

# Smart Health Care Monitoring System Based on IOT Framework Using Low Power Wireless Wearable Devices: Novel Approach

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**Abstract** - Prosperity has prime importance in our regular day to day existence. Sound prosperity is essential to achieve the step-by-step work suitably. With gigantic measures of new human administrations advancement new organizations, IoT is rapidly adjusting the social protection diligence. IoT Based Patient Monitoring System using ESP8266 and Arduino. Prosperity checking is the significant issue nowadays. Heart-beat rate and inward warmth level readings are recorded over Thing Speak and Google sheets with the objective that calm prosperity can be checked from wherever in the world over web. we have organized the IoT Based Patient Health Monitoring System using contraptions. This IoT device could scrutinize the beat rate and measure the incorporating temperature. It continually screens the beat rate and incorporating temperature and updates them to an IoT stage. We are observing various boundaries of the patient using web of things. In the patient checking system reliant upon Internet of things adventure, the continuous boundaries of patient's prosperity are shipped off cloud using Internet accessibility. These boundaries are shipped off a far-off Internet territory so customer can see these nuances from any-place in the world.

There is a huge qualification among standard and IOT based patient noticing outline work. In IOT based casing work, nuances of the patient prosperity can be seen by various customers. The explanation for this is the information ought to be seen by visiting a site or URL. However, in GSM based patient checking, the prosperity parameters are sent using GSM through SMS. Wellbeing is the most pixie ortant part of any human's existence without wellbeing it is pointless to any prize of life. Most people carry on with a bustling life wherein going to a specialist for week after week or even month to month test is an incomprehensible errand. Without checking your wellbeing, it is beyond the realm of imagination to whether you are a solid or

debilitated individual. This issue prompts the plan of an item which monitors your wellbeing consistently without going to a specialist. In this paper, a framework is planned as a model for checking cautioning dependent on the soundness of an individual. This framework is completely auto-mated practically no human assistance is required. Any specialist can monitor this individual from anyplace through the web.

**Index Terms** – Artificial Intelligence (AI), Healthcare, Internet of Things (IoT), Machine learning algorithms Systematic literature review, low power wireless wearable devices, etc.

## INTRODUCTION

Web of things has been a steady entertainer in the business market just as the medical services market, it has become an everyday part of life for the vast majority of the current age and there is no big surprise to say that it will stay reliable with the ages to come. There may be various explanations behind the IOT worldview all through its excursion can be accepted to rely upon the improvement in the fields of wearable sensor organization (WSN), equipment industry, psychological or AI, etc. The public pay is unequivocally attached to public medical care consumption which can be essentially controlled with the use of IOT use cases in medical care. This section plans to address the accompanying inquiries with a specific accentuation on intellectual learning:

- What is the present status of utilizing psychological learning in IOT based medical care
- What are the drivers and difficulties for utilizing psychological learning in IOT based medical care. Conventional.

#### HEALTH CARE MONITORING SYSTEM WITHOUT IOT

- Diagnosing with the assistance of a specialist
- Conventional gadgets that can just gauge a specific boundary.
- Devices that must be associated intrusively to get estimations.
- No mechanized framework exists.
- Smart watches are costly and not explicitly for medical services.

#### IOT BASED HEALTH CARE MONITORING SYSTEM

- system for 24x7 human wellbeing observing is planned and executed.
- In this framework, the Arduino gadgets utilized for gathering and preparing all information.
- Different sensors are utilized for estimating various boundaries.
- All this information is transferred to thing represent far off investigation.
- An ESP8266 module is utilized for associating with the web.
- A sunlight-based force framework is accommodated controlling every one of the sensors.

This framework is extremely successful in checking an individual's wellbeing ceaselessly on the grounds that it is completely robotized. It tends to be tried effectively with any individual. This framework is an awesome illustration of far-off wellbeing checking.

#### ORIGIN OF IOT

The term Internet of Things was first conceived by [7], the creator of the Auto-ID center at the Massachusetts Institute of Technology. Auto-ID is used to portray a wide scope of measures to perceive and improve applications, for instance, work automation, capability redesign, screw up decline, and so on in 2003, the Auto-ID center released the electronic thing code (EPC) coordinate. The EPC enables following things moving beginning with one territory then onto the following.

