An Automatic Health Care System Using IOT

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Abstract : A system is proposed for the automate health monitoring system for a patient. The system utilizes the multi sensor, robotic platform and cloud computing which is used to monitor the health of patient in an automated manner. Pathological and Physiological sensor are used to sense the pathological value and physiological value of the patient respectively, using the mobile device. The body of patient can be scanned using the robotic arms. The data value used to identify the type anomalies and sends the set of anomalies to the cloud server. Cognitive engine is used to identify the disease using cloud computing and it is used to send the report to caretaker and doctor.

Keywords:-WBAN, remote monitoring, Smart health unit, Cloud services, Healthcare.

1. INTRODUCTION

IOT stands for Internet of Things, it refers to millions of devices which is used worldwide that are connected to the internet, this devices can able to collect and share the data.
IOT devices which are connected to the internet i.e. mobile phone, computer, laptop, tablets this all are part of IoT devices. This device can communicate over the internet and can be monitored.
This IOT devices can be integrated with software, sensor and actuators and connectivity which allows to collect and exchange of data information.
Smart health system allows to provide the facility to the patients which are very difficult to treat because of unavailability of facility in respective area i.e. rural area. Using smart health system people who suffers from chronicle diseases can also be reduced by providing the treatment at initial stage. Smart health system allows to store, analyze and based on reading values of patient. Patient can be treated accordingly.

Advantages:

I. Reduce the efforts of doctor.
II. Rate of chronicle diseases can be reduced.
III. People can be monitored from distant location.
IV. Patient can be monitored in efficient manner.
V. System is user friendly.
VI. No need to monitored patient regular time interval.

2. FIELD OF THE INVENTION

Smart health care monitoring system describes the reading of patient and based on that reading it also suggest the tips and tricks for the patient to maintain their health and to stay fit. Based on reading values are compared with certain threshold value in case it rises above the level care taker or respective doctor will be informed.

3. BACKGROUND OF INVENTION:-

In certain conditions it is difficult for both nurse and doctor to provide the treatment due to contagious health issues. In such scenario it is difficult for doctor to go near the patient.
In Rural areas people are unable to get facility due to lack of medical staff by implementing smart health system can manage lots of people at a time and as well as based on reading system can able to provide the suggestion to the patient.
Robots can also be implemented in smart health care system, this feature will implement smart health care system to the next generation healthcare solution.
Robotic system can also the endoscopic camera. By using such system surgeon will able to view the surgical area part from distant location.

OBJECTIVE:

Based on World health organization most of the elderly people dies due to chronical disease physiological pressure and this rate can be reduced by implementing the smart health system so that people able to get treatment at initial stage.
Another objective is to provide the facility to the people for rural areas where lack of medical staffing is there.

SUMMARY OF INVENTION:

Smart health system include the sensors, robotic arm, a database, a processor and a cognitive engine which are further categorized into two i.e. physiological and pathological. Physiological sensor are used to sense the physiological signals and pathological sensor are used to sense the pathological values. Robotic arm has a precision scanner. And this scanner scan the body part of the patient and generates an output. Processor includes two modules i.e. anomaly detection module and communication module. Anomaly detection is used to identify anomaly based on physiological value ad pathological value. Communication module sends the set of anomalies to a cloud server. Cognitive engine used to compare the values which is present at database are compared with patient pathological values of disease. Based on this values it generates a report. And this report can be sent to respective doctor or their care taker.

DESCRIPTION OF DRAWINGS:

