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Computer Engineering

1. This application is a web based health tracking and monitoring 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 network from the patient to an expert system. The expert system would then analyse the data given, by checking for any abnormalities in the data received. 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. Then the system is divided into modules: Hardware(Sensors, Routers, Server, Computers); software(DBMS, WCMS, Private cloud service, VPN, Expert system).

The design of how the system would work is then given by an algorithm and flowchart.

Codes for the system would be written using suitable programming software.

The system would then be tested and errors would be checked for and corrected if found.

The system can be released and is ready for use.

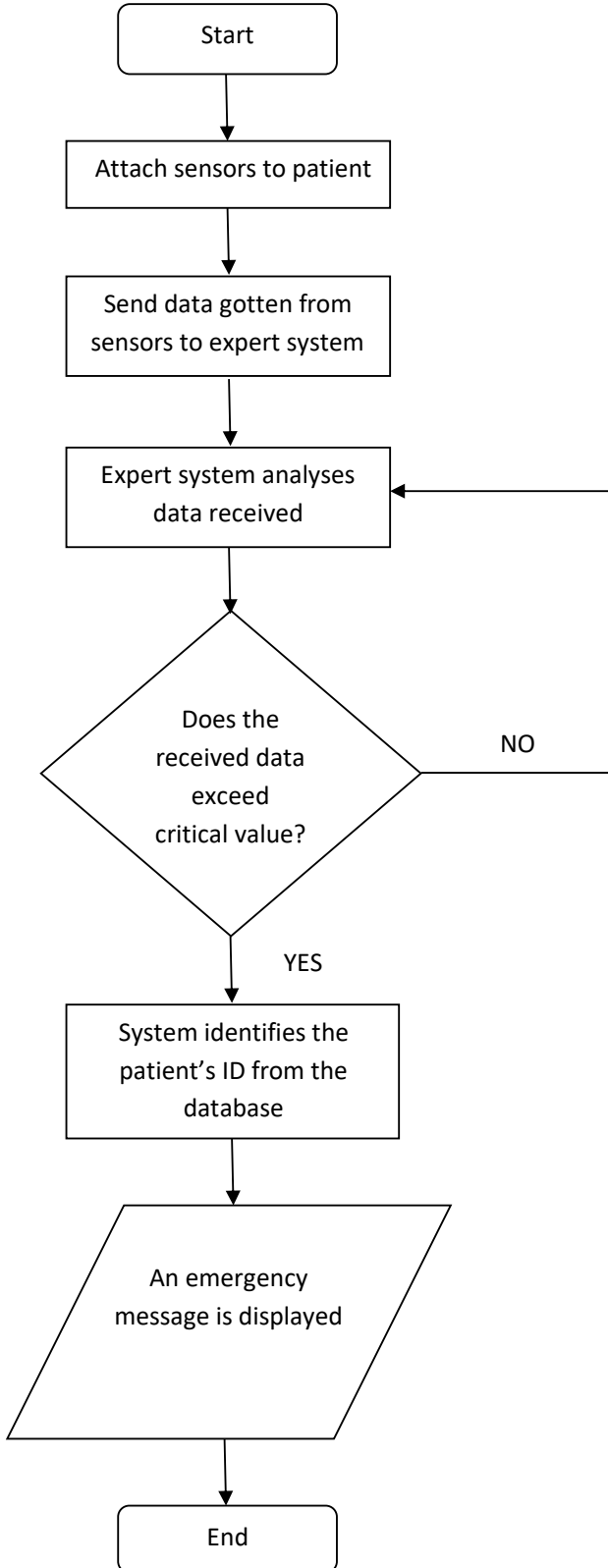
2. Hardware Features:
 - a. Sensors: these are medical sensors that will check for the patient's vital signs (temperature, pulse rate, respiration rate, heart rate, blood pressure).
 - b. Routers: this is a device that would allow the medical data to be forwarded using the internet.
 - c. Server: this is a device that would allow the maintenance and sharing of the medical database of the patients.
 - d. 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. Virtual Private Network: this is to ensure the secure transfer of data via the internet.
- c. Expert system: this is a program that uses AI technologies to simulate the judgment and behaviour of a human that has expert knowledge and experience in the medical field.
- d. Private Cloud storage: this would allow medical data and files to be saved in a secure and private off-site location that can be accessed through the internet or a dedicated private network connection. This would act as an alternative to help back up medical files and data.
- e. Web Content Management System(WCMS): 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.
- f. 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: The data is sent to the expert system for analysis.
- Step 4: Expert system analyses and stores the patient's data on the medical database.
- Step 5: If data exceeds normal values
 - Check for patient ID
 - Else
 - Go back to Step 2
- Step 6: Display emergency message to alert medical personnel.
- Step 7: End

4. Top Down Approach

