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RASPBERRY PI COVID-19 VENTILATOR AND HEALTH MONITORING DEVICE

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ABSTRACT

The pandemic caused by Severe Acute Respiratory Syndrome Coronavirus has affected countries all across the world, heavily burdening the medical infrastructure with the growing number of patients affected by the coronavirus disease (COVID-19). With ventilators in limited supply, this public health emergency highlights the need for safe, fast, reliable, and economical alternatives to high-end commercial devices and has prompted the development of easy-to-use and mass-producible ventilators. Here, we detail the design of the Emergency Ventilator System. The device performs ventilation through mechanical compression of manual resuscitators and includes control electronics and an external data visualization and monitoring unit. We demonstrate its suitability for open loop, pressure- and volume-controlled ventilation. The system has not undergone clinical testing and has not been approved for use as a medical device. The paper documentation needed to reproduce the prototype is freely available and will contribute to the development of open-source ventilation and health monitoring systems.

1. INTRODUCTION

Now a day's aged and people are suffering from at least one deceases and health conscious and increasing. And in hospital difficulty occurs in taking care of that patients. Body Sensor network provides very large portability to patients to detect abnormalities in patient and used to avoid critical situations and gives proper treatment on time. Hence, IoT concept used and sensor are connected to human body with well managed wireless network. For measurement heart bit rate, Temperature etc. can be monitored by sensors. In this system, we are using sensor to detect biological parameters and it processes along with NodeMCU and that all hardware component is integrated with software system to display data to user and user can ably control system.

2.LITEARTURE SURVEY

A Comprehensive Ubiquitous Healthcare Solution on an Android Mobile Device

Nowadays It Has Become Important To Focus On Healthcare Awareness And Also The Growth Of Wireless Mobile Technologies. For This Reason Ubiquitous Health Care Solutions Has Become Important As It Provides Services At Anytime And Anywhere. To Complete Our Needs Android Smart Phone Device Has Put Fourth Mobile Monitoring Terminal To Observe And Analysis ECS [Electrocardiography] Waveforms From Wearable ECG Devices In Real Time Under The Coverage Of Wireless Sensor Network. Due To Use Of Wireless Sensor Network In A Healthcare We Are Able To Reduce Complications Of Wire Networks And We Can Move A Healthcare From One Location To Another Desired Location. Mobile Phones Are Used As Barcode Decoder For Medicinal Care As An Extension To Monitoring Schemes. In Order to Provide Better and More Comprehensive Healthcare Services. We Can Use Barcode Decoder To Verify And Assist Out Patient In The Medication Administration Process.

Android Based Body Area Network for the Evaluation of Medical Parameters

There Are Various Vital Parameters In This System. They Are ECG, Heart Rate, Heart Rate Variability, Pulse Oximetry, Plethysmography And Fall Detection. The Tele-medical System Is the System Which Focuses on the System Which Focuses on the Measurement and Evaluation of These Vital Parameters. In a Android Smartphones There Are Two Different Designers Of A (Wireless) Body Networks The Real Time System Features Several Capabilities. Data Acquisition In The (W) Ban Plus The Use Of The Smartphone Sensors, Data Transmission And Emergency Communication With First Responders And Clinical Server. It Is Very Important To Smart And Energy Efficient Sensors. This Can Be Compensated. In The First ZigBee Based Approach, Sensor Nodes Acquire Physiological Parameter Perform Signal Processing and Data Analysis and Transmit Measurement Value to the Coordinator Node. Sensors Are Connected Via Cable to an Embedded System In The Second Deign. In The Both Types Of System, Bluetooth Is Used For Transferring The Data To An Android Based Smartphone.

Apnea MedAssist: Real-Time Sleep Apnea Monitor Using Single-Lead ECG

This Is A Low Cost Sleep Apnea Monitoring System ‘Apnea MedAssist”, This Is Fully Automated System Which Analyses The Signals From Patients ECG And For Detection Of Apnea It Is Using Support Vector Classifier. This System Implementation Includes Android Application. The Reduced Complexity Of “Apnea Medassist” Comes From Efficient Optimization Of The ECG Processing, And Use Of Techniques To Reduce Svc Model Complexity And ECG Derived Respiration Signals And By Reducing The Number Of Support Vectors.

S. J. Jung and W. Y. Chung studied the Flexible and scalable patient's health monitoring system in 6LoWPAN.

The main advantage of this enabling factor is the combination of some technologies and communications solution. The results of Internet of Things are synergetic activities gathered in various fields of knowledge like telecommunications, informatics and electronics.

