A STUDY ON AN IOT-BASED PROACTIVE TECHNOLOGY TO AID FIGHTERS IN WAR ZONE

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ABSTRACT:

Soldiers as we know, act as our first-fine of defence and protect the citizens and the country from terror and attack. They act as a shield, a barrier to protect the rest of the world. In this act of safeguarding, they have to go through selfless sacrifice, wounds, incurable injuries and sometimes death due to delay in medical aid. This IoT based technology helps solve this very problem. This 'remote patient monitoring system' based technology, if used and embedded on the Kevlar vest and as wrist bands, will help detect, study, alert, send substitute and cure the fighters in due time.

KEYWORDS:

Proactive IoT technology, Sophisticated HMS, Active and passive RFID tags, Geo-tracking unit, sensors, BWCs.

I. INTRODUCTION:

This is an IoT based 'combat – time' health monitoring system which uses sophisticated HMS (Health Monitoring Systems), that consists of wireless health monitors such as Ph sensors, heart rate monitors, temperature sensors, pressure detectors, oxygen saturation testers along with other tracking devices like RFIDs and motion and magnetic field sensors, terrain detectors, weather sensors and BWC (body worn cameras). All the different sensors will be attached to the Kevlar waist and as wrist bands. By this the condition of the fighters can be recorded and sent to the army camp in real time.
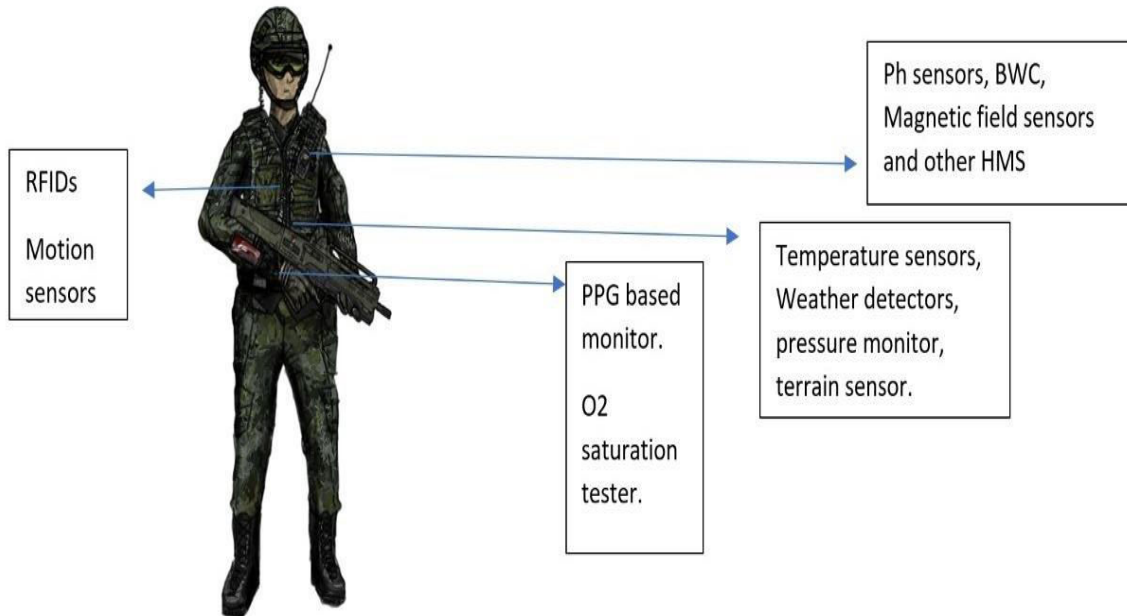
II. PROPOSED SYSTEM:

