SUSTAINABLE CAPSTONE PROJECTS (SCAP)
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ECO-SMART HEALTH MONITORING SYSTEM

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INTRODUCTION

The Eco-Smart Health Monitoring System represents a significant innovation at the intersection of environmental sustainability and healthcare. This system utilizes renewable energy source (Solar energy) and eco-friendly materials to create a sustainable health monitoring solution.

Traditional health monitoring systems, while effective, often rely on non-renewable energy sources and materials that contribute to environmental degradation. This project seeks to mitigate these issues by developing a system that not only monitors health parameters accurately but also operates sustainably.

Additionally, the system's sustainable approach can lead to cost saving in the long-run ,as reliance on renewable energy sources reduces operational expenses.

MATERIALS USED IN CONSTRUCTION

Re-Used/Recycled Materials:
- Wood
- Clothespins
- Solar panels
- Battery

Other Materials:
- Arduino kit
- Pulse oximetry sensor
- Display

FINAL PRODUCT

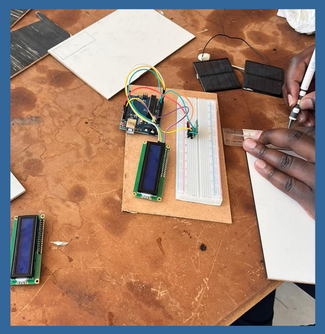
The Eco-Smart Health Monitoring System is constructed using an Arduino kit and powered by solar energy.

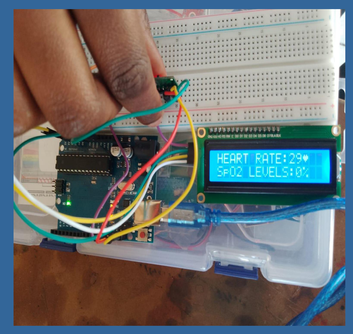
The system utilizes a pulse oximetry sensor to measure oxygen saturation (SpO2) and pulse rate, providing continuous health monitoring.

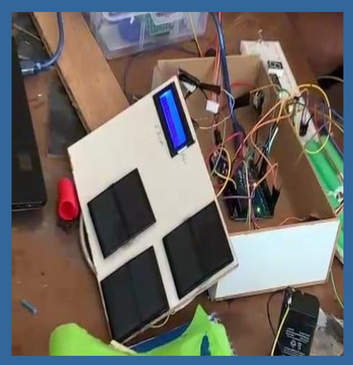
Solar panels capture sunlight to generate electrical energy, which powers the Arduino and the sensor, with excess energy stored in a battery for use during low-light conditions.

The Arduino processes the sensor's data, and the results can be displayed in real-time or transmitted for further analysis.

This setup ensures a sustainable, cost-effective, and portable solution for health monitoring, reducing reliance on non-renewable energy sources and minimizing the environmental impact while providing health information continuously.







RESULTS AND DISCUSSION

The Eco-Smart Health Monitoring System was successfully constructed and tested, demonstrating its capability to monitor vital health parameters sustainably and continuously. The solar panel efficiently captured sunlight, generating sufficient electrical energy to power the Arduino and the pulse oximetry sensor. The system's battery effectively stored excess energy, ensuring uninterrupted operation during periods of low sunlight.

During testing, the pulse oximetry sensor consistently provided accurate measurements of oxygen saturation (SpO2) and pulse rate. The Arduino processed these measurements, displaying real-time data on an LCD screen.

The pulse oximetry sensor's performance confirmed its reliability in measuring vital signs accurately. However, the system's accuracy could be influenced by factors such as sensor placement and user movement, indicating the need for careful application and potential incorporation of motion correction algorithms in future iterations.

CONCLUSIONS

The System successfully demonstrates the integration of sustainable energy solutions with advanced health monitoring technology.The project highlights the feasibility and benefits of using renewable energy to power medical devices, offering an eco-friendly and cost-effective alternative to traditional health monitoring systems. Future improvements could include incorporating advanced algorithms to improve sensor accuracy, and exploring ways to scale the system for broader application in a way that it include more sensors to measure more health parameters.

REFERENCES

1. https://www.youtube.com/watch?v=1LqBvkHTJXU
2. ·Pulse Oximetry." *Critical Care* vol. 19, 2015: 272. https://doi.org/10.1186/s13054-015-0984-8.