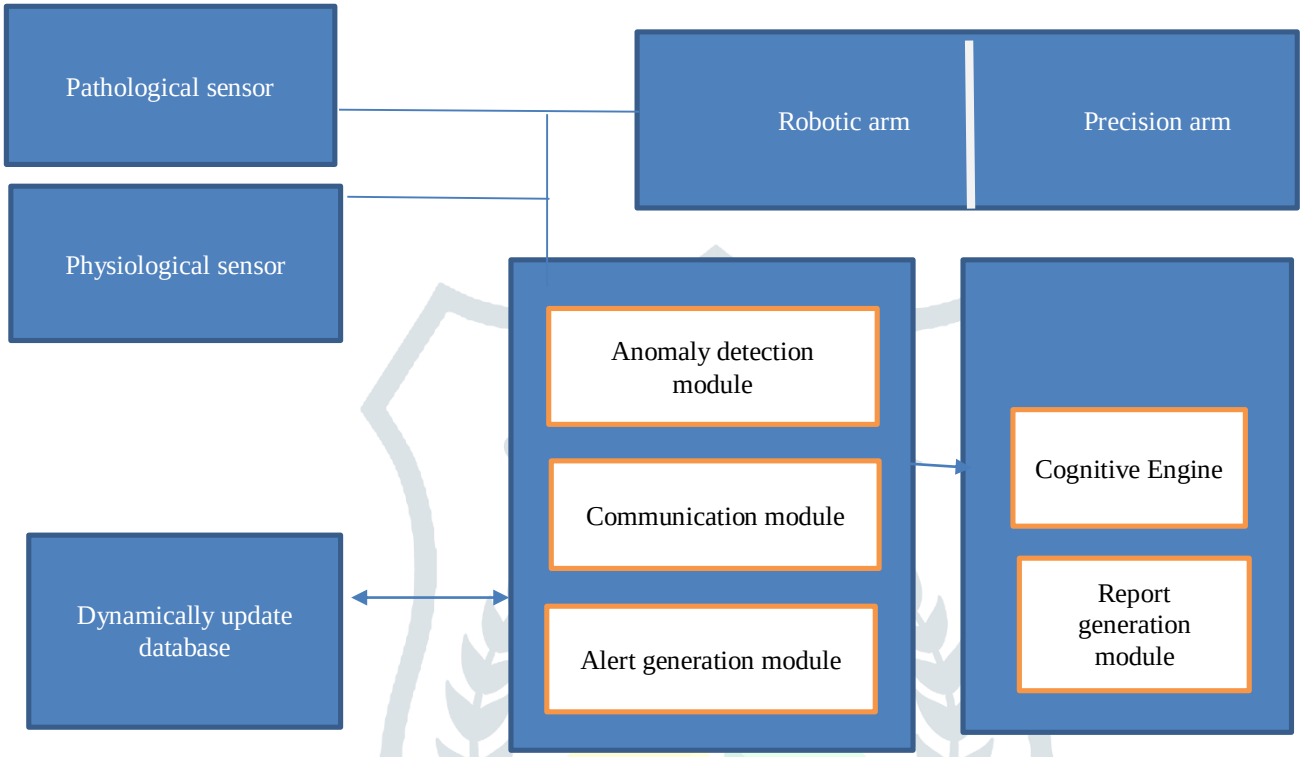

Figure 1

System 100 provides the multi-sensing robotic system, the system 100 helps a caretaker and doctor and nurse to assess the patient without going near to the patient. In addition it also generates the report and sends the report to the respective care taker and respective doctor.

System 100 implements two kinds of sensor those are pathological server and physiological server. Physiological sensor includes the heart rate variability detector, temperature sensor blood pressure monitoring sensor and many more. This kinds of server can be implemented within the system based on the requirement of the kind of smart health system is implementing. System 100 can also implement the mobile based sensors. This sensor can be present on a mobile device and it can also be attached to patient body based on the requirement.

Pathological sensor is a kind of auto –analyzer based sensor this can be used to identify the cholesterol, bacteria, virus etc.Robot arm (106) is capable of movement and it is also used to scan the body of patient. Sensor 116 is capable for generating the report based on the scanning. Sensor 116 include in body imaging system such as ultrasound imaging, ultrawide band (UWB) radar etc.

Anomaly detection module is receives the data from the physiological and pathological sensor this provides the values this values are compared with the standard set of pathological and physiological sensor. Based on the comparison it identifies the set of anomalies corresponding to particular patient.

Communication module is used to send the data to the cloud server that is 114 end using communication module. Communication module can use any of the technique like Bluetooth, wifi etc. And this stores the data to server end and can be used for future use.

Cognitive engine compares the value of physiological and pathological sensor along with the value **present** in the database.

The cloud server 114 model contain the cognitive engine and report generation module. Report generation module generates the report this report is sent to the doctor. Report contain symptoms regarding the particular disease. This report can be used by the doctor to provide the prescriptions to the patient.

Alert generation module is used to generate the alert message based on the values alert message is sent to the caretaker or doctor.