3. EXISTING METHOD

In social insurance framework for patients who stays in home during post operational days checking is done either via overseer/ medical caretaker. Ceaseless observing may not be accomplished by this system, on the grounds that anything can change in wellbeing parameter inside of part of seconds and amid that time if guardian/attendant is not in the premises causes more noteworthy harm. So, with this innovation created period where web administers the world gives a thought to add to another keen health awareness framework where time to time constant checking of the patient is accomplished.

4. PROPOSED METHOD

We proposed a system that, during the outbreak of COVID-19, the demand for respiratory and health-care equipment has increased with each passing day. To overcome the shortage of these devices, we do not have another good solution yet that can help us achieve this requirement. Here we have designed using Raspberry Pi.

Our respirator uses a Servo motor that puts pressure on the air bag (BVM bag), thus compressing the oxygen-focused air in the lungs. When the DC returns to its original position, it causes pressure to be released from the air bag (BVM bag), causing it to retain its original position. This helps to absorb CO2 from the lungs (similar to the process of breathing in and out). All breathing patterns should be in line with the patient's normal breathing rate. This can be achieved by changing the servo motor speed in the system. By transmitting this data to cloud, a doctor can easily monitor the patient condition from anywhere.

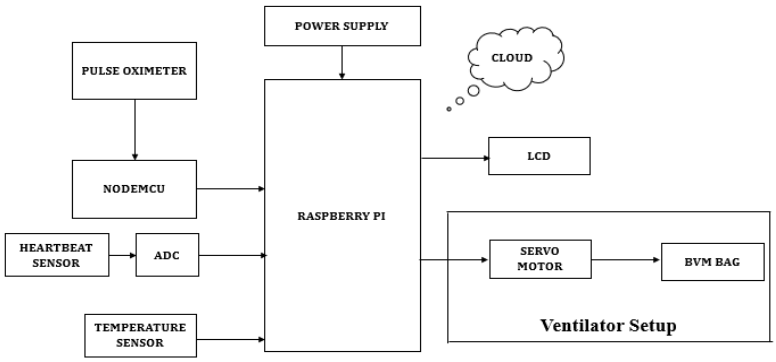

Fig.1: Block Diagram of Proposed System

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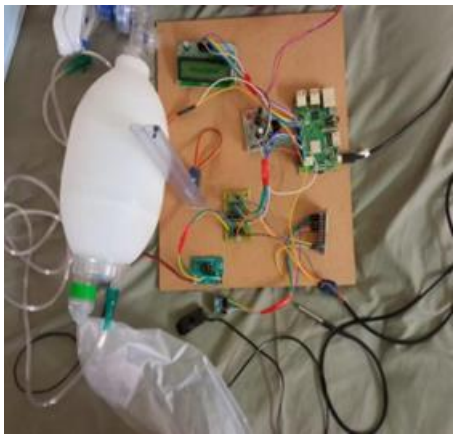
5. METHODS OR TECHNIQUES USED

The raspberry pi enabled covid-19 ventilator and health monitoring system is a device to facilitate the transport of oxygen and carbon dioxide between the atmosphere and the alveoli for the purpose of improving lung gas exchange which can be monitored.

The designed ventilator has several parts consisting of: mechanical hardware consisting of a gripper mechanism which is driven by a DC motor. The gripper functions to apply pressure to the ambu bag to provide inspiratory and expiratory pressure. The mechanical design uses a Gripper model that can apply pressure to an ambu bag.

6. RESULT

VIEW OF THE KIT



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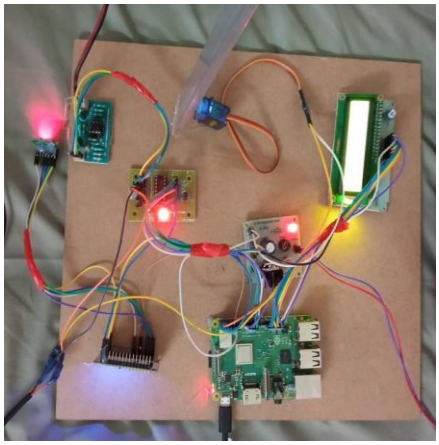

