Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 9 Issue 02, February-2020

Patient IV and Oxygen Control System using IoT

Omamageswari M
(Asst.prof)
Instrumentation and Control Engineering (ICE)
Sri Manakula Vinayagar Engineering College (SMVEC)
Pondicherry, India

Priyadharshini M
Instrumentation and Control Engineering (ICE)
Sri Manakula Vinayagar Engineering College (SMVEC)
Pondicherry, India

Fazila A K
Instrumentation and Control Engineering (ICE)
Sri Manakula Vinayagar Engineering College (SMVEC)
Pondicherry, India

Raisa A K
Instrumentation and Control Engineering (ICE)
Sri Manakula Vinayagar Engineering College (SMVEC)
Pondicherry, India

Mariyasusmi F
Instrumentation and Control Engineering (ICE)
Sri Manakula Vinayagar Engineering College (SMVEC)
Pondicherry, India

***Abstract*— Improving quality of life is one among the most benefits of integrating new innovations into medicine. Medical technologies such as less-invasive surgeries, proper monitoring systems, and better scanning equipment allow patients to recover soon and enjoy a healthy life. For good patient care in hospitals, assessment and management of patient's fluid and oxygen need is that the most fundamental thing required. The patient history will also be helpful if stored in the hospital's database. All most altogether hospital, an assist/nurse is liable for monitoring the saline fluid level and oxygen level continuously. But unfortunately during most of the time, the observer may forget to change the saline bottle at correct time due to their busy schedule. This may leads to several problems to the patients such as backflow of blood, blood loss, drop oxygen level The design and implementation of patient IV fluid and oxygen flow controlling method employs liquid flow sensor, pressure sensor and pulse detector sensor The micro-controller (NodeMCU) are presented here which has the ability to assist the health care provider to control the saline circulation rate and oxygen level by implementing wrist watch using IoT(wifi module) . The node microcontroller platform has been used as controlling unit for providing necessary control along with wifi module and wrist watch to monitor and control. To store data related to patients, API is used which displays their history or present details in a web page of the hospital.**

Keywords*— Saline flow control, Oxygen flow control, API, Wifi module, Node microcontroller.

INTRODUCTION

The requirements for health care are rapidly rising with the continuous growing of the world population. Improvement in medical technology has lead to the tremendous success,the main reason is the rapid advancement of sensors, microcontrollers, and computers' prompt development. Number of technological innovation systems are undertaken which lead to the improvement of medical service. There are researches and development of saline monitoring and controlling device for the betterment of people's health care. The amount of Normal Saline intake taken by patient is totally depends on physiological condition of patient but normally it's between 1.5 to three liters per day for an adult. Oxygen flow intake is up to 2-4l/min. Generally, in hospitals flow level is monitored by nurses and patients relatives. There is always a requirement to see the saline level after certain time. Unfortunately during most of the time, the observer may forget to vary the saline bottle at correct time due to their busy schedule. This may results in several problems to the patients like back flow of blood, blood loss etc. The existing system for flow monitoring is extremely time consuming and inconvenient for nurses. The main objective of proposed system is to supply reliable, convenient, effortless and cost effective system for flow monitoring. The oxygen and saline is injected into blood by considering certain parameters like heart rate or in medical terms Pulse rate of patient. As the saline goes below the critical level, it's necessary to vary the saline bottle. As well because the oxygen flow got to monitor continuously. An automatic monitoring system determine the flow rate. Due to the utilization of IoT, the notification are often sent to the nurse on his/her wrist watch.

OVERVIEW OF PROPOSED SYSTEM

After examining a few paper supported the development of the automated saline monitoring system, it had been seen that a lot of complex circuit and modules were used which increase the value of producing. In some system GSM (Global system for mobile communication) system, Bluetooth module and keypad were used to monitor the system. In all the previous system it had been seen that there's no automatic control of flow. The proposed system of this paper is to detect , indicate and control the flow rate of IV fluid and oxygen label accurately and give the signal to the doctor or nurse so that the amount

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 9 Issue 02, February-2020

of flow can be controlled using a wrist watch which is equipped with nodeMC for transfer of signals. Usage of pulse sensor decides the amount of flow of saline and oxygen flow. The diagram of proposed system is shown in figure 1.If there is any abnormal situation like overflow or saline bottle empty that will be indicated with the help of buzzer in the wrist watch. Sensors will be developed to determine the rate. Once pulse is detected the device will continuously check the flow rate and maintain a normal condition. A flow sensor will detect the water drop accurately. Errors reading are often determined by signal conditioning circuit and can be removed by an isolator circuit.

