Vellore Institute of Technology, Vellore

School of Computer Science and Engineering (SCOPE)

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CSE3999– TARP

J Component / Project Proposal

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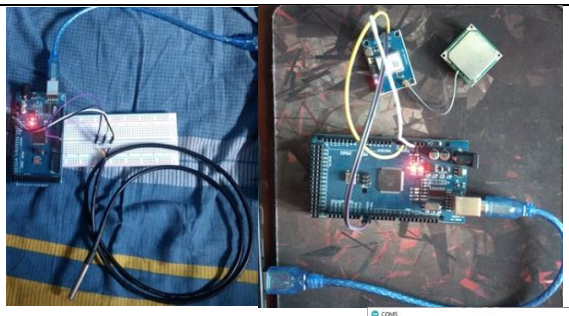
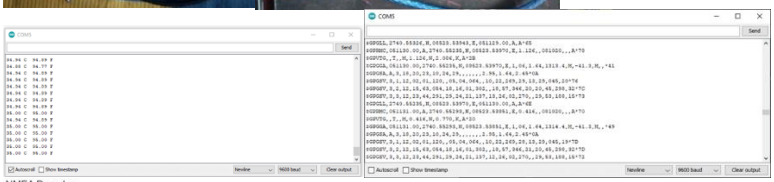
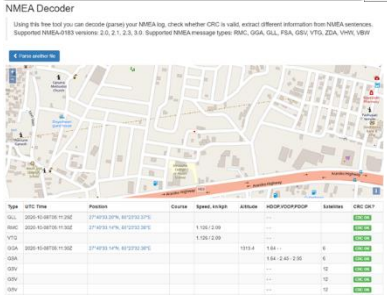
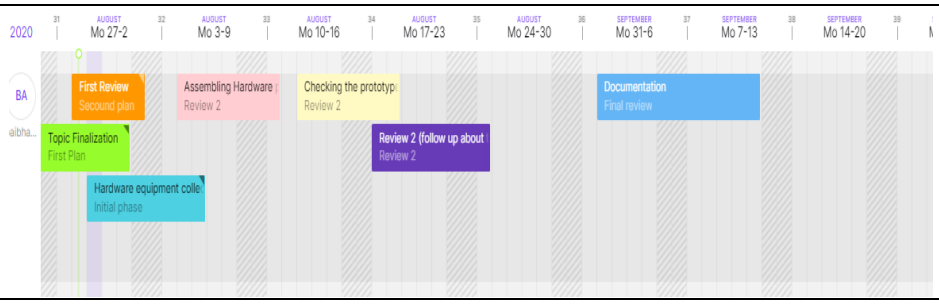
Slot: VL2020210106721- TC1

1. Title (Tentative)	*Intelligent Monitoring System with pulse oximetry analysis*
2. Abstract	***Introduction/Background:*** *This paper reviews analysis of disease and studies aiming at automated diagnosis or monitoring of infectious diseases whose symptoms are detected with the help of body parameters like body temperature, blood pressure, and oxygen saturation level. In this work, we propose a system that monitors the body parameters of the patients, if there is any unusual behavior will be symptoms of the diseases. The monitoring system will help the area where the expert in respiratory diseases analysis may not be available. This project curbs the human error while detecting the presence of these viruses or diseases by using smart monitoring and analysis system. Evaluation of the percentage of detection and efficiency shows which monitoring, i.e., body temperature, blood pressure, and oxygen saturation level, has a higher predictive rate, a comparative study when tested on the same input slide.* ***Objectives:*** *In light of recent events that have exhausted the medicals facilities of developed countries, the SARS-CoV-2 patients find difficulties in breathing after an increase in concentration of carbon dioxide and a decrease in blood oxygen level which causes loss of patient's life. We will collect data from different sensors and then find a correlation between these statistics to determine symptoms of respiratory disease through analytics.* ***Methods:*** *A regular blood oxygen reading would be between 95 and 100 percent, anything under 90 is considered unhealthy. While indicated coronavirus patients with measurements as low as 50 percent. When oxygen levels sink this far, patients have much more apparent trouble breathing. The data could be set, as well as the monitoring results are also directly connected and actually stored on IoT Gateway. From IoT gateway, the IoT system is used to send data of heart rate, oxygen level, carbon dioxide, and volatile organic compounds to the cloud for analytics in real-time.* ***Keywords:*** *Breathing, COVID-19, Healthcare, Respiratory disease, Monitoring.*
3. Introduction, Review of	*Communicable diseases through airborne is a transmission that delivers very minute water droplets. Those droplets are also known as microdroplets. The size*