Even though there has been multiple technological aid and steps taken to safeguard the lives of soldiers, every year around 1,600 soldiers die in India. Hence, this technology is one step ahead and closer to achieving the goal: 'all soldiers safely back home'. This tech invention makes use of various sensors like temperature, Ph, pressure and so on and sends the cumulative data collected from each of these sensors, from each soldier in active time to the internet cloud. From where, the data can be accessed by professionals at the camp. The doctors and trained officers at the camp, then decide on the actions to be carried out based on analyzing the data. In case of emergency, a substitute and a small team of medical professionals are sent to the soldier in need of help by using tracking technologies like geo-tracking (for long range) and RFIDs, both active and passive (for shorter range). Further more the BWCs and the terrain detectors will help understand the severity of the situation much better.
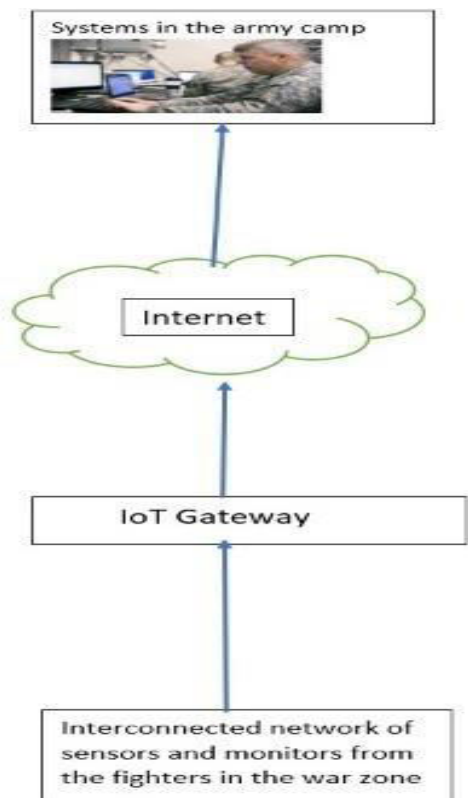
- **Important to the military**

The military is the hidden treasure of the nations that works day and night selflessly keeping their lives at the stake. They are armed with the latest weapons to fight on the battlefield. Instead, constant improvement leveraging advanced technology is needed for the tools to enable military forces to edge out the enemies.

- **Internet of things in defense**

Presently, the defense system needs high connectivity to get real-time information and know situational awareness. All this is possible by leveraging IoT for defense. With the connected technology (Internet of things), soldiers will have more powerful, efficient and effective weapons.

III. WORKING PROCEDURE

SYSTEM REQUIRMENTS:

HARDWARE:

- Ph sensors
- Temperature sensors
- Pressure sensors
- Heart rate monitors
- Motion detectors
- BWC

- Terrain sensors
- RFIDs
- Geo-trackers
- O2 saturation detectors

SOFTWARE:

- A programming Language
- Arduino Compiler
- IOT Gecko platform

IoT: Bridging the gap between M2M communication & data analytics:

- It can also be embedded electronics that generally transfer all type of data over a single network.
- The connectivity between a couple of components enables real-time communication.
- It allows automated decision making with less human involvement.
- IoT is not about Machine to Machine (M2M) communication but can be thought of as an arbitrator of M2M communication along with data analytics.
- The overall modus operandi of M2M is quite seamless and less amount of intelligence is applied for navigation.
- For instance, M2M communication could be **ATMs or vending machines, smart metres**.
- Not to forget **medical equipments**, as it has brought about leviathan changes in the medical sector.

Improving & improvising varied sectors:

1. IoT Enables One To Enjoy A Secured Lifestyle–

With every passing day, security is always a key concern not only for the individuals living in metro cities but also for the ones, settling down at the outskirts or suburbs. If you are away from your property there would always be an outright apprehension. You will constantly remain at pressure as things will not get monitored at regular intervals.

However, IoT has a solution to these problems. Through home security device you can monitor all the checks & balances. If your task demands you to stay away from your property for a longer period you can always rely on smart devices. Through alarms, cameras and remote sensors you will receive instant notification.

If any suspicious activities are being executed, things can be addressed immediately. In recent times more advanced and innovative home surveillance devices are about to hit the market. These devices can take rapid action and they are capable of taking up the onus of addressing issues immediately.

