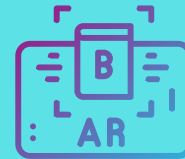


Vitals monitoring System using Augmented Reality

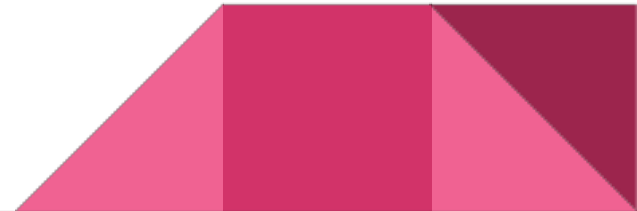


Pretext

Surgeons have great 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.

Developing this method really helps doctors during surgery and reduces the medical errors. It continuously monitors the patient's health condition during surgery.



Basics of AR

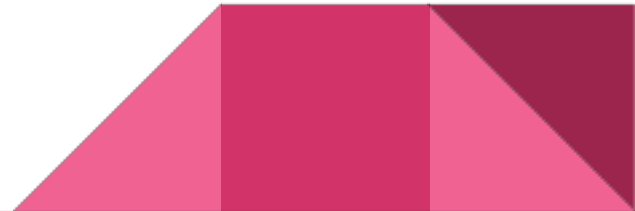
AR denotes a technique to combine a real world and virtual objects which are artificially generated by a computer

AR can allow the user to see 3D virtual objects superimposed upon the real world.

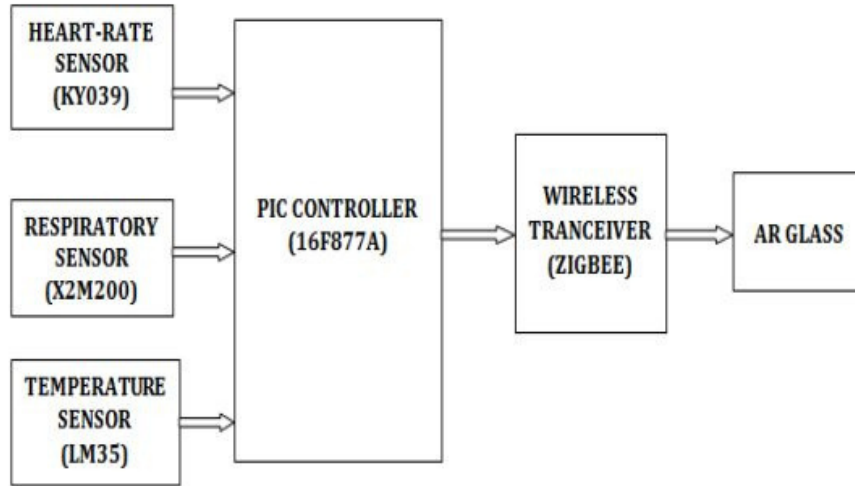
This technology expands our physical world, adding layers of digital information onto it.

AR appears in direct view of an existing environment and adds sounds, videos and graphics to it.

“AR plays a vital role in future of medicine.”



Components Used



Transmitter

Heart-Rate Sensor, Respiratory Sensor, Temperature Sensor, PIC Microcontroller.

Receiver

Zigbee, AR Glass

Sensors in the transmitter

Heart-Rate Sensor

Heart beat sensor gives digital output of heart beat when a finger is placed on it. Output which is in the form of digital can be connected to microcontroller directly to measure the Beats per Minute (BPM) rate.

It is based on the principle of light modulation by blood flow through finger at each pulse.

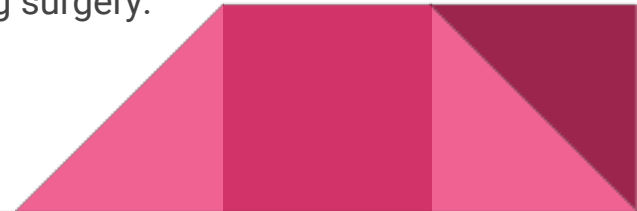
Respiratory Sensor

It is a sensitive girth sensor connected to a high durability woven adjustable electric band.

