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A Review on Implementation of Health Care Monitoring System Using Wearable Sensor and Iot

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ABSTRACT
Now a days, safety is very important for industrial workplace, especially for workers constantly switching working environments between indoor and outdoor. Therefore, an IoT network system which can monitor both environmental and physiological can greatly improve the safety in the workplace. The network system incorporates multiple wearable sensors to monitor environmental and physiological parameters. In today's world it is very difficult to carry patients from home to hospitals for regular checkup. There are lot of challenges like waiting in the queue, travelling time and patient may be prone to various infections moving in this polluted environment. So the health care industry is focussing on in-home health care services where the patient can undergo medical check-ups in the comfort of his home environment. In this we will use Node MCU as main microcontroller unit, in which we are going to interface Temperature Sensor , Heart Rate Sensor and Pulse Oximetry Sensor and also for industrial workplace, especially for workers its important to monitor the environmental parameters like Temperature and Humidity, UV Index Meter, Air Quality Index Meter. Also for IoT scenario, we'll Ubidots Cloud Service for monitoring and Alert/Notification Generation using MQTT protocol.
Keywords- Cloud Service, Index meter, Internet of Thing(IoT), MQIT, Wearable sensors.

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I. INTRODUCTION

Latest advances in computer technology have rise to another innovation: Internet of Things (IoT) .The Internet of Things (IoT) gives availability to anybody at any place and any time. With the progress in innovation, there is a tremendous change in the society where everybody and everything will be allied. The IoT is believed as the future assessment of the Internet that acknowledges machine-to-machine (M2M) learning .The fundamental thought of IoT is to provide independent and secure connection and trade of information between applications and devices. By the year 2020 it is estimated that 20 to 30 billion devices will be connected to the internet. IoT has emerged in various fields like smart cities, smart heath, smart homes. Increasing the number of sick people have grabbed a global attention towards their health. The increased use of mobile technologies and smart devices in the area of health has caused great impact on the world. Health experts are increasingly taking advantage of the benefits these technologies bring, thus generating a significant Improvement In Health care in clinical settings. Likewise, countless ordinary users are being served from the advantages of the M-Health (Mobile Health) applications and E-Health (health care supported by ICT) to improve, help and assist their health.

Wearable body area network (WBAN) is a special purpose WSN that is generally used in healthcare environments to monitor physiological signals that can improve the quality of life, and consequently health and wellness for example, a wrist worn wearable system for photoplethysmogram (PPG) monitoring, WBAN healthcare monitoring system with heart rate monitoring. Apart from healthcare applications, WBANs have also been used to monitor environments. For instance, the work monitors temperature, humidity, and ultraviolet (UV) for safety applications. Safety is very important for industrial workplace, especially for workers constantly switching working environments between indoor and outdoor. In outdoor environments, UV,ozone, carbon monoxide (CO) and particular matter (PM) are harmful to human health. According to, solar exposure has been well established as the major cause of skin cancer in Australia. UV radiation is the component of

sunlight which is harmful. Long-term exposure to UV index level of 3 or above can lead to skin cancer. UV exposure is also a cause of eye diseases . In addition to UV, carbon dioxide (CO2), smoke, CO, and Volatile organic compounds (VOC) are some commonly indoor pollutants . Symptoms of CO2 poisoning, such as hearing loss, headache and rapid pulse rate, may happen to some occupants when the CO2 level is above 600 ppm.

Therefore, it is essential to have a WSN system to monitor both UV and CO2 for industrial workplace. To prevent workers from being exposed to any risky and hazardous situations, some physiological parameters of workers should also be monitored. Body temperature and heart rate are the most studied parameters in WBAN-based medical monitoring works.

II. LITERATURE REVIEW

K. S. Shin and M. J. Mao Kaiver [1] presented a cell phone based health monitoring system with self analysis which incorporates IoT a new paradigm that uses smart objects which are not only capable of collecting the information from the environment and interacting the physical world, but also to be interconnected with each other through internet to exchange data as well as information.

