

TEKNOFEST

AEROSPACE AND TECHNOLOGY FESTIVAL

TECHNOLOGY FOR HUMANITY COMPETITION

PROJECT DETAIL REPORT

PROJECT CATEGORY: Social Innovation

**PROJECT NAME: IoT based patient health monitor in
Quarantine.**

TEAM NAME: Life Saver

TEAM ID: 57104

TEAM LEVEL: Secondary School

TEAM MEMBERS: Laleena Mumtaz

ADVISOR NAME: Ms.Rabia Hassan

Project Detail Report

1. Project Summary:

In times of COVID we have special Covid19 centers setup in order to treat patients. Since Covid is highly infectious it is very important to quarantine Covid patients but at the same time doctors need to monitor health of Covid patients too. With the increasing numbers of cases, it is becoming difficult to keep a track on health conditions of so many quarantined patients. So, with our system it has become possible to monitor the patient health remotely. As the doctors are the front line workers of the society so their health is also very important. Our system provides a safe way to monitor the Covid-19 patients without risk of infection to the medical staff and doctors.

2. Problem/ Issue:

The problems here are:

- Doctors need to regularly monitor patient health
- There are increasing number of patients for the doctors to monitor
- The doctors are at risk of infection just for monitoring purpose.

A lot of equipment is required for example safety kit, special masks and special gloves, that increases the cost and if not provided this can cause health risk for medical staff.

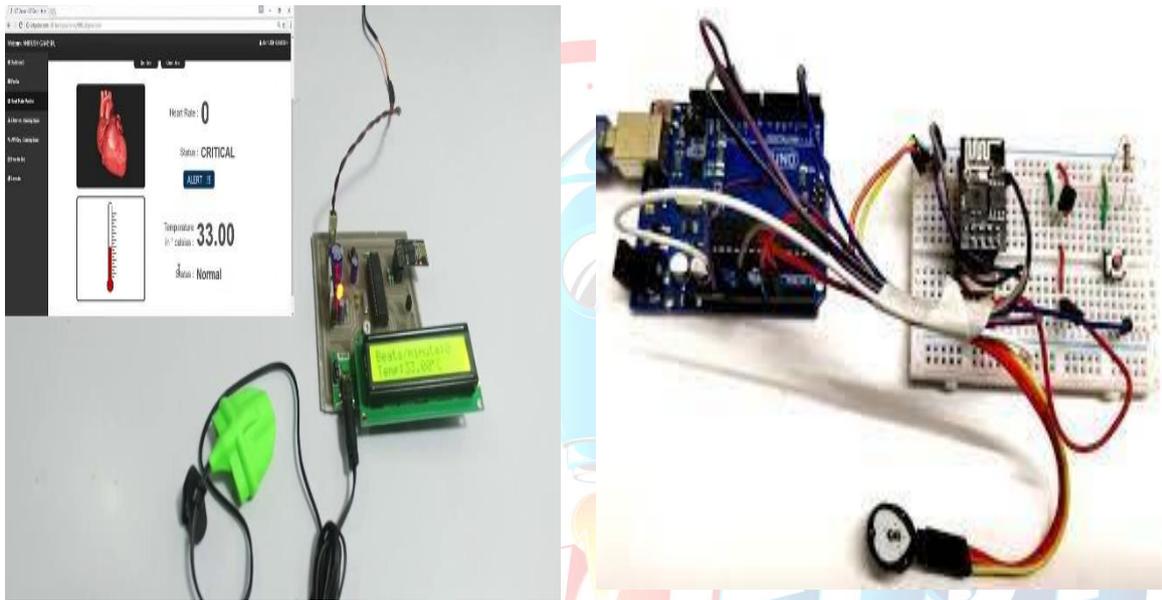
In third world countries like Pakistan, India and many others hospitals have very less space for Covid-19 patients. Even in countries like America, Britain, Spain, Italy and France the space in hospitals proved insufficient for the Pandemic.

Our project simply provide the best solution for pandemic situation as a lot of patients can be monitored at a time and emergencies can difficult to tackle. There is a lack of para medical staff also there is lack of doctors and nurses but the patients have to be monitored on regular basis. This increases the risk of spread of infection among doctors. Our system is the best solution to avoid the danger of spread of disease in doctors and patient is properly monitored. To Solve this issue we here design a remote IOT based health monitor system that allows for remotely monitoring of multiple covid patients over the internet. The system monitors patient heartbeat, temperature and blood pressure using a heartbeat sensor, temperature sensor and BP Sensor respectively. The existing situation no other system is providing a better and safe monitoring system for monitoring patient's health without risking others. Ours is the **best system** which is **user friendly and low cost** as well.