This gives a thought for the IoT pixie lamentation, where central processor can be utilized to make an organization for standard business implies [4]. The radio frequency recognizable proof (RFID) execution further concretes the chances for building up the IoT as another IT worldview in both scholastic and modern environments [8]. In the 2005 report of the International Communication Union, the IoT was favorable to acted like a coordinated effort of processing and sensor-based technologies, like sensors, remote organizations, implanted frameworks, object identifiers and nanotechnologies. This blend empowers the items to be labeled, detected and con-saved over the organizations. The IoT is viewed as a brush ination of technologies planned to give collaboration and correspondence among connected gadgets [8]. A few undertaking frameworks, like medical services, the modern area, etc, in view of IoT applications have likewise been created [9]. Agricultural nations likewise appear to be definitely keen on the IoT. The previous Chinese President initiated a public IOT research focus in 2009 and conveyed a discourse about the requirement for cutting edge innovative work in the IoT field [10]

#### PROPOSED METHODOLOGY

An essential application locale of the IoT is the therapeutic administrations part. The IoT has accepted a basic occupation right currently improving assistance quality while reducing costs. It is possible to follow prosperity boundaries, for instance, BP, blood glucose, inner warmth level, and so forth, dynamically by using distant sensors. The progression of improved sensors, better data taking care of advances and pattern setting developments for distant correspondence has provoked the growing utilization of the IoT in the human administrations territory. The headway of wearable body sensor frameworks (WBSNs) to reliably screen patients" practices is another accomplishment for the execution of the IoT. As a piece of this examination, we will be seen as the segment of the applications on Edge Computing in IOT generally speaking, while concentrating on Health-care advancements close by AI strategies.

IOT Challenges:

The principal challenges around IOT arrangements are:

1. The measure of information produced by the sensors are immense. Extraction of pertinent data from the caught information is a test. This exertion requires improvement of a calculation that can separate variations from the norm in caught information for body sensor systems. There have significant research scopes in field of AI and testing calculations.
2. De-centralization of calculation. With an ever-increasing number of gadgets being IOT able, calculation at one point will make bottleneck in organize assets. The calculation should be disseminated, and Task Level Parallelism should be accomplished. Calculation and asset circulation calculations are zones of significant research enthusiasm for this field.
3. The calculation should be conveyed, and Task Level Parallelism should be accomplished. Calculation and asset conveyance calculations are regions of significant research enthusiasm for this field Security of the IOT gadgets.
4. Power Consumption at End Point Devices. Battery utilization is one of the significant worries in IOT gadgets as charging these gadgets may not be a simple issue. This issue is commonly fathomed by off-loading assignments to a back-end server and sparing battery power that would have been in any case required for in-house figuring. This gave a significant catalyst to look into in the spaces of decentralization of calculation.
5. Security of the IOT gadgets.

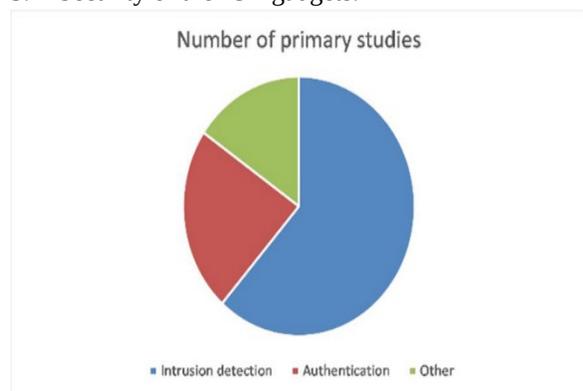
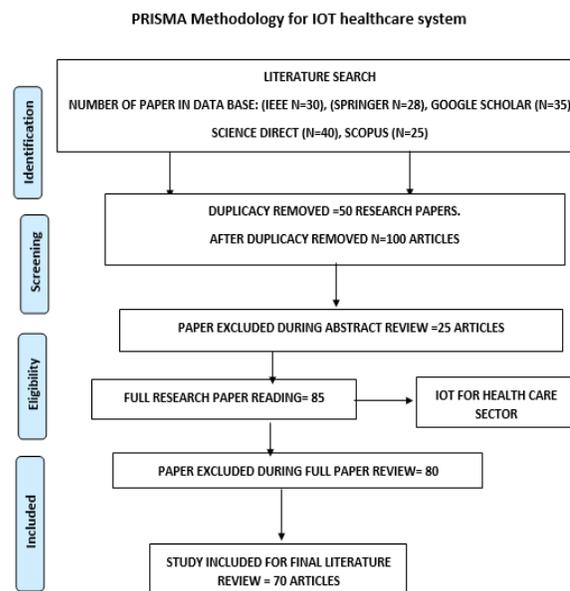