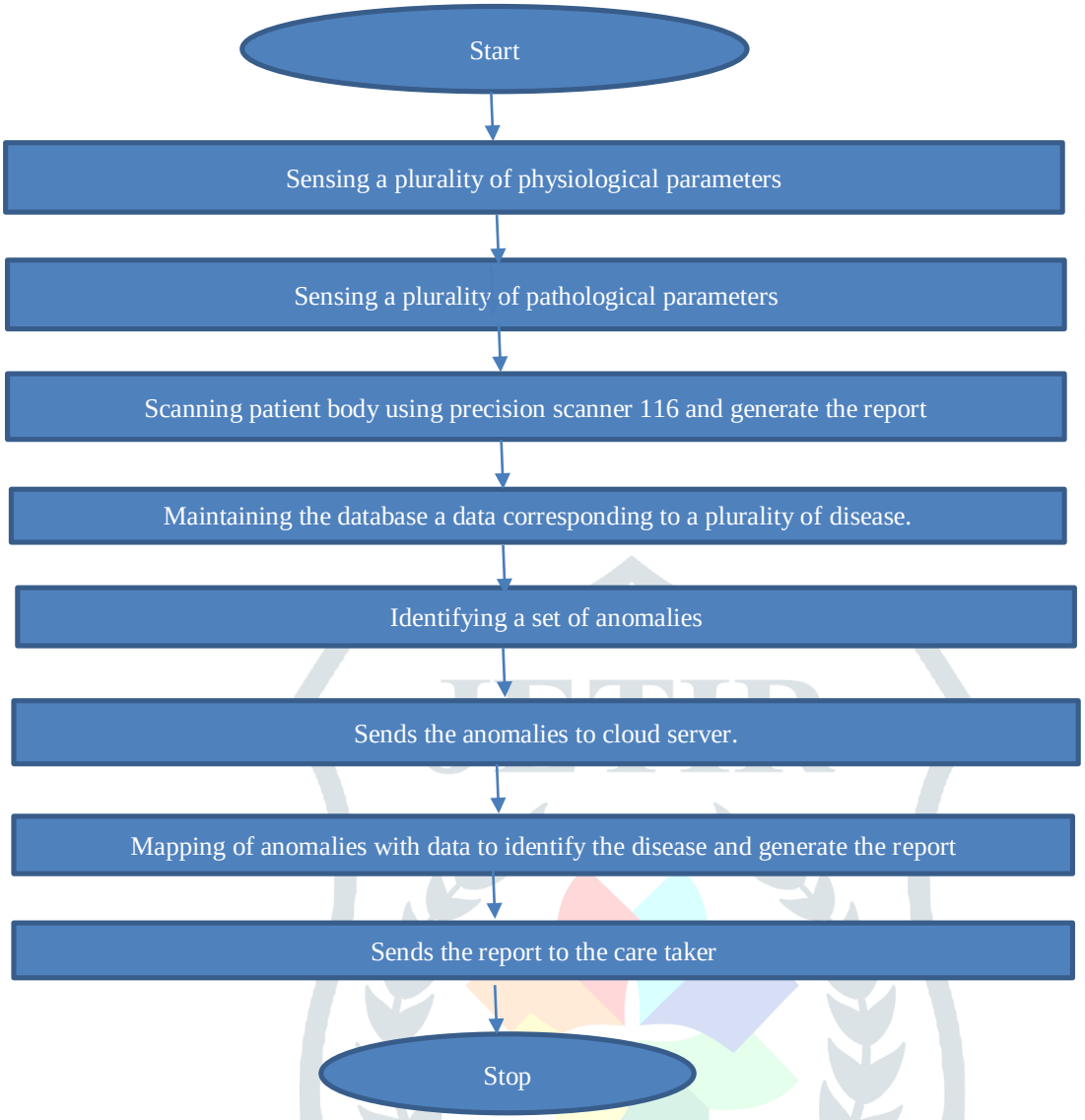

Figure 2

Physiological parameters are identified by physiological sensor. Physiological sensor can also be mobile based sensor and it can also be attached to patient body.
Pathological values are identified using the pathological sensor.
In next step robot arm uses the scanner which scans the body part of the patient based on scan it generates the report. Robotic arm close to patient automatically and achieve the values by using the pathological and physiological sensor. The robotic arm generate the report based on the sensing.
In next stage 208 , A database is maintained it contain the standard value of pathological and physiological value and that can be updated adaptively over the period of time.
In next step 210 anomalies are identified by anomaly detection module .And anomalies are identified based on previous output i.e. through precision scanner. Anomaly refers to the abnormal condition of the patient. Anomaly is identified at next step it is sent to cloud server 114 by the communication module 120.

In next stage 214 set of anomalies are mapped with the present database value. Mapping is implemented with the help of cognitive engine 112. Cognitive engine used to compare values with the sensor i.e. 102,104 and 106 is Based on the comparison a report is generated and that report can be utilize by the doctor or caretaker. And the last stage is 216, the generated report is sent to doctor, can analyse the report and based on report doctor can identify the anomaly and provide the treatment accordingly.
Another idea of invention (PPG) photoplethysmograph is a led based sensor can also be used to identify the blood pressure information from the various body positions.

