International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 5 Issue 5, July-August 2021 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

IOT Based Patient Health Monitoring System Using WIFI

Marupuri Usha Priya[1], Muthu Pandi K[1], Priya S[1], Dr. Kishore Kumar Arjunsingh[2]

[1]Student, [2]Associate Professor,
[1,2]Department of Electronics and Communication Engineering,
Arjun College of Technology, Coimbatore, Tamil Nadu, India

ABSTRACT

Health is given the extreme importance now a-days by each country with the advent of the novel corona virus. So in this aspect, an IOT based patient health monitoring system is the best solution for such an epidemic. With an improvement in technology and miniaturization of sensors, there have been attempts to utilize the new technology in various areas to improve the quality of human life. As a result, this project is an attempt to solve a health care problem currently society is facing covid-19.The main objective of the project was to design for to reduce the corona virus, reduce the components and man power. The framework can be utilized to constantly screen the wellbeing parameters of a patient. The body temperature, heart rate and spo2 can be measured from anyplace on the globe utilizing IOT (Internet of Things). IOT monitoring of health helps in preventing the spread of disease as well as to get a proper diagnosis of the state of health, even if the doctor is at far distance. We proposed a nonstop checking and control instrument to screen the patient condition and store the patient information's in server utilizing Wi-Fi Module based remote correspondence. Hence the proposed architecture collects the sensor data through ESP32 microcontroller and relays it to the WIFI where it is processed and analyzed for remote viewing. Feedback actions based on the analyzed data can be sent back to the doctor or guardian through Google sheet and/or SMS alerts in case of any emergencies.

KEYWORDS: *ESP32, IOT, WIFI, Sensors, Covid-19*

How to cite this paper: Marupuri Usha Priya | Muthu Pandi K | Priya S | Dr. Kishore Kumar Arjunsingh "IOT Based Patient Health Monitoring System Using WIFI" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-5, August 2021, pp.1917-1920, URL: www.ijtsrd.com/papers/ijtsrd45143.pdf

IJTSRD45143

INTRODUCTION

In today's area, health problems are increasing day-by-day due to the corona virus how health care has become of major importance. In such areas where the epidemic is spread, it is always a better idea to monitor these patients using patient health monitoring technology. So Internet of Things based health monitoring system is the current solution for it. In wireless sensors technology by designing a system which included different wireless sensors to receive information with respectively pulse oximeter (SPO2) and lm35 it measures human body oxygen level and heart rate and body temperature. That will be further transmitted on an IOT platform which is accessible by the user via internet. An accessible database is created about patient's health history which can be further monitored & analyzed by the doctor if necessary. Once the health issue has been increased to a critical stage and the life of the person is endangered condition, then they take medical assistance, which can cause an unnecessary waste of their earnings. This also comes into account especially when certain epidemic is spread in an area where the reach of doctors is impossible. So to avoid the spread of disease, if a smart sensor is given to patients, who can be monitored from a distance would be a practical solution to save many lives. This paper proposes health monitoring system which is capable of detecting multiple parameters of our body such as oxygen level in blood, temperature, heart rate & further transmitting this information on an IOT server. Also in case of emergency, automatically generating alerts will be sent to doctors and family members if any emergency activity is detected. There see the condition of patient through Google link in Google sheet.

PROPOSED SYSTEM

The main objective is to design a Patient Monitoring System with two-way communication i.e. not only the

patient's data will be sent to the doctor through SMS and check in Google sheet on emergencies, but also the doctor can send required suggestions to the patient or guardians through SMS or Google sheet. And Patient or guardian can able to track patient's location at any point in time through Google Maps which would enable to send medical services in case of an emergency for non-bed ridden patients