Figure 1: Classification of machine learning techniques

### PRISMA Methodology for IOT healthcare system



### LITERATURE REVIEW: ROL

A fundamental application region of the IoT is the restorative organizations part. The IoT has acknowledged an essential occupation right presently improving help quality while decreasing expenses. It is feasible to follow success limits, for example, BP, blood glucose, internal warmth level, etc, powerfully by utilizing removed sensors. The movement of improved sensors, better information dealing with advances and example setting improvements for far off correspondence has incited the developing usage of the IoT in the human organizations domain. The progress of wearable body sensor systems (WBSNs) to dependably screen patients" rehearses is another achievement for the execution of the IoT. As a piece of this assessment, we will be viewed as the section of the applications on Edge Computing in IOT as a rule, while concentrating on Health-care advancements nearby AI procedures.

### Literature Review: ROL.

THIS LIT-REATURE REVIEW BASED ON IOT FRAMEWORK FOR WEREABLE DEVICES. Currently, communication and sensing wearable devices and their respective software have become versatile for healthcare-IoT systems. A wide range of

good decisions made by these systems is driven by the use of the following IoT-enabling technologies.

1. Related work based on devices and connectivity using IOT in health care system.

Konstantinidis et al. (2015) give a short diagram of effectively accessible, generally ease, and simple to utilize controllers for old consideration mediations, including the WiFi remote controller, weight sensors, and Kinect sensors utilized for gaming and wellness following. These gadgets can be coordinated with Smart TVs, which can progress toward becoming center points for unpretentiously observing the status of older individuals, conveying alarms to wellbeing experts, and helping individuals practice through games, in this way empowering day by day life the board and autonomous living. Besides, ceaseless checking, remote determination and information sharing through versatile wellbeing gadgets and applications are basic for maladies, for example, strokes, rest issue, and epilepsy (Sun et al., 2016).

Shahmiri (2016) talks about inalienable dangers related with wearables, including hacking of gadgets and information, absence of clear and compact client understanding and security arrangements, absence of client information insurance enactment, which could deflect across the board selection of these gadgets. Thus, shoppers' worries with respect to wearables wellbeing impacts, precision and unwavering quality, information gathering and capacity, and protection are featured in an investigation by Marakhimov and Joo (2017). The creators find that shoppers respond emphatically to these issues and that future innovation needs to deliver them so as to be fruitful. It isn't amazing these worries exist, since there is an absence of guidelines checking IoT gadgets. Actually, a few analysts guarantee that in spite of the fact that IoT has indicated incredible guarantee for human services, it has not been as fruitful true to form as a result of the absence of solid and predictable.

2. Related work on detection and treatment procedure using IOT for health care system

Today, doctors can analyze and treat considerably more illnesses than before examined work. Even following quite, a while of training, they can at present battle to make the right determination effectively. This is the place advancements, for