WORKING EXAMPLE OF PRESENT INVENTION:

Based on invention system 100 can also be implemented with smart phone based BP,HR, and HRV solution along with eHealth sensor can be added i.e. glucometer, Body temperature sensor, Electrocardiogram sensor (ECG) and many more. Smart phone is connected to Arduino board with the medium of Bluetooth and also connected to eHealth sensor through eHealth shield, i.e. Used for data gathering. The signal is sent to the processor by eHealth sensor. In computer system anomaly cognitive engine module and anomaly detection module both are provided.

The cognitive engine takes the action based on the static, dynamic facts and ontologies. The input is sensed by the sensor and it is given to the queue and this data information is processed by the data handler. Data handler perform the various operations that is data filtering and transformation is done on data .Working memory matches the rules and based on matching results queries are triggered to get the desired result. Working memory also have the input that is from rule engine and Facts, ontologies. Queries are written in SPARQL .

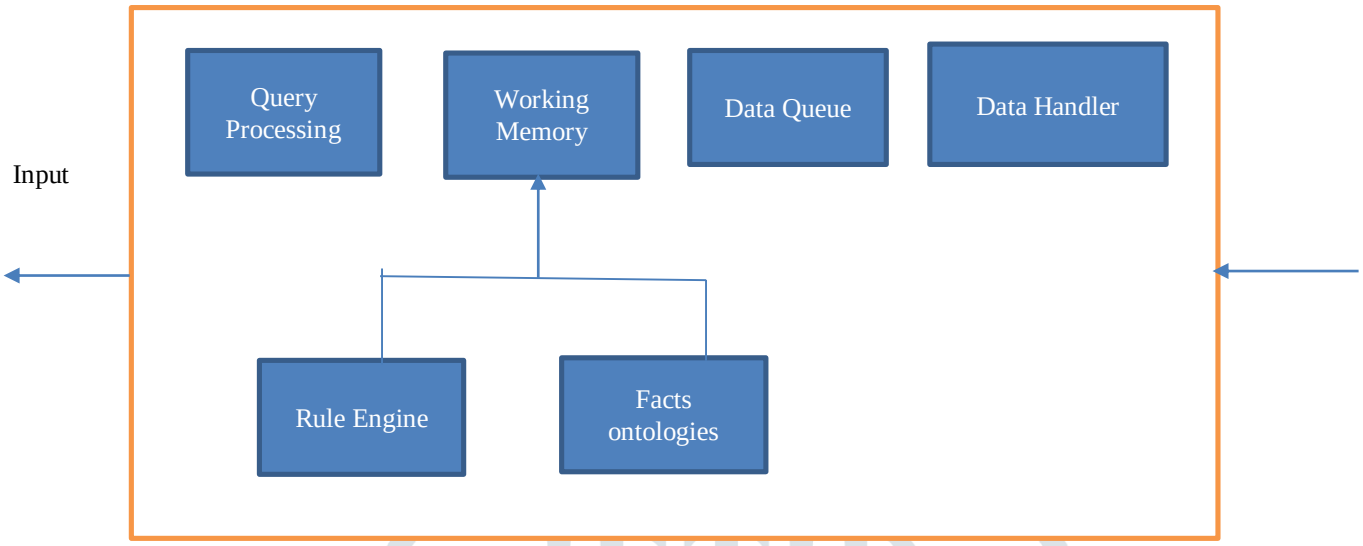

Figure 3

RESULT:

Successful implementation of BP and HRV when it is implemented on participants And it is found that error in BP was under 5% validated against the Omron sphygmanometer while the HRV implementation error is found under 14% validated against HRV calculated from AliveCor ECG9 data.

In present condition automated health monitoring of patient can be implemented using multi-sensing, robotic platform and cloud computing.

CONCLUSION:

The main objective behind the proposed system is to facility the patient in efficient and reliable manner. By implementing the system it reduces the efforts of the doctor in terms of regular meet to the patient. By proposing this system all the information can be stored to the cloud server, and this information can be utilize by the doctor for providing the medical treatment. In emergency case message can be sent to the respective doctor or caretaker. Most of the elderly people dies due to chronicle diseases and that can be reduced by implementing such system. This system can guide the patient accordingly based on his data value. Proposed system can be implemented through via web as well as it can also be implemented as mobile app which will allow the easier access across the globe. Proposed system also helps the rural area people who do not get good facility of medical due to lack of unavailability of doctor.

IoT can redefine the healthcare to the customers. By developing the smart wearable devices. It can make healthcare more accurate, precise and timely.

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