ELECTRICAL ENGINEERING DEPARTMENT
COLLEGE OF ENGINEERING AND SCIENCES
FINAL YEAR PROJECT

SUPERVISOR:
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PROJECT:
IOT BASED SMART CLOTHING FOR HEALTH MONITORING

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ABSTRACT

- This project investigates how to use smart clothes to create a suitable, remote wellbeing monitoring framework for those who live in areas without access to healthcare professionals. This wearable device provides continuous vital sign observation by successfully integrating open sensors such as temperature, pulse, SpO2, and ECG into clothing. A small D1 Small ESP8266 Wi-Fi module enables remote data transmission to a secure Internet of Things platform. This enables clinical personnel to assess patient well-being from a distance and intervene instantly.
- A smart clothesline architecture that uses a D1 A smaller-than-normal ESP8266 module and natural sensors are used to address environmental challenges. To avoid precipitation-related injury. The two frameworks place an emphasis on being straightforward to incorporate in any event, even persons with low expert awareness, making them suitable for employment in various geologically diverse places.
- This Project shows that it is feasible to include healthcare functions into clothing, which advances wearable technology. It demonstrates how IoT may be used for data logging and remote healthcare communication, with the ultimate goal of enhancing patient outcomes and healthcare accessible in disadvantaged regions.

PROJECT COMPONENTS AND TOOLS

❖ Hardware Components:

- WeMos D1 Mini ESP8266
- Temperature Sensor ds18b20
- AD8232 ECG Sensor
- MAX30102 Sensor
- Power Supply i.e. Lithium Ion Battery
- Power Bank Module
- 50MM Round Medical disposable ECG Electrode
- Soft wires
- T-Shirt

❖ Software:

- Mobile App - MIT App Inventor
- Google Firebase

INTRODUCTION

- Smart clothes are an outcome of the textile industry's revolution caused by the incorporation of technology into textiles. There are countless opportunities to improve our well-being and performance, style, and quality of life with smart clothing, which is a ground-breaking union of fashion and technology. In an effort to close the gap between technology and textiles, this initiative focuses on the design and development of cutting-edge smart apparel. Introducing the background and importance of smart clothes in today's environment, the introduction sets the stage for this game-changing undertaking.

- Smart clothing is a rapidly growing sector that has the potential to dramatically alter a wide range of businesses and our daily routines. Wearing clothing with sensors and other electronic gadgets embedded in it enables information collecting, monitoring of health and wellness, and even client support and input.