example, IoT and AI can assume a key job in giving dependable help to deciding a determination and the best course of treatment. Simulated intelligence innovations, for example, neural systems can rapidly break down the broad measure of data accessible to doctors, streamline the analytic procedure, and help stay away from mix-ups by coordinating both recorded information and explicit patient data (Amato et al., 2013). This is critical as tremendous measures of social insurance information are beginning to be accessible from an assortment of sources – including IoT therapeutic gadgets that can create constant information - making human example recognition and translation progressively troublesome. We know, for instance, that screening procedures, for example, X-Rays and CT sweeps rely upon the capacity of the radiologist to effectively translate the outcomes. In any case, by and large, 10% of mammography screenings have uncertain outcomes for bosom malignancy and require further biopsies which can regularly cause major mental and physical distress for patients (Keleş et al., 2011). A comparable issue is looked with screening of the thyroid, where 20% of biopsies bring about further medical procedure so as to acquire a more clear determination (Paydar et al., 2016). In spite of the fact that not a trade for prepared doctors, AI frameworks can give extra help to specialists by giving more clear pictures, featuring suspicious locales, giving better investigation devices and individualized hazard assessments for every patient, which thus diminish the requirement for obtrusive techniques (Keleş et al., 2011, Paydar et al., 2016).

#### ANALYSIS OF LITERATURE REVIEW

1. There have been extraordinary headways in figuring, availability and detecting advancements as of late. Minimal effort Health groups fit for detecting human body conditions (Body Sensor Networks) are presently fueled with abilities of registering and availability. A great deal of human services applications is put together presently based with respect to IOT worldview.
2. For some continuous applications "distributed computing" is an over-head because of its high and erratic system inactivity and hence-forth edge registering that carries calculation closer to

the User Device is picking up in ubiquity. It may be noticed that by and large "edge registering" is an enhancement and not a substitution of "distributed computing"

3. Setting mindful calculations are getting significant in IOT based arrangements.

IOT Applications in Healthcare:

Right now, will consider the prior articulations composing related to edge figuring and IOT applications in human administrations is given underneath:

IoT has applications in human services that advantage patients, families, doctors, clinics and insurance agencies. They can follow patients' adherence to treatment plans or any requirement for guaranteed clinical consideration. IoT empowers social insurance experts to be progressively attentive and associate with the patients proactively. This recommendation is for an in-significant exertion tenacious human administrations checking system model reliant on lightweight wearable sensors. These recognizing center points are used for cease-less revelation and examination of human administrations data of patients. The devices are expected to have the alternative to accumulate and share the collected data among themselves thusly promising information examination and limit. This moreover sheds manual in-efficiencies at the same time. For understanding data assembling, an Arduino PI controller based wearable contraption with Body Sensor Networks is proposed.

The web of things in human services: The IoT is portrayed as a system of physical gadgets that utilizes network to empower the trading of information. Under-takings, for example, remote patient checking, treatment progress perception, and the lodging of immunizations are for the most part capacities of clinical gadgets with incorporated IoT. The present innovation in social insurance and a general act of medication gets improved with the IoT frame-work. Experts reach is growing inside an office. The different information gathered from enormous arrangements of certifiable cases increments both the precision and size of clinical information. The exactness of clinical consideration conveyance is additionally improved by fusing increasingly modern advances in the human services framework.

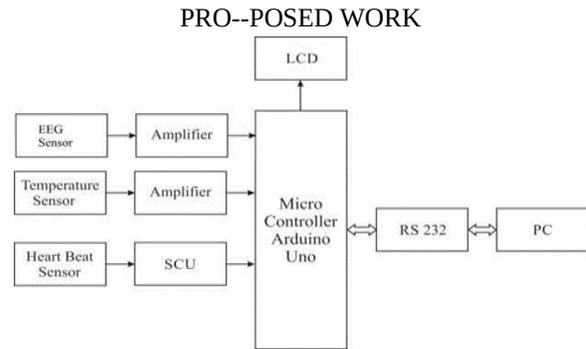


FIG 1.1 BLOCK DIAGRAM OF IOT.