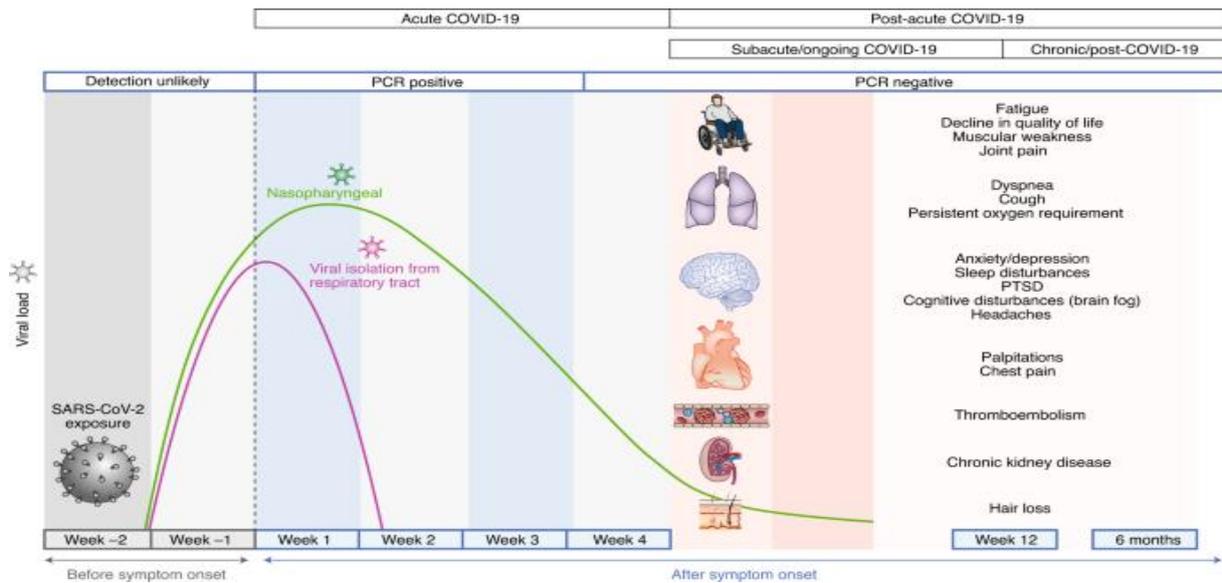


4. Solution

To Solve this issue we here design a remote IOT based health monitor system that allows for remotely **monitoring of multiple covid patients over the internet**. The system monitors patient heartbeat, temperature and blood pressure using a **heartbeat sensor, temperature sensor and BP Sensor** respectively. It is a **simple system which uses very less power supply** it has three main sensors and it monitors the health of multiple patients at a time which **saves time space energy and it is safe for para medics** who are in direct contact with patients. If any patient face any difficulty the sensor sends an alarm and message over internet

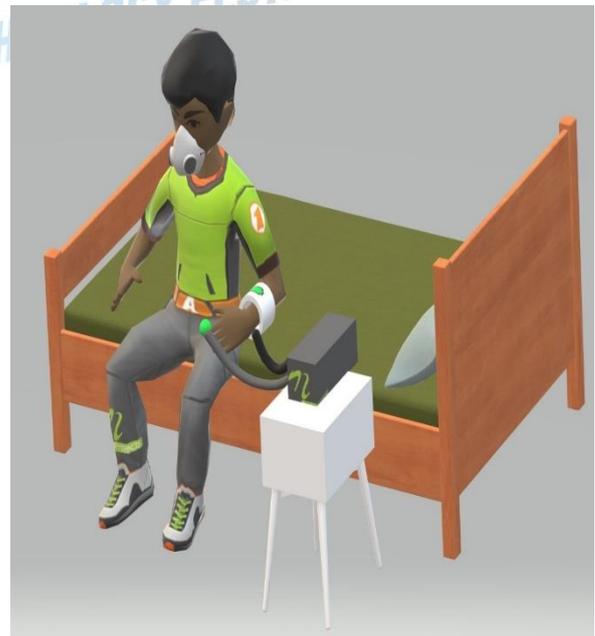


immediately to the doctor and the patient is taken care of. This system consists of four-protocol layers such as the physical layer, network layer, middleware layer and application layer. First, the physical layer consists of devices embedded with sensors and transmitters. The network layer is responsible of transmitting signals from sensors to the Cloudlets whereas the Middleware layer do the work of storing the data into the cloud and make it available to the people who are concerned. Finally, in the application layer, analytics and diagnosis process are performed. Patients will be given with the necessary wearable sensors capable of measuring Electrocardiography (ECG), Temperature, Electromyography (EMG) muscle activity, respiratory rate, sweating and blood glucose level. Using these devices, diseases such as arrhythmia, fever, neuromuscular abnormality, blood pressure, obesity and diabetes. The sensors used nowadays can be easily placed in contact with the skin in multiple body parts are highly preferable so that to obtain accurate results.