DIAGRAM AND FLOWCHARTS

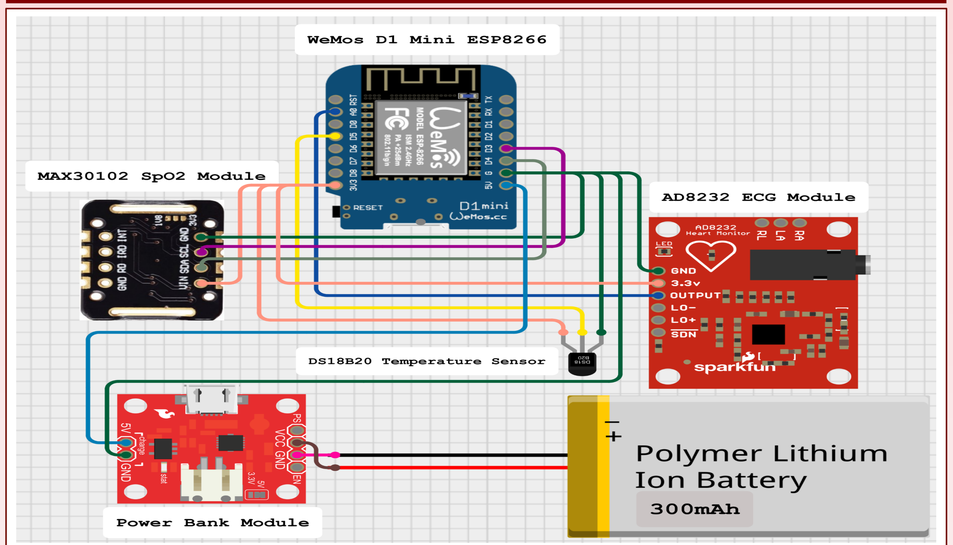

Fig 01: Circuit Diagram

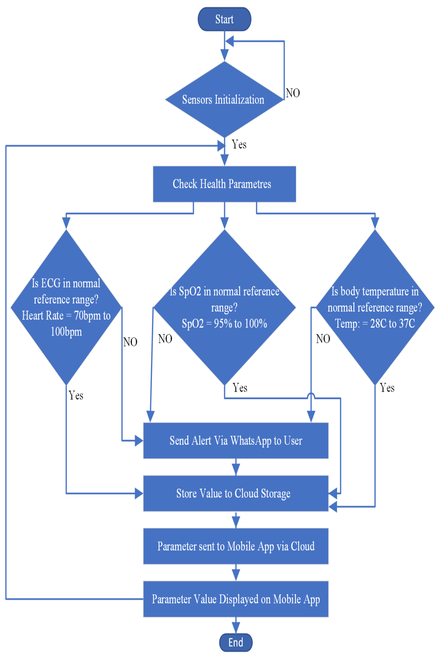

Fig 02: Hardware Flowchart

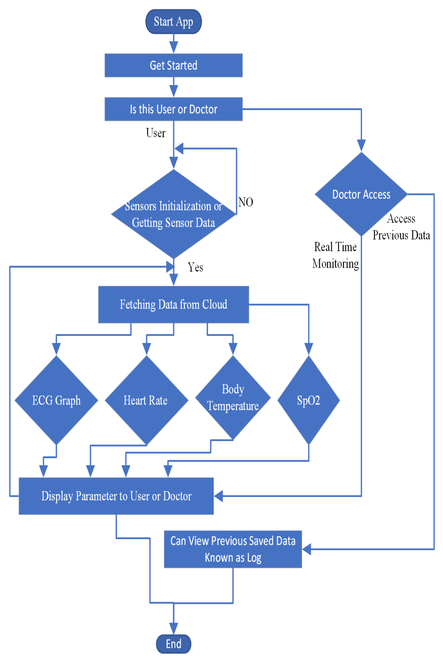

Fig 03: Software Flowchart

PROBLEM STATEMENT

- The integration of health monitoring systems into everyday clothing presents significant technical and practical challenges. Current smart clothing technologies face issues such as inefficient sensor integration, cross-device communication limitations, and unreliable real-time data availability. These challenges prevent the effective use of smart clothing for continuous health monitoring, particularly in remote and underserved areas lacking access to healthcare professionals. There is a need for a seamless, unobtrusive, and reliable smart clothing system that can provide continuous and accurate health monitoring to improve patient outcomes and healthcare accessibility.

SDGs & CEPS

- **Depth of Engineering Knowledge:** The project leverages advanced engineering knowledge to integrate multiple sensors, such as heart rate, SpO2, temperature, and ECG, with wearable technology and IoT for health monitoring. This involves applying principles from embedded systems, biomedical engineering, and wireless communication, demonstrating a comprehensive understanding of these fields and their integration.
- **Range of Conflicting Requirements:** The project addresses conflicting requirements such as ensuring sensor accuracy, maintaining user comfort, and providing real-time data transmission. Balancing these aspects requires resolving conflicts between technical feasibility, user experience, and performance reliability.
- **Extent of applicable codes:** The use of smart clothing goes beyond existing standards of practice, as wearable sensors and other IoT technologies are not yet fully standardized in engineering and medicine. This unique approach requires the creation of new benchmarks and regulations for wearable health monitoring devices.

SDGS

- **SDG 03:** Good Health and Well Being
- **Goal 3:** It ensures healthy life and promotes Wellbeing for all the ages**.**
- **Target 3.8:** Achieve universal health coverage, including financial risk protection, access quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all**.**
- **Indicator 3.8.1:** Coverage of essential health services.
- **SDG 09: Industry, Innovation and Infrastructure**
- **Goal 9:** Built resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**.**
- **Target 9.5:** Our target is to promote internet of things (IoT) in each and every aspect of life such as industries to transform the world towards innovation and technology by 2025**.**
- **Indicator 9.5.1:** Research & development expenditure as a proportion of GDP