*Journal of Science and Technology*
*ISSN: 2456-5660 Volume 5, Issue 6, Nov-December 2020*

*www.jst.org.in* *DOI: https://doi.org/10.46243/jst.2020.v5.i6.pp93-99*

# Smart Health Monitoring and Management Using Internet of Things, Artificial Intelligence with Cloud Based Processing

Juhi Joshi[1], Nupur Patel[2], Prof.Jinal Shah[3]
[1,2](Student, PICA, Parul University, Post Limda, Waghodia, Gujarat, India)
[3](Professor, PICA, Parul University, Post Limda, Waghodia, Gujarat, India)
[3]Corresponding Author: jinal.shah42084@paruluniversity.ac.in

***To Cite this Article***
*Juhi Joshi, Nupur Patel and Prof.Jinal Shah, "Smart Health Monitoring and Management Using Internet of Things, Artificial Intelligence with Cloud Based Processing", Journal of Science and Technology, Vol. 05, Issue 06, Nov-December 2020, pp*

***Article Info***
*Received: 30-06-2020 Revised: 29-09-2020 Accepted: 05-10-2020 Published: 16-10-2020*

***Abstract:*** *Smart health monitoring system is a system that shortens the distance between a patient and the relevant medical organization. These systems have rapidly evolved during the past two decades and have the potential to change the way health cases are currently delivered. The Internet of Things (IoT) is an innovation for smart health management. It provides monitoring patients remotely and guarantees giving patients the medication and getting complete health care without the latter getting infected. As we know that the NovelCorona-virus also known as covid-19 expanded its impacts from China and still expands its catchment, national as well as international measures are being taken to contain the outbreak such as the placing of lockdown in nations. As a result, many people are being infected making the hospital incapable of providing proper healthcare.*
*This paper proposes a smart health system that monitors the patients holding the coronavirus remotely and to protect the lives of the health service members (like physicians, nurses) from infection. This smart system observes patients by using sensors, to gather rich information every minute seconds. This benefits the patient as well as the service members because the physicians can observe the patient while freeing up beds in the hospitals for the critical cases.*

***Keywords****: Smart health, IoT, Patients, Hospitals, Corona,*

## I. Introduction

Recently the natural event of the novel coronavirus has wedged several peoples' life and also the disturbance created, cause the hospitals running out with beds and providing insufficient care services. within the past few years, we have a tendency to saw an increase in wearable sensors from that several square measure commercially accessible. Researchers have thought of applications, that facilitate in long observance, management, and clinical access to patient's physiological data. supported current trends we are able to say that within the close to future observance, that typically takes concerning 3-4 days amount are going to be shortened and fewer pricey mistreatment these wearable sensors [1]. This information aids to form higher designation and facilitate in early intervention.
According to World Health Organization the typical life expectancy has magnified by five-hitter throughout 2011-15 in spite over sixteen,000 kids underneath the age five died everyday thanks to lack of correct access to medication. over two hundred million girls still don't have access to correct care [2]
As covid-19 threatens to own devastating consequences in least developed countries (LDCs), health systems is also unable to address a high increase in infections, and these countries lack the resources to address the socioeconomic consequences of internment round the world. Providing these countries with such sensible observance systems that square measure cheap and reliable can facilitate such countries fight with the threat higher Grammar Check Re-write Again

## II. Internet of Things (IoT) and Artificial Intelligence (AI)

IoT is creating any objects internally connected and it's been thought-about because the next industrial revolution. good health watching mechanism, good parking, smart home, smart city, good climate, industrial sites, and agricultural fields area unit a number of the applications of IoT. the employment of IoT is tending management that provides health and setting condition chase facilities. IoT is linking computers to the net utilizing sensors and networks.

These connected elements will be used on devices for health watching [3]. computing (AI), typically known as engine intelligence, this intelligence incontestable by machines, in contrast to the natural intelligence displayed by being, computing (AI), usually mentioned as machine intelligence. As machines become additional and additional capable of doing tasks thought-about to need 'intelligence' area unit typically faraway from the definition of AI a development known as the AI result [4].

### *Major Components*

Few major components in these wearable sensors include:-

***I. ESP32 Processor***

ESP32 Processer is a hybrid microchip which supports Wi-Fi and Bluetooth connectivity for wide range of devices. It's one of the main IoT learning tools. *This* provides full Linux system platform at a very low price with a very robust design and is highly integrated with built in antennas [5].