Literature and Background	*is around less than 5 micrometers. In comparison, water droplets are usually larger than 5 micrometers. Because it is minute and feathery, the aerosol carrying the SARS-CoV-2 coronavirus can survive levitating in the air for many hours. Besides, these particles can also drift quite far. Studies in the U.S. call the SARS-CoV-2 coronavirus can live on particles for up to four hours. While other studies say it can last 16 hours* *The recent research shows coronaviruses that are artificially sprayed can stay alive in the air for at least three hours. However, the scientists stressed that the experiment was conducted in a laboratory, which is different from real-life conditions where the results can vary. Cases of coronavirus, called 'super spreading', have strengthened the suspicion that airborne contamination is a possibility. In the city of Mount Vernon in Washington, USA, one person is suspected of infecting at least 45 other people who have sung with him in the same choir. As people getting so much infected, it would be straightforward if any device could simulate and find a relation between blood oxygen level and breathing also, with other health parameters, then we could also detect the symptoms of disease caused by the coronavirus and save lives. There are devices like ventilators that aids patients while they are suffering from breathing problems.* *This article reviews about asthma disease and how can we monitor this disease with the help of Arduino. As mentioned, this disease can be easily treated when medicine and treatment are given in time. The proposed architecture tests different activities and environmental parameters of asthma. The basic parameters that are going to be examined are temperature, humidity, air pressure, activity, and volatile gases are collected and then send to the patient's doctors via the GSM module. The doctor then examines the data and then gives suitable treatment and medicines for asthma.* *Another paper reviews about e-health monitoring system which the device designed monitors the difficulties experienced by the users in flight. The main goal of this system comes after knowing of the condition inside cab travelers in cab conditions, such as low pressure, lack of oxygen, and low humidity risk factors in patients suffering from cardiovascular diseases etc. Monitoring the oxygen level of the patient during takeoff/landing and during flight hours provides valuable information on the health status of passengers. This information later could be used to travelers of similar alignment of health difficulties.* *Basically, with the help of the architecture proposed, we will solve the major problem that we are facing in this pandemic. Firstly, the device helps to monitor the patient's primary health condition like spo2 level, which thresholds to be more than 92% of body temperature etc. from home itself, which reduces the risk of health workers and other frontline workers to get infected. Then after that, the doctor analyses the data received from the sensors and validates whether the patients are in safe conditions. If not, then changes in medication and treatment can be easily made through phone or necessary steps that can be taken.*
4. Related Work and Technologies Used Currently	*There are lots of existing monitoring system but new concept of home isolation was brought in after coronavirus pandemic happened. This architecture basically help government, healthcare department and patients to promote home isolation and control the spread of virus.*
5. Design Methodologies (Technologies / Algorithms / Architectural Modifications / etc)	*The basic system architecture would consist of spo2 sensor module, body temperature sensor module, GPS sensor module. The main purpose of this project is to integrate these modules to gather data from the user. All the modules would be connected using Arduino board that contains wi-fi module which is going to send data onto the cloud. Now the data collected can be processed and analyzed using ML. This would be really helpful in predicting the how likely a person is going to affected by the virus or diseases and thus encouraging steps to create more health posts for the betterment.*

	5.1.1. Functional Requirements *Product Perspective:* *The product is used for collecting data from the patient and uploading it onto the cloud for information and analysis.* *Product Features:* *The product implements sensors to collect data and then uses Wi-fi module to upload it to the cloud. The data are processed in such a way that when being written into CSV the abnormality is known.* *User Characteristics:* *The user has to just give the input while the rest is assured by the proposed system.* *Assumption and Dependencies:* *The assumption is that the users have a good knowledge about using the input devices and a basic knowledge of keeping the device connected at all times.* *Domain Requirements* *The proposed project would require an established net connection on both the senders end as well as the receivers end for real-time data transfer.* *5.1.2. Non-Functional Requirements* *. Efficiency:* *The efficiency of the proposed work depends on the proper maintenance of the sensors and the strength of the Wi-fi.* *Reliability:* *The reliability of the proposed work depends on the maintenance of the sensors. It is not fragile but should be kept properly for more accurate results.* *Portability:* *The system is portable with certain cautions should be taken over handling the sensors.* *Usability:* *The system could serve a day-night usability without being worn out if handled properly* *The system model design details in more about the design approach of the proposed* *system.*
6. Implementations	*The project is basically implemented in to three modules i.e. GPS module in which the patient's positioning can be monitored easily and checked if the person has broken any rules set by the government. Secondly, we can get the body temperature from the patient's body which could be used to analyses whether the*

	person health condition is well or not. If there is any abnormalities doctor or medical staff can immediately take further action looking at the medical history of the patients.
7. Result Analysis and Verifications Methods	   *First, we get the result of patient's body from the DS18B20 temperature sensor. Then we get the location of the patient that needs to be monitored in real time after parsing the NMEA data return by NEO-6M GPS Module.*
8. Conclusion and Future Directions	*We can get the position of patients easily and will stop other people from getting affected. We also can get his body's temperature & blood oxygen level which is basic criteria. In future this project could be further develop as product. The product in form of watch could help people to be monitored remotely than physically. We could use better sensors than we have used in this project to increase the accuracy of this project. The project could be further developed as product by developing it into watch by designing a PCB which could make it portable like a fitness band. The fitness band could easier for the patient to wear it.*
9. Project Timeline	
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Submission	• Your Project Proposal (this form) (M.S. Word – docx) • Reference base paper (as attachment) **Mode of submission**: Hardcopy