PROJECT PROPOSAL

Synergizing Healthcare Excellence: Real-Time Monitoring and Intelligent Health Care Delivery Platform

1. **Major Area:** Health/Med Tech, IOT, User Interface, AI and ML
2. **Problem statement:1**

   To develop an analytics platform for the hospital's healthcare data, simultaneously track staff nurse attendance along with patient conditions. Real-time patient conditions will be monetarized continuously by integrating sensors with IOT to improve patient precision health by providing more customized care through RPM (Remote Patient Monitoring) and streamlining operations.

   Problem statement: 2

   To develop a chatbot application for sending alerts to the chief nurse if anomalies of patients are abnormal. This application will also recommend the drugs along with dosage based on the anomalies (Age, Weight, and condition) of the patient by analyzing the EMPL (Emergency Medicine Protocol List) to give medicines for patients in life-threatening conditions under the five rights of nursing to enhance overall efficiency in healthcare institutions.

   மருத்துவ தரவுகள், IOT sensor-களின் உதவியைக்கொண்டு கண்காணிக்கப்படும் நோயாளிகளின் தற்போதைய நிலை (இரத்த அழுத்தம், இதய துடிப்பு வீதம், இரத்த சர்க்கரை அளவு, Intravenous Fluids அளவு) செயலியில் தரவேற்றம் செய்யப்படும், மற்றும் செவிலியர்களின் வருகைப் பதிவுகளை தடமறியும்சாதனம் மூலம் பகுப்பாய்வுக்குட்படுத்தி செயலியின் மூலமாக தலைமை செவிலியருக்கு எச்சரிக்கை மின்னஞ்சல் அனுப்பப்படும். இவ்வாறு செய்வதன்மூலம் நோயாளிகளின் உடல் சார்ந்த மாற்றங்களை காலநேர தாமதமின்றி செயல்பாட்டுக்குள் கொண்டுவருதல் நோயாளிகளின் முன்னேற்றத்திற்கு பெரும் உதவியாக இருக்கும்.

   அவசரகாலத்தில், உயிருக்கு ஆபத்தான நிலையில் மருத்துவரை தொடர்புகொள்ள முடியாத பட்சத்தில் அவசரகால மருத்துவ கொள்கைகள் பட்டியலில் நிர்னையிக்கப்பட்டிருக்கும் மருந்துகளை அவ்வப்போது செவிலியரின் ஐந்து உரிமைகளின் கீழ் நோயாளிகளின் நிலைமைகேற்ப சரியான மருந்துகளை தகுந்த அளவீட்டில் செலுத்த செயலியின் வாயிலாக பரிந்துரை செய்யப்படும் இவ்வாறு செய்வதன்மூலம் செவிலியர்களால் தாமதமின்றி முடிவெடுக்கவும் செயல்படுத்தவும் இயலும்

   Note: Five Rights of Nursing Responsibilities – The right patient, the right drug, the right time, the right dose, and the right route; all of which are generally regarded as a standard for safe medication practices.

3. **Cost Estimation**

Items	**Cost**
QlikView, Tableau, and Power BI for analytics & visualization	20,000
Cloud services for storing and handling huge data	3,000
MAXREFDES117 Heart rate sensor to measure the heartbeat rate	1,581
Cuff-type sphygmomanometer to detect BP and irregular heartbeat	4,499
Glucometer for continuous glucose monitoring every 15 minutes	6,690

Intravenous Fluid level intimation sensor	2,084
Arduino UNO to control the data logger	5,099
16*2 LCD Display with I2C module (2) for reading indication	399 × 2 = 798
MCP4725 IC2 DAC Module for integrating sensor with Arduino	568
DS18B20 Waterproof Digital thermometer for RPM	713
ESP32 Wi-Fi module for sensor data transmission	540
PCB 7.5×5 cm for connecting modules with conductive lines	264
Switch for activating and deactivating the system	17
Buzzer for alarm intimation	35
Total cost:	**45,888**

4. **College Code & Name:** 4204 & Adhiparasakthi Engineering College
5. **Guide Details**
   Guide Name, Designation: Dr. C. Dhaya., professor/HOD
   Mobile No. & Email id: 9655611996 & dhaya@apec.edu.in
6. **Student Team details:**

Sl. No	Student Reg. No.	Name of the Student	Branch	Mobile No.	email id
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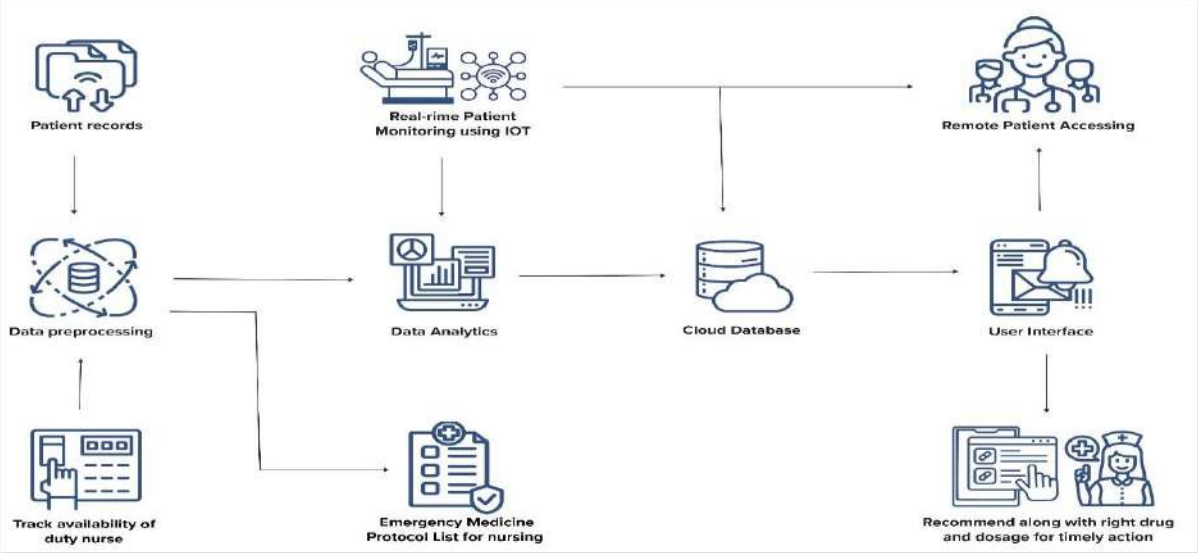
7. **Project Summary**