Remote Controlled Home– Be it washing machines, lights, air conditions or other electrical apparatus, everything can be controlled with ease from any given location. You will have the access to every single accessory at your residence. If required you can either lock or unlock your doors leaving the keys at your convenient positions. Through just a touch in your phone, the entire residence can be managed with ease.

2. Through IoT, cities will get smarter–

More than half of the population of the world lives in cities. During the **1960s 34% of populace used to stay in the city**. The number is supposed to reach **64%** or more than that by the mid of the century. The above report is cited by **the United Nations** and it has also been cited that the cities are a major contributor to climate change.

Some of the pivotal cities across the oblate-spheroid are already feeling the negative impact as sea levels are rising by the day. But have we ever thought that the cities are gargantuan incubators for IoT technology? IoT has made urban life more appealing and attractive. The convenience of transportation, energy-efficient buildings and innovative street lighting systems are all part of smart city technology, courtesy IoT.

a) Barcelona : A technologically Connected City–

In recent times citywide Wi-Fi information network has enabled sensors to get linked through data analytics & software in Barcelona, Spain. The technology has enabled water technology along with remote-controlled irrigation, automated street lightings.

On-demand waste pickups and parking metres, digital bus routes have decreased traffic jams and pollution all across the city. This is a great initiative and the locals of the city have welcomed this move and they are quite happy after the city has adopted these latest technologies.

b) Cities Of Chicago & Las Vegas Are On the Move-

Other cities like Chicago and Las Vegas are also on the move. The former is taking up all key measures of eradicating pollution, controlling traffic and other metrics. The latter on the other hand is following the footsteps and ready to make the city more chromatic and vibrant in the days to come.

c) The Entire City of Songdo in South Korea is IoT connected–

The entire city of **Songdo in South Korea** is connected through IoT. The network is designed in such a manner that buildings, transportation, infrastructure are connected efficiently. This connection has made life easier for the people living in this part.

3. Clean Air & Clean Water-

One of the biggest advantages of IoT is, it has enabled cities to get access to clean water devoid of arsenic and eradicated polluted air. The air quality has improved drastically in cities where IoT is applied extensively. We have talked about Barcelona & Songdo, South Korea in our aforementioned point and these cities have witnessed the magic of events as pollution is very minimal or none there.

A staggering **9 million deaths were reported in 2015 due to water contamination**. The Asian cities like **Delhi & Beijing have suffered heavily** due to air contamination. Though sensors are getting deployed in this part of the world, the effects are so severe that things are not improving.

With recent lockdown after the COVID-19 pandemic, things have changed a bit. With few or no individuals hitting the roads, pollution level has decreased. With just a minimal amount of cars running across the cities, **Volatile organic Compounds (VOC)** are less emitted and air quality is in control. But when things will get back to normal, a similar scenario will be witnessed again. It is time to think positive and act smart by adopting more and more remote sensory lighting as it causes no pollution at all.

Sensors are an ideal approach that can help policymakers to identify and decrease pockets of pollution. If IoT infrastructures are building all across the cities then we can avail more sustainability.

4. Innovative & smarter Agriculture–

From humongous agribusiness giants till miniature organic farmers all across the globe are making use of IoT. Through this smart choice technology, water consumption and usage of fertilizers become less. IoT allows farmers to improve the quality of crops and yield more. They can check the climatic situation and take necessary measures. The popularity of **IoT in agriculture is about to reach its peak by the end of 2025**.

The Recent Development of Agriculture in California after Drought–

The recent drought in California has forced farmers to search out ways and approaches that can yield more productivity using less water and fertilizers. Tech giants have stood beside the farmers and are helping them with smart devices like soil sensor machines.

They are getting access to drone imagery & real-time climatic checking tools that are helping them in reaping maximum advantages. A recently published report in "**The Nature Conservancy**" it has been opined, technology will help farmers to cut the cost of water and fertilizers at least up to 40% and if not more than that.

