International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 04 | Apr 2020 www.irjet.net p-ISSN: 2395-0072

PATIENT MONITORING SYSTEM USING AUGUMENTED REALITY

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Abstract - *Surgeons are regularly on the lookout for technologies that will enhance their operating environment. They face difficulties in monitoring the vital parameters while doing surgery continuously. So, in this project, the system for assisting the doctors while performing surgery using Augmented Reality. Augmented reality (AR) are rapidly becoming increasingly available, accessible and importantly affordable, hence their application in healthcare is to enhance the medical use of data is certain. The Vital Parameters such as Heart Rate, Humidity and Temperature of Patients are measured using suitable sensors. The sensors used for measuring Heart rate, Humidity Sensor, Temperature Sensor. The ARDUINO UNO is used for processing the sensor values and is programmed using Embedded C. The surgeon is provided with an alert signal, whenever the sensor output exceeds a normal threshold Value. The alert signal is displayed on the AR glass through the wireless transceiver. Thus, this prototype helps the doctors to monitor the patients continuously during Surgery.*

***Key Words*: Augmented reality (AR), Heart rate, Humidity Sensor, Arduino Uno**

1. INTRODUCTION

Surgeons are showing interest in adopting the newer technologies that provide them a better surgical environment. The main need of medical augmented reality came from the need of visualizing medical data and patient within the same medical space. Augmented reality (AR) supplements the real world with virtual objects, such that virtual objects appear to coexist in the same space as the real world. Developing this method really helps doctors during surgery and reduces the medical errors. It continuously monitors the patient's health condition during surgery. AR technology provides users to digital information into the existing environment. AR innovations can enhance doctors and surgeon's ability to diagnose, treat, and perform surgery on their patients more accurately by giving them access to real-time data and patient information faster, and more precisely than ever before. In the existing system, the doctors should take care of any parameters during surgery manually.

It will be difficult to monitor the parameters of the patients undergoing surgery continuously for the doctors and it may cause some serious case. So, there is a need for the system to monitor the parameters continuously during surgery.

1.1 LITERATURE SURVEY

In 2014, a review made by Egui Zhu, Arash Hadadgar, Italo Masiello and Nabil Zary tells that Augmented reality (AR) amounts to the real world with virtual objects, such that virtual objects appear to coexist in the same space as the real world. AR is used in Clinical care as it provides with an internal view of the patients without any invasive procedures. AR implemented in several healthcare areas and aimed at all level of learners. But, this paper has a Lack of learning theories to guide the design of AR. It did not clearly describe which kind of learning theory was used to guide design or application of AR in healthcare education. So, in this project we provide a clear idea for the use of augmented reality in surgeries by providing the surgeons the semi-transparent glass where they will be alerted if any parameters go above the threshold ranges.

In 2018, Filip Malwski developed the augmented reality for car assistive system. Based on this paper we got the idea of developing the same system for assisting doctors. The AR technology can be used in Handheld Devices, Stationary AR Systems, Spatial Augmented Reality (SAR), Systems Head-mounted Displays (HMDs), Smart Glasses, Smart Lenses. Major medical applications deal on robot-assisted surgery and image guided surgery.

1.2 PROPOSED SYSTEM

We propose a system in which provide real time information for the doctors of certain parameters during surgery by displaying on semi-transparent Glass which is said to be AR- glass and AR provides the real-worldview, In this project, during surgery the real time data of patients is collected by the sensors attached to patients once the sensor measured the values then it is processed and send to doctors Augmented Reality glass through wireless and alert if any abnormal condition occurs. It is easy to assist while doing the surgery to the patients there is no deviation of seeing the health parameters (heartbeat rate) of patients around him.