***II. Heart Beat Sensors***

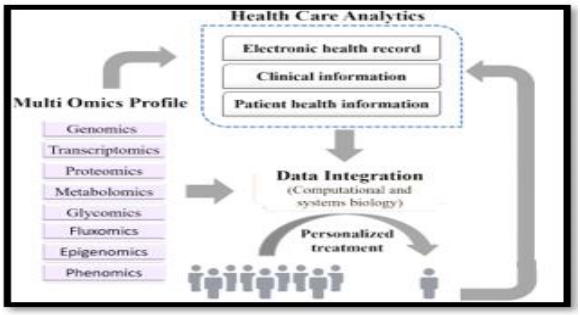
Heart Beat is the expansion and contraction of heart that sends blood through arteries. The number of times the heart beats is the BPM and the movement in the arteries near the skin is known as pulse. The heart beat sensors senses the pulse rate through the principle of photo plethysmography [6]. This principle uses diode to emit light, when the tissue is illuminated with the light.

***III. Body Temperature Sensors***

These are the sensors that are used to measure the infrared energy of the object. This is done by the sensing element composed by multiple thermocouples on the silicone chip[7]. Most common measurements include ear, forehead and skin temperature.

## III. System Engineering

The major area unit for good health monitoring systems are as follows:
***Data Acquisition:*** The design consists of varied applications, doctor application, automaton applications, and cloud server.
There is a hardware device connected to automaton applications through Bluetooth. The hardware devices carries with it sensors connected to that. The sensors that is wearable and it measures psychological biomarkers like graph, Skin temperature, rate of respiration, EMG muscle activity and plenty of additional. The system connected to a network through a smart phone situated within the section of the patient [8].
***Data Transmission*** may be a data assortment in care permits health systems to form holistic views of patients, personalise treatments, advance treatment ways, and improve communication between doctors and patients, health outcomes. care knowledge management is that the method of storing, protecting, and analysing information force from numerous sources. looking on the live, information will be collected from totally different sources, as well as medical records, patient's surveys, and body information accustomed pay bills or to manage care. With up-to-date information at their fingertips, providers, patients and caregivers will work along to create totally enlightened care choices. Improved safety and quality. practical patient information helps guarantee patients receive acceptable tests and medications, whereas avoiding duplicative or conflicting ones [9].



This figure represents the aid analytics, multi omics profile, customized treatment and these all attach on the one purpose that is information integration. Cloud Computing plays a very important role in health observation system. Cloud computing has principally 3 elements that is IaaS (Infrastructure as a Service), PaaS (Platform as a Service), SaaS (Software as a Service) [10]. A health care cloud could be a cloud computing service employed by health care provides for storing, maintaining and backing up Protected.Health information (PHI)[11].Remote accessibility of information is probably the most important benefits that cloud storage of information offers. the mixture of cloud computing with tending has the potential to enhance variety of healthcare-related functions like telemedicine [12], post-hospitalization care plans [14], and virtual medication attachment [14]. Cloud computing is quickly turning into a necessity within the medical field. Hospitals and health clinics may even use a public cloud for a remote storage of their own medical information (not the patient's data). essentially, a public cloud could offer the healthcare industry service agility and cost savings [15].

## IV. Comparisons

IoT is reliable and a heavily researched topic. Compared to any other system the smart health monitoring system is very advanced. Sensors are being used almost everywhere in our day to day life. IoT makes our life smarter, more efficient and easier. We chose this system to createawareness among our self and people around us at hard times like this i.e. pandemic.

## V. Conclusions

IoT based on the smart healthcare to monitor the basic signs like body temperature, heart rate, etc. Using this monitor the medical staff can view and track the data in real-time even though the patients perform the tests outside of the hospital. Improving the current healthcare system, will provide with faster diagnosis and lesser the chance of deaths. This system is very important in case of a pandemic such as the novel coronavirus (COVID-19) treatment. In the coming future this system will be more compact and will be very significant to determine the patient's health conditions.