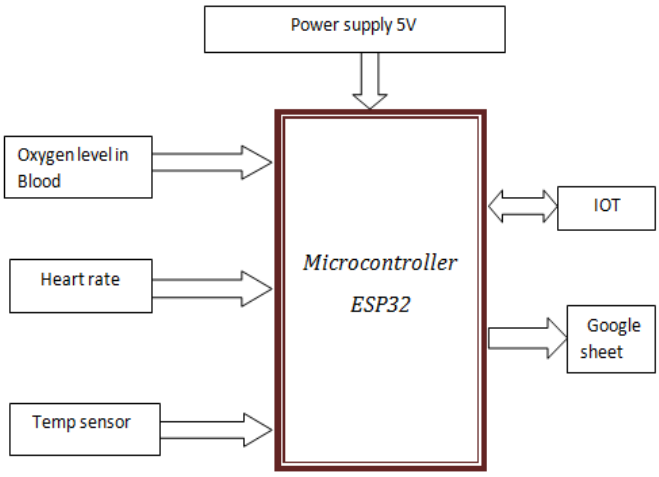

Fig: Proposed system

HARDWARE SPECIFICATIONS

1. LM35 (Temperature sensor)

It is an IC sensor that is used to measure temperature with an output voltage linearly proportional to the Centigrade temperature. The LM35 sensor has an advantage over linear temperature sensor, as the user has not to make the conversion of Kelvin to Centigrade. This is major significance of LM-35 that it calibrate directly in Celsius and it is also suitable for remote applications. It has better efficiency than thermistor.

Body temperature	State
25.5 °C to 35. 5 °C	Normal
>37.5 °C	High
<35. 5 °C	Low

Table: Temperature sensor

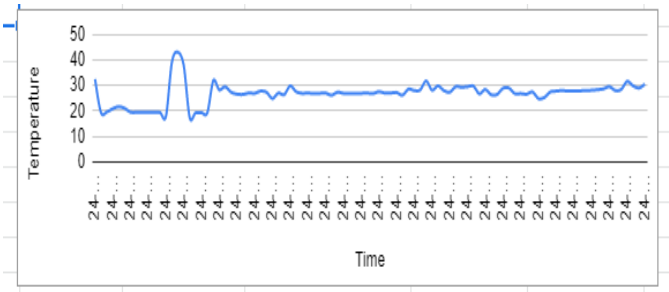

Fig: Graphical representation of LM35

2. Heart rate sensor

It is used to measure the heartbeat of the patient. It gives a digital output of heart beat when a finger is placed on it. It is compressed in size. The working voltage of heart beat sensor is +5V DC. It works on the principle of light modulation by blood flow through finger at each pulse. Heart beat sensor is used to measure heart beat which normally lies between 60-100 bpm.

Pulse rate	State
60 - 100 BPM	Normal
>100 BPM	High
<60 BPM	Low

Fig: Table for Heart rate sensor

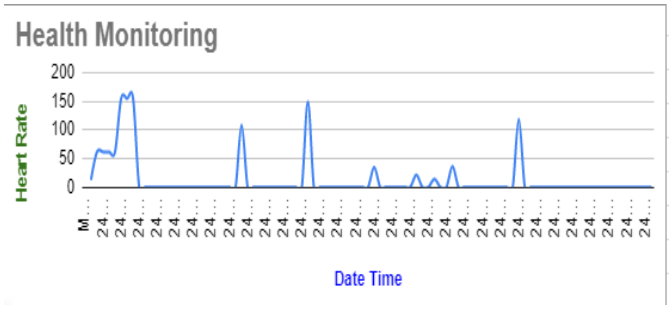

Fig: Graphical representation of Heart rate.

3. SPO2

Pulse oximeter MAX30100 is used for check oxygen level in blood.

In this situation the spo2 plays a major role.

Spo2	+95	negative
Spo2	>90	positive

Fig: spo2 checking the virus

4. ESP32 Microcontroller

ESP32 is a series of low cost, low power system on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth.

5. Working

ESP32 is a master device in proposed system. All the other devices are connected to it. A DC power supply of 5V is provided for working in ESP32. IOT server is attached to the system. It allows the connectivity for data exchange with other devices. IOT allows connected objects to identify and control remote access across network. The output of sensor is sent to the receiver or doctor end. All the information is first acquired, processed and stored. The stored information is then transferred to the receiver by means of IOT server. The Receiver section, all the information is received. Webpage(Google sheet) displays the result of each sensor which is attached to microcontroller.

EXPERIMENTAL RESULTS

The body temperature sensor, heart rate sensor, oxygen sensor values are calibrated using the microcontroller. where it shows the output values of the sensors calculated and displayed in a Google sheet.