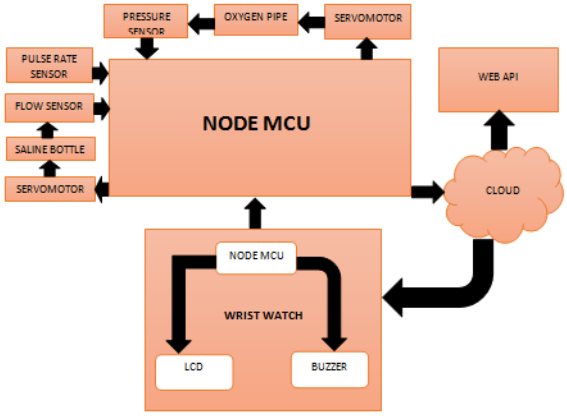

Fig 1.blockdiagram of proposed system

SIMULATION OUTPUT USING PROTEUS SOFTWARE

Fig 2 depicts the Simulation output using proteus software of a oxygen and IV control system that consists of the flow sensor, pressure sensor, pulse rate sensor and LCD display. The system has been proposed using Node microcontroller platform contains General-purpose input/output (GPIO) is a pin on an IC (Integrated Circuit). It are often either input pin or output pin, whose behavior are often controlled at the run time. NodeMCU Development kit provides access to those GPIOs of ESP8266. The only thing to require care is that NodeMCUDev kit pins are numbered differently. For example, the D0 pin on the NodeMCUDev kit is mapped to the internal GPIO pin 16 of ESP8266.In addition to this API is implemented to display or show the patient's Health details.