5. Method

Ours is a remote IOT based health monitor system that allows for remotely monitoring of multiple covid patients over the internet. The system monitors patient heartbeat, temperature and blood pressure using a heartbeat sensor, temperature sensor and BP Sensor respectively. The system then transmits this data over the internet using WIFI transmission by connecting to WIFI internet connection. The data is transmitted and received over IOT-by-IOT Gecko platform to display data of patient remotely. The entire system is run by a microcontroller-based circuitry. If any anomaly is detected in patient health or if the patient presses the emergency help button on IOT device, an alert is sent over IOT remotely. In case of a critical situation which requires the immediate attention of the doctors or nurses for any of the patients, the custom software will instruct the Central PMS to enable the GSM modem to send an SMS with the patient ID. A voice call is also made to the doctors and the staffs of the hospital. The SMS also consists of a status of the patient's physical condition. With the help of the patient ID, the doctor can easily identify and attend to the patient situation.



6. Innovative Aspect

Our system is a unique and innovative system as it is **portable and user friendly**. It is also **very cost effective** and it also provide the best use by saving man power as one doctor can **monitor at least 500 patients at a time** with the help of our system.it can easily used in the **third world countries** where there is lack of doctors. Our proposed system can be used for the benefit of the people world wide as it is a low cost and small sized system. It is also cost effective and benefits are enormours. No system currently present in the market can compete with our proposed system in terms of cost and effectiveness.

In the countries where the Covid pandemic risk is high and hospitals are facing lack of doctors our system is the best to use.In the current scenario the danger of Covid is not gone. Covid-19 is changing its strains that can be more leathel to Human race. Our proposed system should be attached to all hospitals of the country for emergency situations through which the doctors can monitor a lot number of patients without being in contact with them.

Components:

- Atmega Microcontroller
- Temperature Sensor
- Heartbeat Sensor
- Blood Pressure Sensor
- LCD Display
- Wifi Module
- Switches
- Resistors
- Capacitors
- Diodes
- Transistors
- PCB
- LED's

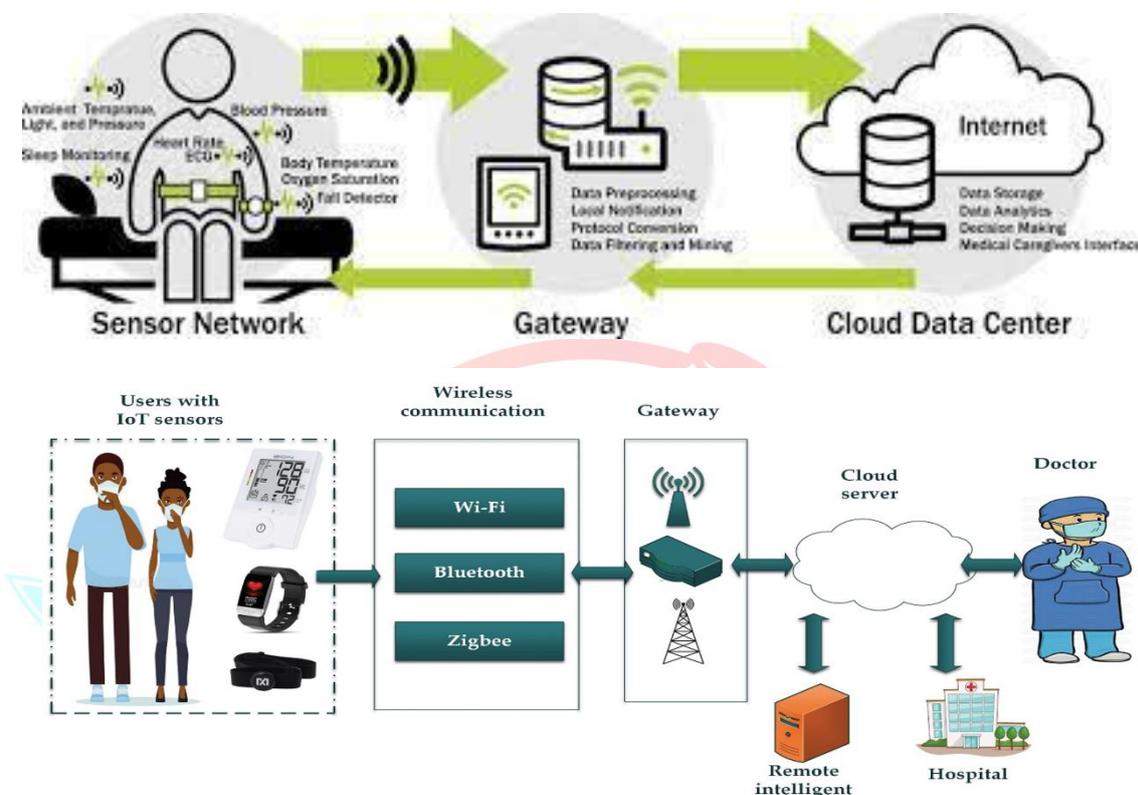
7. Applicability

The **applicability of our system is worldwide** as it is low cost ,user friendly and portable system. Our system **can be used on commercial basis** anywhere in any hospital. It's portable size makes it easy to use and it can help doctors to monitor 1500 patients at a time. This System allows:

- Doctors to monitor patients remotely without risk of infection
- A single doctor over 500 patients at a time.
- Doctor gets instant alert in case of health fluctuations of emergency.