When strapped around a patient's chest or abdomen, It detects the abdominal expansion/contraction and converts it to a rise and fall of the signal on the screen.

Temperature Sensor

This sensor is used to measure the body temperature of the patient during surgery.



Transmitter

PIC Microcontroller

Microcontroller are used to monitor and control the system and make it user friendly. Microcontrollers are semi programmable devices so enable the required peripherals and make application hardware.

The acronym PIC stands for "Peripheral Interface Controller".



Receiver

Zigbee

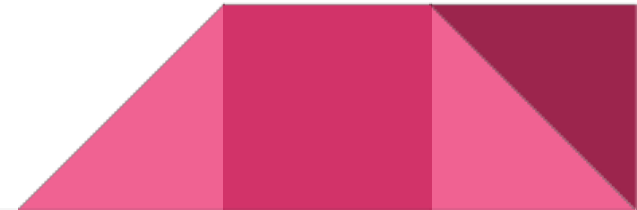
Zigbee is basically used for two-way wireless communication between sensors and control system. It is a short-range communication standard like Bluetooth and Wi-Fi, covering range of 10 to 100 meters.



The real-time data of patients in hospital are collected by the sensors attached to patient.

The measured sensor values are given as input to the “PIC microcontroller “and the values are processed

The wireless ZIGBEE transceiver receives and displays the real time patient’s body details in augmented reality glass and alert if abnormal condition occurs



The doctor can take respective actions based on the patient's current health condition



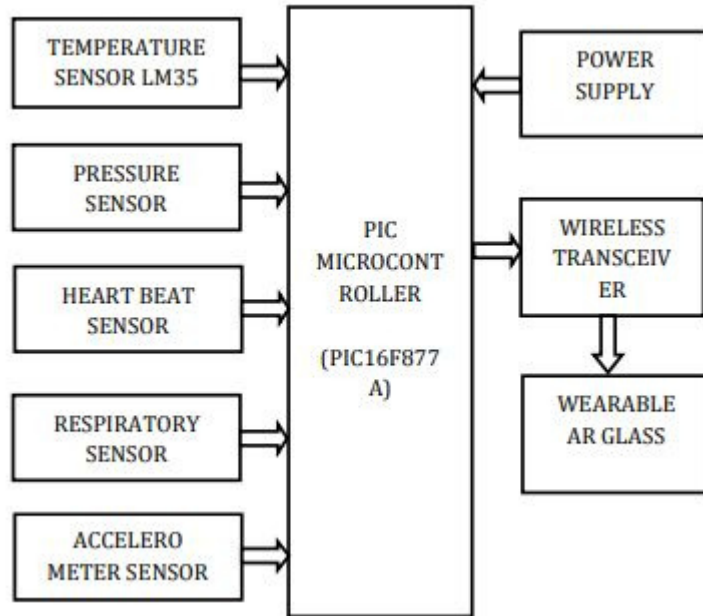
When the doctor enters the patient ward with the goggles as soon as he goes near the patient the information gets transmitted, using these information the doctor can analyze the critical patients and treat them first.



If the parameter goes above the threshold values, the alert message is sent to the doctor



Future scope



Pressure Sensor

The Blood pressure Sensor is a non invasive device designed to measure human blood pressure.

Accelerometer Sensor

This sensor monitors five different patient positions like standing, sitting, and supine, prone, left and right. It can be helpful for monitoring the body positions and movements made because of their relationships to particular diseases.

Conclusion

Surgery is changing from open procedures to minimally invasive approaches.

AR technology has a great potential to assist this change

It helps the doctor take appropriate action based on the patient's current health condition.

AR's potential ability to concurrently display imaging data and other patient information could save lives and decrease medical errors. The AR glass provides necessary parameter details to the surgeon in digital manner.

It reduces the risk of invasive surgery, which can be avoided by keeping the most important information in front of the surgeon. It significantly improves the quality of treatment.



Thank You!