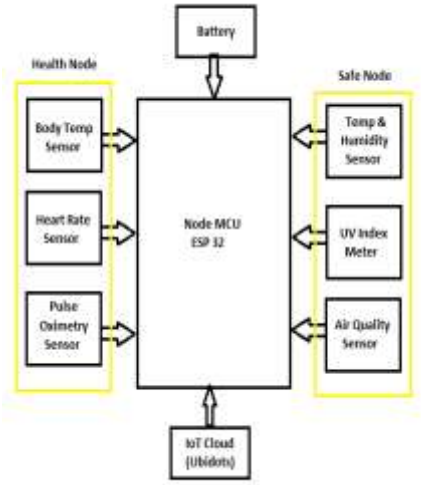
S. J. Jung and W. Y. Chung[2] studied the Flexible and scalable patient's health monitoring system in 6LoWPAN . The main advantage of this enabling factor is the combination of some technologies and communications solution. The results of Internet of Things are synergetic activities gathered in various fields of knowledge like telecommunications, informatics and electronics.

Mario Blumthaler [3] presented a technique to provide information about the level of solar UV. The UV-Index (UVI) is the relevant quantity, expressing the erythemally weighted irradiance to a horizontal plane on a simple scale. As solar UV irradiance is strongly variable in time and space, measurements within a network provide the best source of information, provided they can be made available rapidly.

Shivayogi Hiremath, Geng Yang, Kunal Mankodiya [4] presented an effort to conceptualize WIOT in terms of their design, function, including wearable sensor, internet connected gateways and cloud and big data support that are key to its future success in healthcare domain applications. Also present a new system science for WIOT that suggests future directions, encompassing operational and clinical aspects.

III. PROPOSED WORK

In this paper proposed approach of wearable sensor network for health care system consists of two nodes, health node and safe node interface with Node MCU ESP32 Microcontroller Unit. Heterogeneous wearable IoT sensor network system for connected safety and health applications, which is also suitable for industrial workplace. The system architecture is shown in Fig. 1.



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Wearable body area network (WBAN) is a special purpose WSN that is generally used in healthcare environments to monitor physiological signals that can improve the quality of life, and consequently health and wellness. Safety is very important for industrial workplace, especially for workers constantly switching working environments between indoor and outdoor. In outdoor environments, UV, ozone, carbon monoxide (CO) and particular matter (PM) are harmful to human health. The wearable network consists of multiple wearable sensor nodes which are capable of communicating with each other. Each person is equipped with nodes: the first node is named Safe Node for environmental condition monitoring ; the second node named Health Node is for physiological signals monitoring. Safe Node consists of environmental sensors includes Temperature and Humidity Sensor (DHT11), UV Index Meter and Air Quality Sensor (MQ 135). Health Node consists of wearable body sensors includes Body Temperature sensor (LM35), Heart Rate and Pulse Oximetry sensor (Max 30100).Wearable sensors on different subjects are designed to communicate with each other for an effective connectivity. In addition, a smart IoT gateway is designed and implemented to process, store and pass the data to cloud infrastructure. Monitored data can be displayed from a local web server located in the gateway and a website in the cloud server. If any emergency condition is detected, the system can notify users by pushing

notifications to the their smart phone. In our approach, we are going to use Ubidots IoT Cloud Service.

IV. CONCLUSION

In this paper, we present an IoT network system for connected health and safety applications for industrial outdoor workplace. The system is able to monitor both physiological and environmental data forming a network from wearable sensors attached to workers' body and provide invaluable information to the system operator and workers for safety and health monitoring. Aspects such as sensor node hardware and software design, gateway and cloud implementation are discussed. In our future works, different environmental and physiological sensors can be integrated to the system to suit different workplaces. A smartphone-based IoT gateway can be developed to reduce the dependency of the fixed location gateway.

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