Fig ; Project Overview

OUTPUT

	Heart Rate	Temperature	Spo2
MM-dd-yyyy HH:mm:ss		Degree Celsius	%
24-03-2021 16:38:03	12.5	32.5	25.4
24-03-2021 16:40:23	61.55	19.34	94
24-03-2021 16:40:59	61.55	19.58	94
24-03-2021 16:41:32	61.55	20.87	94
24-03-2021 16:42:05	61.55	21.68	94
24-03-2021 16:43:06	154.56	21.03	95
24-03-2021 16:43:39	154.56	19.5	95
24-03-2021 16:44:12	154.56	19.42	95

Fig: Table for output

CONCLUSION

The system developed patient monitoring based on Internet of things, is an alternative that can be used to help patients with COVID-19. Likewise with this set of solutions the aim is to improve the quality of life of patients, not just monitoring them, but also to enable direct them to improve their eating habits and workout routines. The context model developed for the system proved to be efficient when making inferences related to the context, such as recommendations for taking measures through sensors, as well as recommendations and workout routines tips to improve the eating habits of patients.

REFERENCES

[1] Prajoona Valsalan, Tariq Ahmed Barham Baomar, Ali Hussain Omar Baabood monitoring system in 2020.

[2] S. H. Almotiri, M. A. Khan, and M. A. Alghamdi. Mobile health (m- health) system in the context of iot. In 2016 IEEE 4th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW), pages 39–42, Aug 2016.

[3] Gulraiz J. Joyia, Rao M. Liaqat, Aftab Farooq, and Saad Rehman, Internet of Medical Things (IOMT): Applications, Benefits and Future Challenges in Healthcare Domain, Journal of Communications Vol. 12, No. 4, April 2017.

[4] Shubham Banka, Isha Madan and S. S. Saranya, Smart Healthcare Monitoring using IoT. International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 15, pp. 11984-11989, 2018.

[5] K. Perumal, M. Manohar, A Survey on Internet of Things: Case Studies, Applications, and Future Directions, In Internet of Things: Novel Advances and Envisioned Applications, Springer International Publishing, (2017) 281-297.

[6] Ali, A. Nazar. "Performance Enhancement of Hybrid Wind/Photo Voltaic System Using Z Source Inverter with Cuk-sepic Fused Converter." Research Journal of Applied Sciences, Engineering and Technology 7. ISSN: 2040-7459; (2014): 3964-3970.

[7] Ali, A. Nazar. "Ride through Strategy for a Three-Level Dual Z-Source Inverter Using TRIAC." Scientific Research publication 7. ISSN Online: 2153-1293 (2016): 3911-3921.

[8] Ali, A. Nazar. "An ANFIS Based Advanced MPPT Control of a Wind-Solar Hybrid Power Generation System." International Review on Modelling and Simulations 7. ISSN 1974-9821 (2014): 638-643.

[9] Nazar Ali, A. "Performance Analysis of Switched Capacitor Multilevel DC/AC Inverter using Solar PV Cells." International Journal for Modern Trends in Science and Technology 3. 05 (2017): 104-109.

[10] Ali, A. Nazar. "FPGA UTILISATION FOR HIGH LEVELPOWER CONSUMPTION DRIVES BASEDONTHREE PHASE SINUSOIDAL PWM - VVVF CONTROLLER." International Journal of Communications and Engineering 4. Issue: 02 (2012): 25- 30.

[11] ali, A. Nazar. "A SINGLE PHASE HIGH EFFICIENT TRANSFORMERLESS INVERTER FOR PV GRID CONNECTED POWER SYSTEM USING ISPWM TECHNIQUE." International Journal of Applied Engineering Research 10. ISSN 0973-4562 (2015): 7489- 7496.

[12] JAIGANESH, R. "Smart Grid System for Water Pumping and Domestic Application using Arduino Controller." International Journal of Engineering Research & Technology (IJERT) 5. 13 (2017): 583-588.

[13] Pau1l, M. Mano Raja, R. Mahalakshmi, M. Karuppasamypandiyan, A. Bhuvanesh, and R. Jai Ganesh. "Classification and Detection of Faults in Grid Connected Photovoltaic System."