The system is mounted at patient bedside and constantly transmits patient health data over the internet so that doctors can monitor multiple patients remotely and attend the desired patient urgently when needed. The only Risk in the applicability of our system is sudden power failure or internet intruption that can be easily overcome by providing emergency power supply arrangements or generator which are usually present in the homes these days. The idea will be easily implemented by placing it on the side table of the patient and connecting it to

the internet system of the hospital. The doctor will monitor daily fluctuations in temperature, breathing rate, heart beat and blood pressure on daily basis and in case of any emergency the patient's machine will send a signal to the doctor or the hospital and immediate help will be on the way. This idea is highly recommended to be used on commercial basis.



8. Estimated cost and Project Scheduling

Components	Price\$ USD
Atmega Microcontroller	13 \$
Temperature Sensor	8 \$
Heartbeat Sensor	10 \$
Blood Pressure Sensor	8 \$
LCD Display	2 \$
Wifi Module	6 \$
Switches	2 \$
Resistors	6 \$
Capacitors	5 \$
Diodes	4 \$
Transistors	5 \$
PCB	6 \$
LED's	4 \$
Total Cost	79 \$

Hence the total cost of our proposed system is \$ 79 only which is very cheap.

Our project is made up of very simple parts which do not need much time for scheduling and assembling. After our project is approved we will start our procedure by setting up the components to make half of our setup. Our project will start working in no time as very simple parts are being used. Moreover, our IoT patient health monitoring system is already in market but those cost a lot and are complex as well.

Project Calender:

Research work	01-06-2021
Collection and assembling of materials.	30-06-2021
Checking the Working and test results of experimentation	16-07-2021
Presentation of Project	21-26 September

9. Target Group of the Project Idea (Users):

This system can be introduced in every country especially the one's facing the issue of poverty and lack of doctors (e.g. Africa) and the countries which have access to latest technology (e.g, turkey). This project can be practiced at domestic as well as industrial level to increase the work efficiency of doctors without risking their lives. This project is the basis of a sustainable future for the world hence,very useful for serving humanity. As it is observed during the pandemic situation in Spain, Italy, US and India many of the doctors and para medical staff members were affected by the leahel disease and died. Our proposed model can provide a safety outlet from the mentioned situation. As our system makes doctors able to monitor more than 1500 patients without being physically in contact with them. This can save the lives of patients as wel as doctors.

9. Risks

As it is mentioned earlier that this project is a **simple and user friendly system** so, the chance of any kind of problems or risk is not there. As the electrical components are used in a safe way so, my project is **risk free**. Our system uses very less energy. It can malfunction but it is very less likely to happen.All the parts used are easily available everywhere.

But if it does not work I have a **Plan B** , I can make two types of these systems with same components in a matter of no time. Moreover, there is negligible chance that it may not work as it is a simple and portable system.

		Impact				
		Trivial	Minor	Moderate	Major	Extreme
Probability	Rare	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	Medium
	Moderate	Low	Medium	Medium	Medium	High
	Likely	Medium	Medium	Medium	High	High
	Very likely	Medium	Medium	High	High	High

10. Resources

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.

2. 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.

3. 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.

NOTE ON REPORT DRAFTS:

- The explanation of the 10 items above will be a maximum of 10 pages including the contents, the cover and the images to be added .
- Supporting the competitors' reports with visuals (prototype, test results, etc.) will provide an advantage in terms of evaluation.
- All reports must be written in accordance with academic reporting standards.
- Each report must contain a cover page.
- Font: Times New Roman, Size: 12, Line Spacing: 1, 15 , Justified on both sides, Page margins should be 2.5 cm top-bottom-right-left.
- sentences are identical in the report s should not be in the nature and again.
- In their report, our teams that have benefited from the previous year's reports on our website should state that they have cited on the relevant page . **QUOTE FORMAT:** "Cited Sentence/ s " (Year, Competition Name, Category, Team Name) **EXAMPLE CIRCUMSTANCE:** "The most important problem that slows down the debris removal and search for earthquake victims is that the location of the earthquake victim cannot be determined in the debris." (2020, Technology Contest for the Benefit of Humanity , Disaster Management, X Team)

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