5. Healthcare Connectivity Through IoT–

Connecting healthcare industries means better service for patients. Through IoT medical officers and doctors can have quick access to patient's data. Wearable, Internet-connected devices having sensors can monitor each & every possible body movement of a patient. Be it the heart rate, blood pressure, pulse beat can all be monitored with ease.

The reading that comes up is accurate and compact. At the same time technology is constantly helping medical officers & doctors to monitor patients who live all alone. Robotic assistance along with sensors will notify the caregivers if the patient forgets to take pills and other medical assistance.

a) The Ebola Outbreak of 2015–

We all remember the Ebola outbreak which took place in the year 2015 in Sudan, West Africa. After the outbreak **Scripps Translational Science Institute** was successful in bringing a gamut of medical device organization under a single aegis.

They did carry out a test with integrated sensors for tracking heart rate and blood pressure, oxygen saturation and so on. The devices were capable of transmitting data through Bluetooth and it decreased physical interaction amongst individuals. The decrease in physical interaction somehow was responsible for curbing down the pandemic.

B) Fighting Hard To Eradicate Breast Cancer–

In the past breast cancer was controlled amongst women in America, but now it has reached to every nook & cranny of the world. But with screening and advancement in treatments survival rates have improved in recent times. With recent developments like **iTBra** by **Cyrcadia Health** has allowed doctors to diagnose the disease seamlessly. The embedded sensors are responsible for tracking temperature changes in the tissues of the breast. All the data are transmitted remotely to the mobile phone of the user which is now shared with health care professionals.

6. Advantages For Business Enterprises–

With IoT, enterprises are having more data about a particular product and the internal systems. If they find any loopholes the changes can be made internally before it hits the market. Off late manufacturers are also adding sensors to the respective components so that they can transmit data back about how they are executing. What it does is, it allows organizations to locate the danger before it causes damage. The supply chain tends to become more efficient after they make use of the sensory data.

As per recent data, global manufacturers are about to invest more than $70 Billion on IoT in 2020. Though the recent pandemic has brought about a stoppage in economic developments, global players are keen on investing as the market opens up. It will help the factory operators to witness when machinery needs replacement or repair. They can also make out how the entire operation can be much effective and flawless.

The retail sectors are also commencing to make use of Bluetooth beacons to make things more transparent. The reaching out the customers has become easier these days and they can also offer personalized discounts as and when required.

7. The boon of IoT in Logistic & Transportation–

Be it supply chain logistics or public transportation IoT are being applied to make business gain more positive effects. Through the connection of sensors shipping vehicles can be monitored with ease. Be it their geographical location, details of the drivers, arrival time, departure time can be monitored.

The sensors in the vehicle help drivers to drive in a manner that will allow him to consume fuel. In the near future connected infrastructures will allow tracking of vehicles with ease. Through sensors, drivers will get chances of road navigation and avoid locations which remain heavily crowded with traffic congestion. The chances of accident also decreases if proper monitoring is carried out well in advance.

8. IT industry and IoT – The Key Benefits–

IoT has already proved to be a boon in IT both for the provider & the user. With the usage of IoT, the companies can make use of both urban and modern ambience & continue their speed of work that too remotely if required. There will be huge data storage space & thereby security issues will no longer persist. Analytics along with visualization will allow the companies to become more competent and confident.

IV. RESULT:

The result of this application can be summarized as:

- User-friendly and effective.
- Meets the demand and full fills the goal.
- Saves brave lives.
- Sophisticated and unique.

V. CONCLUTION:

This helps safe the life of many soldiers and acts as a proactive tool. It not only helps ensure the safety of the men and women at war but also prevents injuries and major accidents. It relays on effective and advanced technologies and comes around to be beneficial. It also helps ensure that the needed aid is done at due time and eliminates the fear of delay due distance and location tracking as it comes with trackers and BWCs along with other medical aid sensors.

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