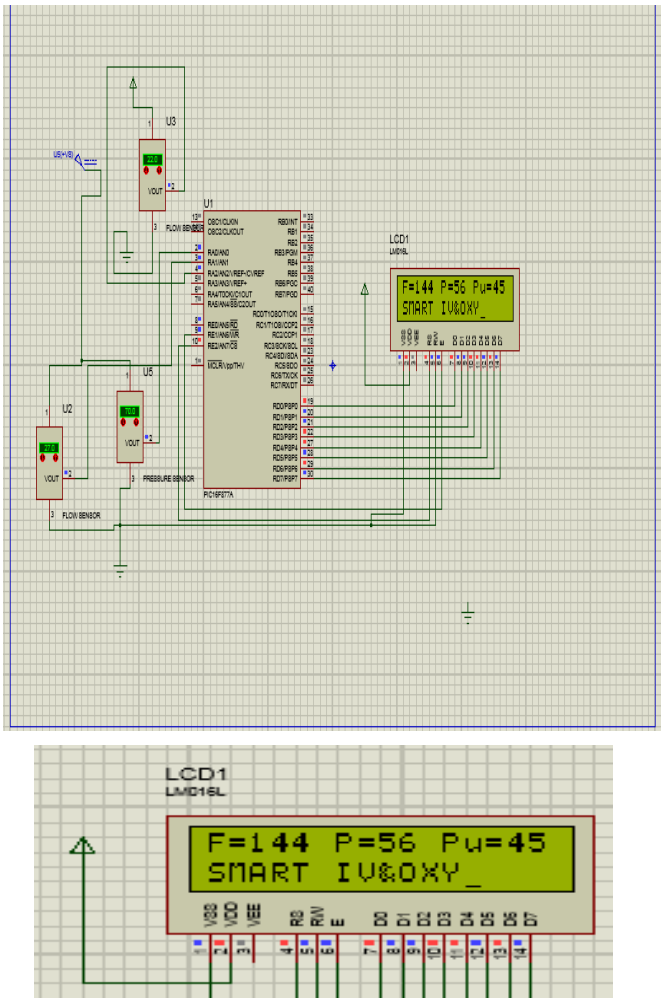

Fig 2. Simulation output using proteus software

HARDWARE ARRANGEMENT OF PROPOSED SYSTEM

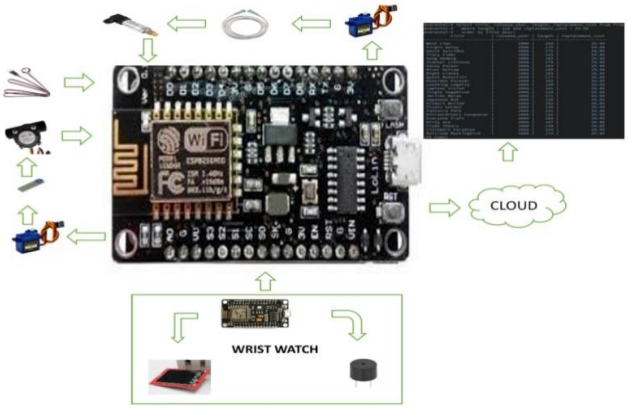

Fig 3. Hardware Arrangement of proposed system

SOFTWARE OUTPUT

A web page has been developed using application programming interface for storing the patients' health details within the hospital server. the online page using API is shown within the fig.4

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 9 Issue 02, February-2020

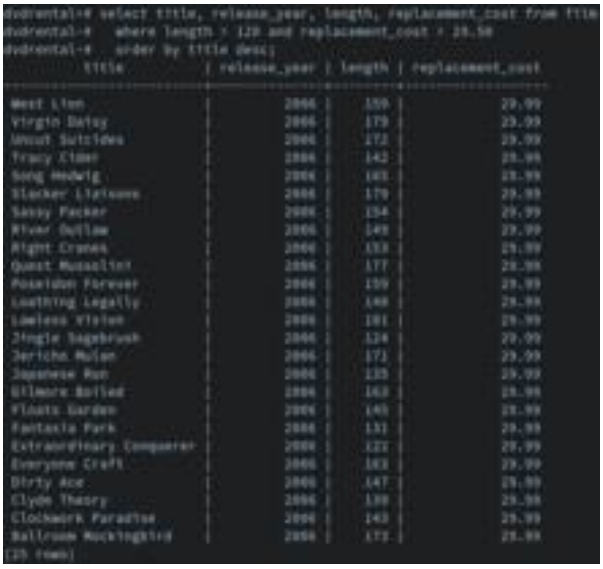

Fig 4. API web page

PROGRAMMING FLOW DIAGRAM

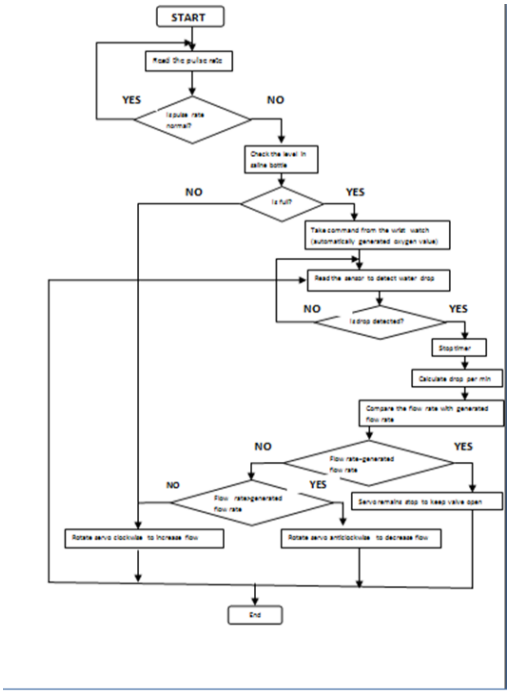

Fig 5.Flow for IV fluid control

The flow chart given in fig 5 shows the steps being undertaken for the fluid (saline) control device. At first the pulse rate or heartbeat of the patient is determined with the help of pulse rate sensor. According to the pulse rate of the patient one can determine the amount of glucose (saline) and oxygen level that is to be given to the patient. Thus both fluid amount and oxygen level are displayed in the wrist watch of the assist/nurse. The Node MCU in wrist watch sends signals to the microcontroller in the installed system. The level sensor indicates whether the saline bottle is empty or not. If empty the servo motor rotates clockwise to fill the bottle. Then according to the displayed fluid level, the saline is introduced into the patient using flow sensor and servo motor. The servomotor will rotate clockwise or anticlockwise depending on whether there is decrease or increase in the flow that is given to the patient. The buzzer
in the wrist watch of the patient will snooze when there is any abnormal situation in the flow. After the procedure is completed web page is developed. The development of apps for mobile devices meant that organizations needed to perrmit users to access information through apps and not just through the web. Within the Medical sector, APIs are used to allow patients to easily share information and also lets the doctors interact with patients as well.