## VI. Literature Review

| Sr. No | Name of the Journal/Website/Company/Documentation | Title | Year(If Applicable) | Functionality | Future Work | Reference Link |
|---|---|---|---|---|---|---|
| 1. | Health monitoring systems | Health Monitoring System | 2020 | Health Monitoring System (HMS) consist of lots of wearable devices and advanced technology. | Improve the reliability of network communications and also will improve the health care issues. | https://www.sciencedirect.com/science/article/pii/S2144644719300508 |
| 2. | Census India | Life-tables of census India | 2019 | Census represents the perfect and accurate data in any research. It helps the peoples to know the accurate data of any research. | As the census program will take over by the government then only people know about the country. | https://www.worldometers.info/world-population/india-population/#:~:text=The%20current%20population%20of%20India,of% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | 20the%20total%20world%20population. |
| 3. | Health Tech | The Future of Artificial Intelligence in Healthcare | 2020 | AI works on deep learning, machine learning, and many more fields. | Artificial intelligence will improve the health care technology by their advanced technology. | https://healthtechmagazine.net/article/2020/02/future-artificial-intelligence-healthcare |
| 4. | Springer Link | Smart Healthcare Data Acquisition System | 2020 | Health care acquisition system is consisting of many hardware devices in health care. | Many advanced technology will takes place in health care in acquisition system. | https://link.springer.com/chapter/10.1007/978-3-030-37218-7_88 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. | Colleaga | Personal Health Information and Consent | 2020 | Personal health information (PHI), also referred to as protected health information in the Health Records refers to demographic information, medical history, test and laboratory results, clinical notes, insurance information. PHI is discussed in this article within the context of privacy and consent:<br><br>Understanding Consent<br>Obtaining Consent<br>Rules and Regulations for PHI<br>Electronic Health Records | In the future, the personal health information will get advanced by the different gadgets. | https://www.colleaga.org/article/personal-health-information-and-consent |
| 6. | Health and medical insurance | Healthinsurance | 2020 | Health insurance helps people for health care. As hospitality is not very affordable by the middle class people then the middle class people think of health insurance. | Health insurance is very important part of peoples and all people are aware of this insurance. | https://www.imedpub.com/scholarly/health-insurance-journals-articles-ppts-list.php |
| 7. | Springer open | IoT based | 2020 | IoT stands for | IoT is very | https://jo |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | technology | | internet of technology. It includes in the health care sector. | helpful in the future and it is being helpful in the present. It provides the advanced technology in the future and being the IoT is providing in the present. | urnalofbigdata.springeropen.com/articles/10.1186/s40537-019-0268-2 |
| 8. | Research gate publications | Cloud processing and system management | 2020 | Cloud processing and system management plays very important role in the health care. It helps to improved medical research, and better coverage in patient's care. | Cloud processing and system management provides the best help in health care. Cloud processing is expensive in future. But it provides the benefits to both sides the customer as well as the host. | https://www.researchgate.net/publication/275405581_Medical_Applications_and_Healthcare_Based_on_Cloud_Computing |

## Refrences

[1]2015 IEEE International Conference on Services Computing:- http://www2.ece.rochester.edu/~gsharma/papers/Moeen_HealthMonitor_SCC2015.pdf
[2]Census India 2011-15:- https://www.censusindia.gov.in/Vital_Statistics/SRS_Life_Table/SRS_11-15/3.Analysis_2011-15.pdf
[3] https://www.wipro.com/en-IN/business-process/what-can-iot-do-for-healthcare
[4]Catelo;Health Tech Magazinehttps://healthtechmagazine.net/article/2020/02/future-artificial-intelligence-healthcare
[5]2019 ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD.:- https://www.espressif.com/en/products/socs/esp32#:~:text=ESP32%20can%20perform%20as%20a,SDIO%20or%20I2C%20%2F%20UART%20interfaces.
[6]Electronics Project Focus:- https://www.elprocus.com/heartbeat-sensor-working-application/
[7]Ghole,07/01/2020Available at:-https://link.springer.com/chapter/10.1007/978-3-030-37218-7_88
[8]March 2017IEEE Transactions on Industrial Informatics PP(99):1-1 DOI:10.1109/TII.2017.2687618:- https://www.researchgate.net/publication/315649367_Private_and_Secured_Medical_Data_Transmission_and_Analysis_for_Wireless_Sensing_Healthcare_System
[9]Apervita Inc.,August 19, 2018:-https://apervita.com/2018/08/19/apervita-iaas-saas-paas-healthcare/
[10]Patrick Lo , The Power of Collective Intelligence :-https://www.colleaga.org/article/personal-health-information-and-consent
[11] Chiron Health 2020:-https://chironhealth.com/telemedicine/what-is-telemedicine/
[12] TATTVA HOME HEALTHCARE PRIVATE LIMITED:-https://onelifehealthcare.in/category/post-hospitalization/
[13] J Am Med Inform Assoc. 1997 Nov-Dec; 4(6): 413–425.doi:10.1136/jamia.1997.0040413:- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC61259/
[14]Innovative Architechture:-https://www.innovativearchitects.com/KnowledgeCenter/industry-specific/healthcare-and-cloud-computing.aspx