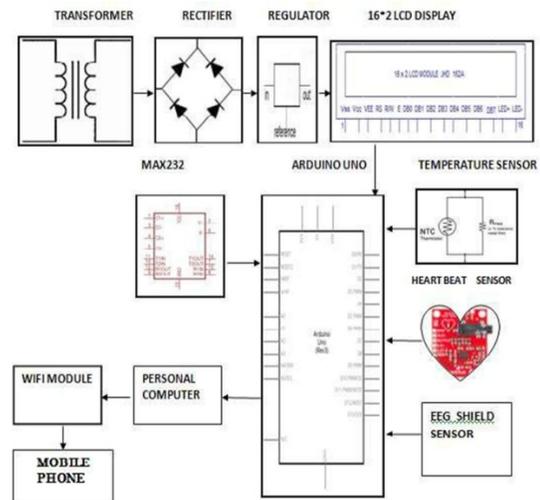
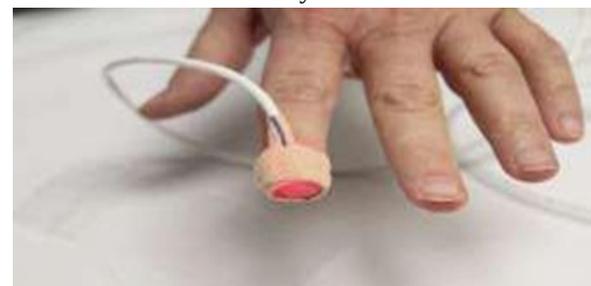
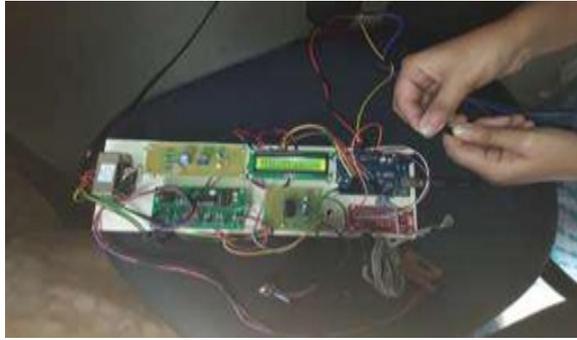


FIG1.2 HEALTH CARE MONI-TORING SYS-TEM USING IOT

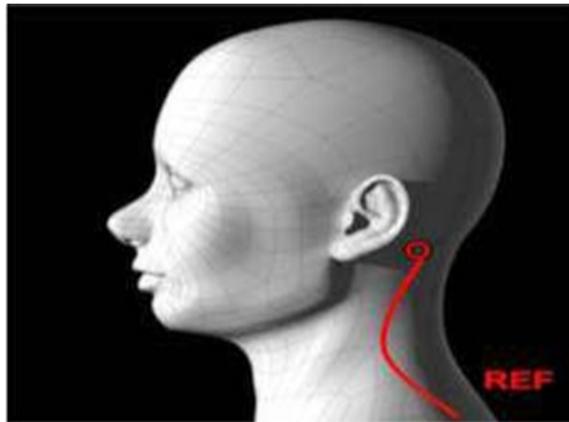
Simulation and result ana-lysis:



1.



2.



IOT MOBILE BASED

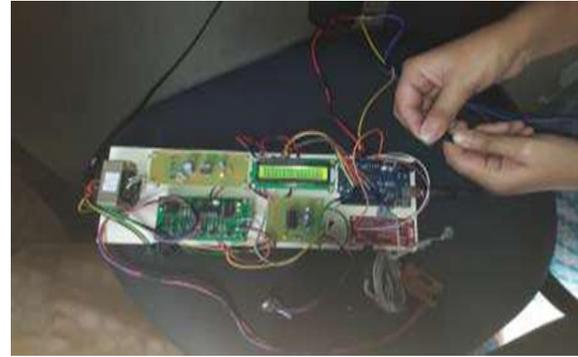
The yield is shown through string in a specific interim of time. The application is basic as it just shows the simple qua-laities followed by an announcement portraying the sort of significant worth showed.