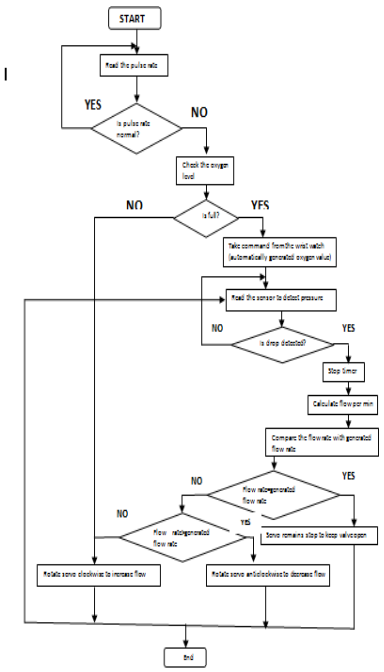

Fig 6.Flow for Oxygen control

The flow chart given in fig 6 shows the steps being undertaken for the oxygen control device. At first the pulse rate or heartbeat of the patient is determined with the help of pulse rate sensor. According to the pulse rate of the patient one can determine the amount of glucose (saline) and oxygen level that is to be given to the patient. Thus both fluid amount and oxygen level are displayed in the wrist watch of the assist/nurse. The Node MCU in wrist watch sends signals to the microcontroller in the installed system. The level sensor indicates whether the oxygen cylinder is empty or not. If empty the servo motor rotates clockwise to fill the cylinder. Then according to the displayed oxygen level, the oxygen is introduced into the patient using pressure sensor and servo motor. The servomotor will rotate clockwise or anticlockwise depending on whether there is decrease or increase in the flow that is given to the patient. The buzzer in the wrist watch of the patient will snooze when there is any abnormal situation in the flow. After the procedure is completed web page is developed. The development of apps for mobile devices meant that organizations needed to permit users to access information through apps and not just through the web. Within the Medical sector, APIs are used to allow patients to easily share information and also let the doctors interact with patients as well.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 9 Issue 02, February-2020

CONCLUSION

Our project totally focuses on both technology improvement and health care improvement. . Now a days as population increases, death rate also increases. Thus population rate is directly proportional to death rate. There has been many technologies developed in medical field and our project can be one of them. The accuracy, size, affordability of our project can pay way to greater implementation. The prime important in today's world is reducing man power. The repeated checking about the status of IV and oxygen set is reduced. Thus our project reduces man power and increases the system's efficient..

REFERENCES

[1] Flow measuring system And Gsm Based Remote Monitoring Device", International Journal of Pharmaceutical Applications, vol. 3, no. 1, pp. 277-281, 2012.
[2] I.S.Tawade, M.S.Pendse, H.P.Chaudhari "Design and Development Of Saline flow Monitoring System Using Flow Sensor, Microcontroller and RF Zigbee Module", International Journal Of Engineering Research and General Science, vol. 3, no. 3, pp. 472-478, 2015.
[3] Priyadharshini.R , Mithuna.S , VasanthKumar.U, KalpanaDevi.S , Dr. SuthanthiraVanitha.N, "Automatic Intravenous Fluid Level Indication System for Hospitals", International Journal for Research in Applied Science & Engineering Technology (IJRASET), vol. 3, no. 8, pp. 427-432, 2017.
[4] "HC-03/05 Embedded Bluetooth Serial Communication Module AT command set", http://www.linotux.ch/ 2011.[Online].Available:http://www.linotux.ch/arduino /HC0305_serial_module_AT_commamdset_201104_revised.pdf.
[5] **R.Vasuki**and et al., proposes "A portable monitoring device of measuring drips rate by using an intravenous (IV) set"**.**
[6] **C.C.Gavimath**and et al., proposes an method of "Design and development of versatile saline flow rate measuring system and GSM based remote monitoring device".
[7] **R.Aravind**and et al., Proposed a paper, "Design of family health monitoring system using wireless communication".
[8] **V.Ramya**and et al., proposes an "Embedded patient monitoring system". In this system the status of the patient is monitored continuously by using an embedded system.
[9] NeramitrChirakanphaisarn and et al proposes"Heart Rate measurement and electrical pulse siganalanalysis".