Accessible Correlative Diagnostic Solution for Multi-Organ Dysfunction Caused by SARS-CoV-2: The Future of Home-Based, AI-Enabled Telemedicine

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Context: There are currently about 82.3 million COVID-19 cases worldwide with 24% of these cases being severe and a 2% mortality rate due to late medical attention. COVID patients have common symptoms of Multi-Organ Dysfunction (MOD) which include: fatigue, difficulty breathing, and fever. Delay in the detection, diagnosis, and treatment of MOD indicators can lead to not being able to manage severe symptoms, conditions getting worse, and even deaths that can be prevented. Materials, Methods, Procedure: The spirometer, oximeter, and thermal camera are the devices that measure these defined symptoms and were utilized in this solution to output correlative analysis. Code developed in C with the Arduino IDE is used to develop the correlation algorithm to output an “Overall Health” reading for the user to interpret. Integration of these vital elements led to a contactless telemedicine device that can display comprehensive data/results along with the use of IoT and Machine Learning. Results: The use of this device with corroboration from standard sensory equipment provided validation for the accuracy of the product. Lung Capacity, Oxygen Saturation, and temperature reading had an inaccuracy of approximately 1-5%. The correlative analysis provides a precise overall health reading for users to apprehend. Conclusions: With the compact and affordable design of integrating the 3 biotechnologies onto a single board, we can leverage this to be accessible for low-income and underserved communities. A more sustainable flow of ICU admissions can be achieved because users will have real-time data on their state-of-being. This can lead to a proper triage process when users will see a trend of their overall health decreasing and go to the hospital to seek medical attention.

Awards Won:
Third Award of $1,000