figure 2: Pulse oximetry (SPO2) device.

3. Global Positioning System (GPS):

Global Positioning System is a world renowned tracking technology. It is the U. S owned utility consists of 24 satellites calculating the position, navigation and timing (PNT). Control segment controls the satellites ensuring that they are stable in their respective orbits. User devices are equipped with the GPS receiver equipment to receive the one way signals from the satellites to track the position and timing. Control segment uploads the updated information through the internet. With the help of GPS, a person can go anywhere in the world.

Figure 3: Global Positioning System (GPS).

III. OBJECTIVES

- To combine the SPO2 technology with the GPS technology.
- Constantly keeping the track of heart rate and simultaneously tracking the position and location of a person.

- To help people restore their health especially in cardiac disease prone people.
- To alert the nearest ambulances in case of critical conditions.

IV. THE NEW DEVICE

The idea is to combine both the technologies and to register the ambulances all over the city of Hyderabad and to alert the ambulance which is nearest to the victim's location.

How to combine these technologies (SPO2 and GPS)?

To combine both SPO2 and GPS, GPS microchips are needed which are very compact and can be easily embedded in all nano devices like smart bands. To combine both technologies, a mediator chip which contains a program to fetch information from both SPO2 sensors and GPS chip is required. Once the mediator chip is designed, the input and out communication between these chip is shown below.

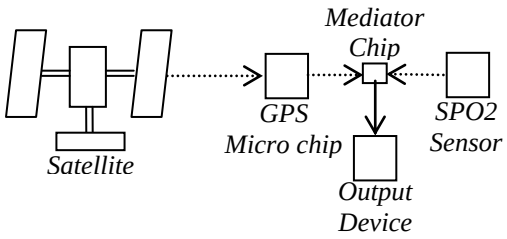

Figure 4: Combining SPO2 and GPS using Mediator chip.

How it works?

In the above diagram, GPS micro chip receives the signals from the satellite and sends the received data to the mediator chip. Mediator chip also fetches the data from the SPO2 sensors and sends the entire information such as heart rate, steps walked, sleeping hours, location to the output devices connected. GPS micro chip with dead reckoning technology is recommended for accurate location even in low signal scenarios.

How device knows the nearest ambulance?

Before the device being assembled, all the ambulance details and the driver details including the name of the hospital to which the ambulance is related, the ambulance number, the driver name, driver's personal contact details, his house number etc, must be stored in the mediator chip and the ambulances must have GPS chip attached and it should be monitored by the mediator chip. The mediator chip must be programmed with conditions that if it receives a heart rate reading count lower than the required and reached the critical condition and the person is about to have an heart stroke, at this time the person is already experiencing some illness like nausea, improper breathing, chest pain or about to faint but does not know what the real problem is, the device should send an alert message and the location of the victim to the ambulance whose GPS coordinates are closer to the present GPS coordinates.

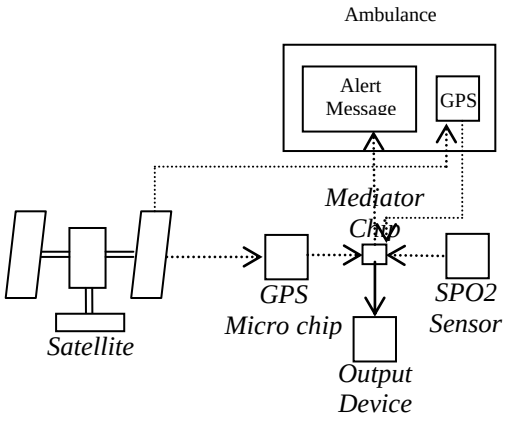

Figure 5: The communication system between ambulance and the device.

V. CONCLUSION

If the people wear this device all the time, there are very less chances of heart attack deaths in the world and the person can be treated immediately without any delay which may cause life threat. Though the device is expensive but less than the cost of life. This device is highly recommended to the people who are exposed to high levels of mental stress. With the help of this device, one can track the sleeping hours, workout activities, heart rate frequently. This device will become a life saving hope to the people who face lot of mental stress.

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