Output displayed in the mobile application device

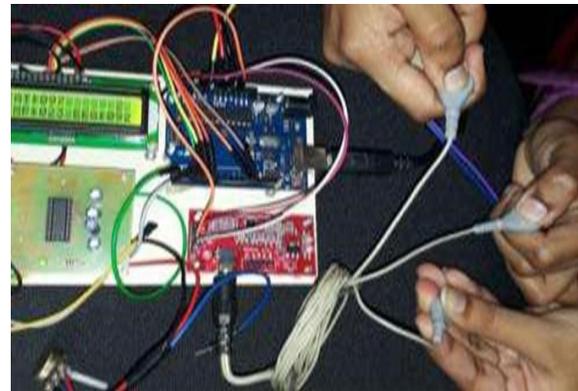
Testing and findings health ca-re unit:

1 Temperature Findings



## 2. EEG Findings

The EEG sensor is used with electrodes with error rate indicating the status as active or in-active.



## SIMULATION AND RESULT ANALYSIS

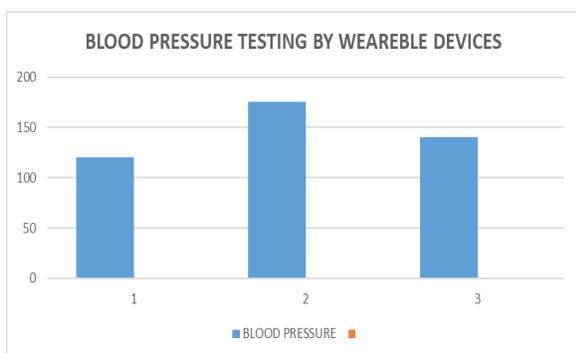
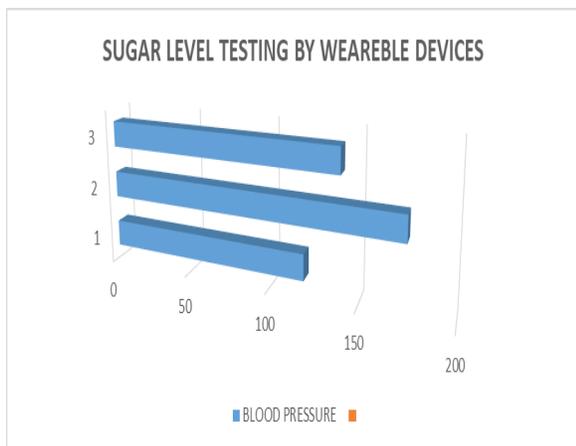
Resul-tant and graph for measuring various parameters: WEA-REBLE DEVICES.

Blood sugar measure by rasp-berry pi controller:

IOT DE-VICES	PATIENT 1	PATIENT 2	PATIENT 3
BLOOD PRE-SSURE	120	175	140

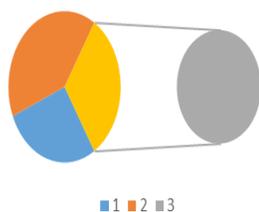
Temperature measure graph: rasp-berry pi controller:

Health Para Meters	22.05	22.1	22.2	22.25	22.3	Temperat ure measures
BODY temperat ure	23	23	24	23	24	temp 2 3
BODY temperat ure	23	23	24	23	24	temp 2 4



IOT Devices	Patient 1	Patient 2	Patient3
Blood Pressure	120	175	140

### BLOOD PRE-SSURE TES-TING BY WEAREBLE DEVICES



### CONCLUSION

The consistently pixie erative parameters, for instance, heartbeat, body temperature, EEG signs can be dis-played in the crowd ile phone and the comparable can be ship off the expert during emergency circum positions. The expert introduced system of patient prosperity monitoring can be especially used in emergency conditions as it will in

general be step by step monitored, recorded and set aside as a data base. In future the IOT device can be combined with the distributed computing so the illuminate action base can be dad taken in every one of the centers for the raised consideration and treatment. Tireless Health monitoring using IoT is a development to empower seeing of patients outside of conventional clinical settings (for instance in the home), which may construct admittance to mind and decrease social protection conveyance costs. This would altogether be able to improve an individual's very own fulfillment. It licenses patients to keep up independence, thwart complications, and cutoff singular costs. This edge work facilitates these goals by conveying care right to the home. In addition, patients and their relatives feel com-for-braid understanding that they are being checked and will be sup-ported if an issue emerges.

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