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Electrical Engineering

1. This application is a web smart health system that would allow the detection, display, storage, transmission of data and also allow access of the database via the web. This system would help to minimise human interaction that is involved with monitoring and tracking the health status of infected patients, which in turn would help to reduce the possible spread of COVID-19 amongst more medical personnel.
   The framework of the web based health tracking and monitoring system is as follows. A number of medical sensors would be connected to the patient in order to obtain vital signs which would be converted to biomedical signals that would be transmitted via Wi-Fi/cellular. The data received is then analysed. In the case of abnormality found a medical expert would be alarmed in order to help contain the situation, while in the case of no abnormality the system would keep on monitoring the patient's vital signs. A webpage would be used to access patient information from the hospital database, if the need arises.

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PHASES OF THE SLDC

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- PLANNING: This is the first phase in the systems development process. One would be hard pressed to find a solution to a problem that is not fully defined. Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol-based rub frequently and not touching your face. COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). Currently, there are no specific vaccines or treatments for COVID-19. For the case of this study we are to design a web-based application that can detect, display, rate (degree of infection), store, transmit data obtained wirelessly and access the data via the web.

- SYSTEMS ANALYSIS AND REQUIREMENTS: The analysis stage is usually broken down into three areas of feasibility:
    - Technical (do we have the necessary resources to support the application if it is acquired?)
    - Economic (do we have the financial resources to pay for it?)
    - Operational (do we have properly trained individuals who can use the software?)
   Great care is taken to ensure that the proposed system meets the objectives put forth by the management.

- SYSTEMS DESIGN
- DEVELOPMENT
- INTEGRATION AND TESTING
- IMPLEMENTATION
- OPERATIONS AND MAINTENANCE

2. Hardware Features:
    a. Sensors: these are medical sensors that will check for the patient's vital signs (temperature, pulse rate, respiration rate, heart rate, blood pressure).

b. Server: this is a device that would allow the maintenance and sharing of the medical database of the patients.

c. Computers: this could be a Smartphone, laptop or desktop that can be used to access the web based health tracking and monitoring system in order to retrieve patient information.

Software Features:

a. Database Management System (DBMS): this is a software application that is designed to allow the definition, manipulation, retrieval, and management of the hospital's medical database.

b. Web Design Package: this software would be used to design the web template that would be used to access patient information via the internet. It would also help to organise and manage the digital information on the website.

c. Access control management software: this software would control who has access to medical records using the two-factor authentication. This is to ensure that the medical data isn't altered or tampered or given access to the unauthorized personnel.

3. **Flowchart:**
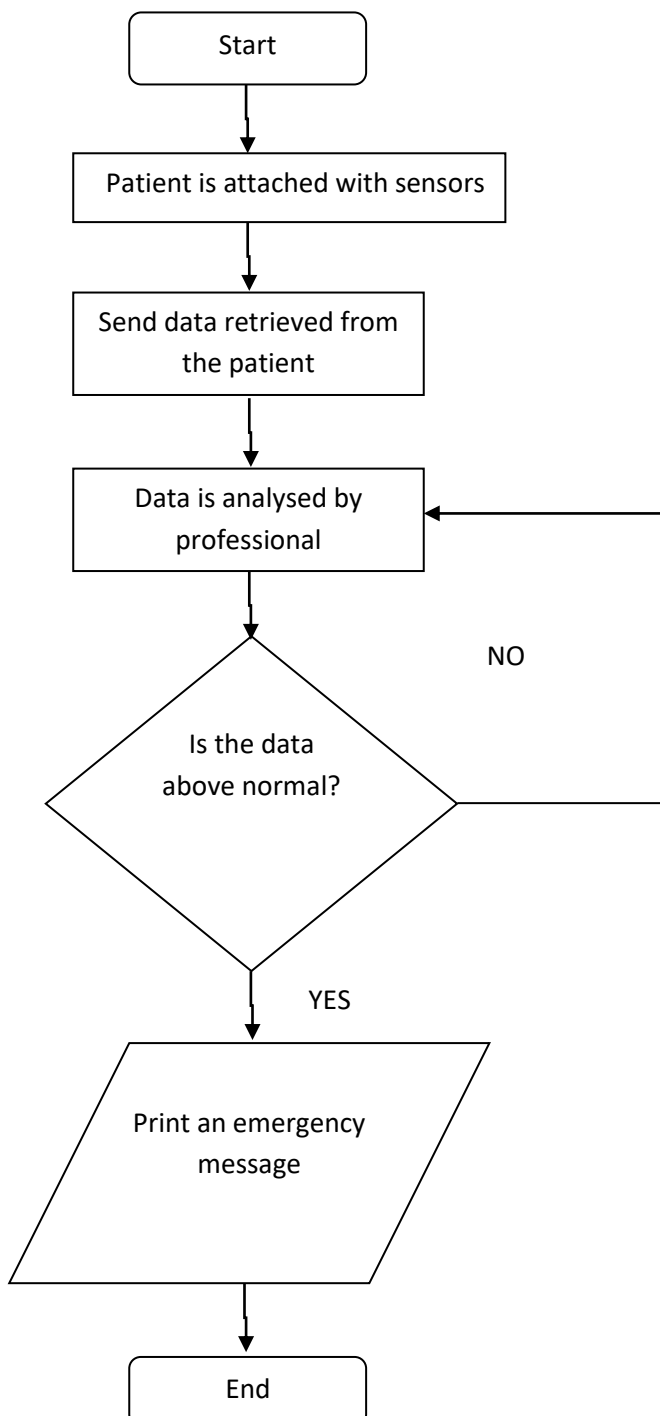
Algorithm:

Step 1: Start
Step 2: Data is collected from the sensors attached to the patient.
Step 3: Data received is analysed by a professional
Step 4: If data exceeds normal values
      -Mark patient
    Else
      -Go back to Step 2
Step 5: Print an emergency message
Step 6: End

Start

Patient is attached with sensors

Send data retrieved from the patient

Data is analysed by professional

NO

Is the data above normal?

YES

Print an emergency message

End

4. Top Down Approach