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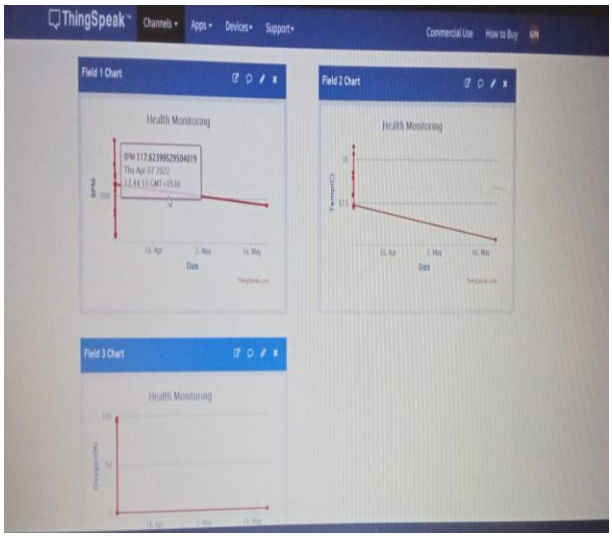

Fig 6.3 Health Data of Patient

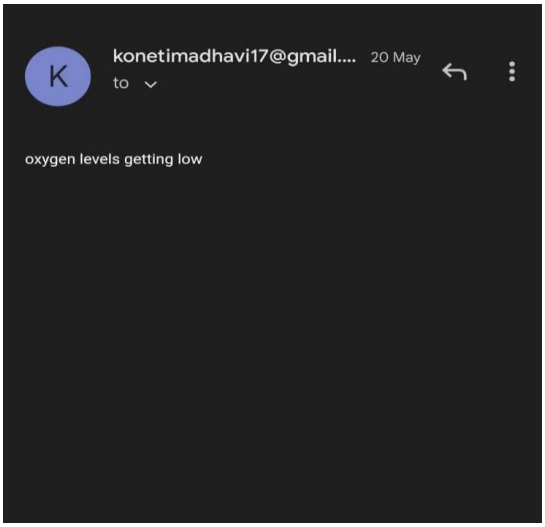

Fig 6.4 Message to the Owner

5.CONCLUSION

In this paper, the prototypes provide the real time solution of observing the patient heart pulse rate with reliability. This system can be adopted in the general wards of the hospital to help the patients understand its performance and utilization. The processes of storing the data can be further used in many ways such as predicting the diseases, analyzing etc. using this system can reduce the adverse emergency for a patient to occur with the heart disease.

6. FUTURE SCOPE

As this raspberry- pi based device is capable of measuring human body parameters it can also be used for the continuous evaluation of patients who need regular medical check up's and for senior citizens. Doctors and nurses can use this handheld device to record patients' real-time data and constantly update their medical history. This makes more accurate and more efficient diagnoses and treatments**.**

7.REFERENCES

• Arif. M. Sreevas, S. Nafseer, K. and Rahul. R. (2012), 'Automated online Blood bank database', India Conference (INDICON), Annual IEEE, Print ISBN: 978-1-4673-2270-6, pp. 012-017.

• Bing-Nan Li, Taipa Ming-Chui Dong, and Vai, M.I. (2006), From Codabar to ISBT 128: Implementing Barcode Technology in Blood Bank Automation System', 27th Annual International Conference of the Engineering in Medicine and Biology Society, IEEE-EMBS, pp.542-545.

• Ibrahim. M and M. Youssef (2012), 'CeIlSense': An Accurate Energy-Efficient GSM Positioning System Vehicular Technology, IEEE Transactions on Volume: 61, Issue: 1, ISSN:0018-9545,pp.286-296.

• Dr. A. Sabanayagam, G. Anish Girija," DESIGN AND MODELING OF MOBILE HEALTH MONITORING SYSTEM", International Journal of Innovations in Scientific and EngineeringResearch(IJISER),vol4,no2,pp.63-65,2017.

• S. M. Mahalle, P. V. Ingole, "Design and Implementation of Wireless Body Area Sensor Network Based Health Monitoring System", International Journal of Engineering Research & Technology,Vol.2Issue6,pp.105-113,June2013.

• R. Kumar; M. Pallikonda Rajasekaran, An IoT based patient monitoring system using raspberry Pi, 2016 International Conference on Computing Technologies and Intelligent Data Engineering(ICCTIDE'16).

• Sarfraz Fayaz Khan, Health care monitoring system in Internet of Things (IOT) by using RFID, 2017 6th International Conference on Industrial Technology and Management (ICITM).