[14] Ganesh, Rajendran Jai, et al. "Fault Identification and Islanding in DC Grid Connected PV System." Scientific Research Publishing 7. Circuits and Systems, 7, 2904-2915. (2016): 2904-2915.

[15] Jaiganesh, R., et al. "Smart Grid System for Water Pumping and Domestic Application Using Arduino Controller." International Journal for Modern Trends in Science and Technology 3. 05 (2017): 385-390.

[16] Kalavalli, C., et al. "Single Phase Bidirectional PWM Converter for Microgrid System." International Journal of Engineering and Technology (IJET) ISSN: 0975- 4024 Vol 5 No 3 Jun-Jul 2013.

[17] Lilly Renuka, R., et al. "Power Quality Enhancement Using VSI Based STATCOM for SEIG Feeding Non Linear Loads." International Journal of Engineering and Applied Sciences (IJEAS) ISSN: 2394-3661, Volume-2, Issue-5, May 2015.

[18] Karthikeyan, B. JEBASALMA. "RESONANT PWM ZVZCS DC TO DC CONVERTERS FOR RENEWABLE ENERGY APPLICATIONS. "International Journal of Power Control and Computation (IJPCSC)Vol 6. No. 2 – Jan-March 2014 Pp. 82-89©gopalax Journals, Singapore available at:www.ijcns.com ISSN: 0976-268X.

[19] Gowri, N, et al. "Power Factor Correction Based Bridgeless Single Switch SEPIC Converter Fed BLDC

[20] Motor. "ADVANCES in NATURAL and APPLIED SCIENCES. ISSN: 1995-0772 AENSI Publication EISSN: 1998-1090 http://www.aensiweb.com/ANAS2016 March 10(3): pages 190-197.

[21] Ramkumar, R., et al." A Novel Low Cost Three Arm Ac Automatic Voltage Regulator" ADVANCES in NATURAL and APPLIED SCIENCESISSN: 1995-0772 AENSI Publication EISSN: 1998-1090 http://www.aensiweb.com/ANAS2016 March 10(3): pages 142-151.

[22] Kodeeswaran, S., T. Ramkumar, and R. Jai Ganesh. "Precise temperature control using reverse seebeck effect." In Power and Embedded Drive Control (ICPEDC), 2017 International Conference on, pp. 398- 404. IEEE, 2017.

[23] Subramanian, AT Sankara, P. Sabarish, and R. Jai Ganesh. "An Improved Voltage follower Canonical Switching Cell Converter with PFC for VSI Fed BLDC Motor." Journal of Science and Technology (JST) 2, no. 10 (2017): 01-11.

[24] Muthu F et al. "Design of CMOS 8-bit parallel adder energy efficient structure using SR-CPL logic style". Pakistan Journal of Biotechnology. Vol. 14, No. Special Issue II, pp. 257-260, 2017.

[25] Prasad, D., Kabir, Z., Dash, A., Das, B. Abdominal obesity, an independent cardiovascular risk factor in Indian subcontinent: A clinico epidemiological evidence summary(2011) Journal of Cardiovascular Disease Research, 2 (4), pp. 199-205. DOI: 10.4103/0975-3583.89803

[26] Keerthivasan S et al. "Design of low intricate 10-bit current steering digital to analog converter circuitry using full swing GDI". Pakistan Journal of Biotechnology. Vol. 14, No. Special Issue II, pp. 204-208, 2017

[27] Vijayakumar P et al. "Efficient implementation of decoder using modified soft decoding algorithm in Golay (24, 12) code". Pakistan Journal of Biotechnology. Vol. 14, No. Special Issue II, pp. 200-203, 2017.

[28] Rajendran T & Sridhar KP. "Epileptic Seizure-Classification using Probabilistic Neural Network based on Parametric Features", International Journal of Scientific & Technological Research. Vol. 9, No. 3, 2020 (Accepted for Publication). IOT BASED HEALTH MONITORING SYSTEM Journal of critical reviews 743

[29] Rajendran T et al. "Performance analysis of fuzzy multilayer support vector machine for epileptic seizure disorder classification using auto regression features". Open Biomedical Engineering Journal. Vol. 13, pp. 103-113, 2019