2. METHODOLOGY

Arduino board is connected to external power supply. Then the heartbeat sensor, Humidity sensor, Temperature sensor are connected with the Arduino. These sensor collects the values from the patient. LCD display is connected with Arduino which displays temperature values it will alert if temperature cross threshold range. Then all sensor value is transmitted by the wireless transmitter. The microcontroller is connected to temperature, heartbeat and pressure sensor. The microcontroller is connected to an external power supply. These are placed near the patient

bed. As soon as the patient gets admitted the details are input to the microcontroller through the sensors. The information is recorded in the microcontroller and sent to the doctor's goggles through wireless transmitter. The information is received through the WIFI receiver placed at the doctor goggle. When the doctor enters the patient ward with the google as soon as he goes near the patient the information gets transmitted using this information the doctor can analyse the critical patients and treat them first.

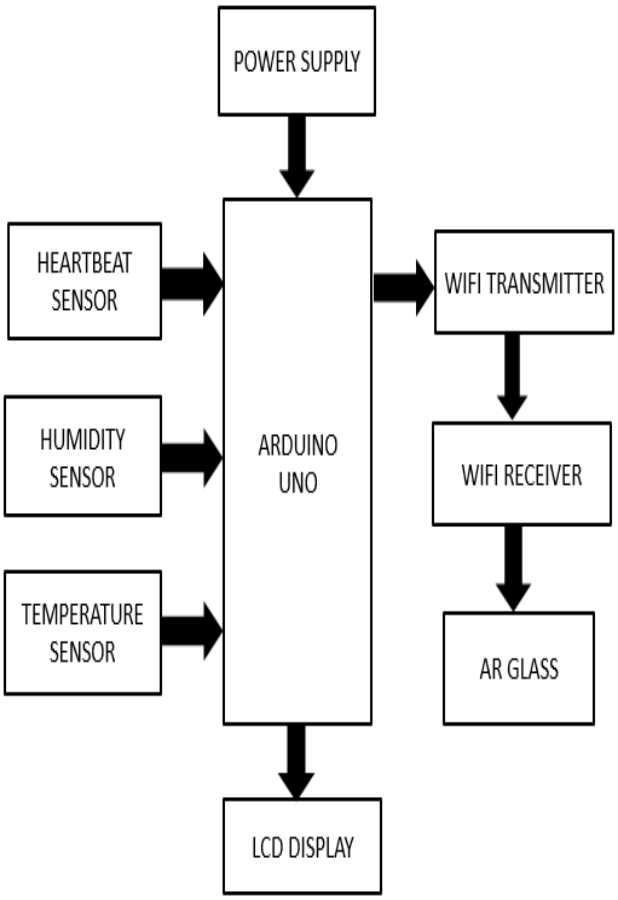

Fig -1: Block diagram

Then the transmitted data is received by wireless receiver then the data will be displayed on AR glass. During surgery it continuously monitors the patient's health condition and sent Real time data to Surgeons. AR innovation can help surgeons to treat, diagnose and to perform surgery on their patients accurately giving real-time data of patient's information faster and more precisely. These sensors are attached with the patient during surgery.

The WIFI transmitter collects the patient's information about the patient and transmits to the goggle. The doctor now sees the information about the patient through the goggle. On analysing the patient information, the doctors decide whether the patient is critical or normal. If normal the doctor moves to other patient otherwise the doctor takes more attention to the patient. The OLED lens display the temperature, pressure, and heart beat information about the patient

Fig -1: Block diagram

Body parameters like heartbeat, temperature and pressure are measured using the sensors. The analog outputs from the sensors are given as inputs to the Arduino UNO microcontroller and processed. This AR glass can wear during surgery it is semi-transparent glass which make surgery simple, easy it provides new innovation to medical fields. The processed digital outputs are transmitted to the wireless transceiver through WIFI protocol using Arduino software.

The receiver section consists of a 9V battery powered VR glass, adjusting mirror and the ZigBee receiver. Now the VR reality ray falls on the adjusting mirror and reflects on the OLED. The output is displayed on the wearable glass using augmented technology

3. CONCLUSION

In this project the patient monitoring system is developed. The potential ability of Augmented Reality is to display imaging data and patient information which save lives and decrease medical errors. It will be very helpful for the surgeons while doing surgery. It will alert if any abnormal health condition of the patient during surgery.

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