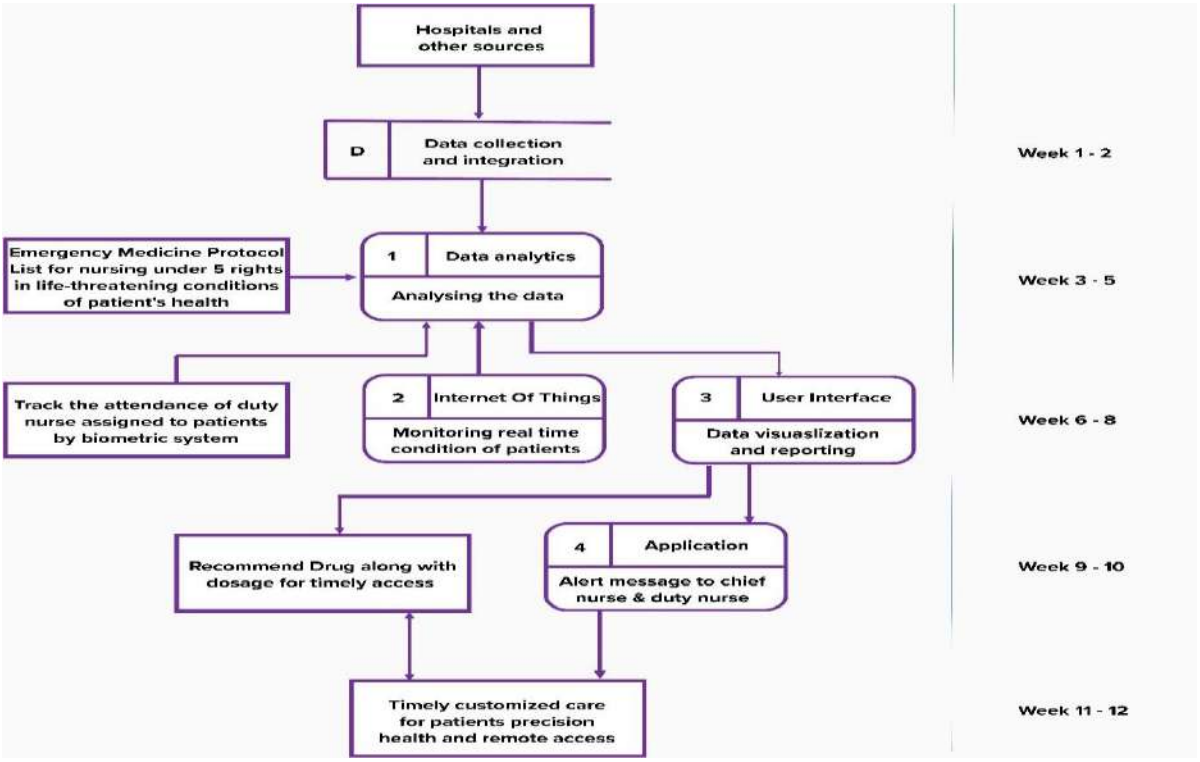
The Healthcare Analytics methodology covers a broad spectrum, from aggregating diverse data for implementing analytics, optimizing streamlined operations, enabling real-time monitoring, and remote access, and emphasizing interoperability of Health Information Systems (HIS) and analytics tools for a robust and adaptable healthcare analytics solution.

8. **Proposed solution with methodology**



A comprehensive healthcare analytics platform, focusing on the simultaneous tracking of real-time patient conditions using IOT and staff nurse attendance, the platform aims to enhance precision health and provide tailored care via Remote Patient Monitoring (RPM) in emergency life-threatening conditions. A chatbot application will be created to alert the chief nurse of abnormal patient anomalies, recommending drugs and dosages based on age, weight, and condition analysis. Leveraging the Emergency Medicine Protocol List (EMPL), medications will be prescribed under the five rights of nursing, contributing to improved overall efficiency in healthcare institutions.

9. **Workplan / time schedule indicating the project milestone**



10. **Plan of action for implementation**

Real-time data Collection and Integration: Connect various data sources, including Electronic Health Records (EHRs), medical imaging, demographics, treatment records, and operational datasets. Develop a detailed data integration focusing on seamless consolidation of different data types and sources. Establish secure and efficient mechanisms for transferring, transforming, and loading (ETL) data into a unified repository.

Analytics for Patient Care and Staff Attendance: Preprocess data, with a particular emphasis on cleaning and organizing staff attendance records. Implement machine learning models for predicting patient outcomes, readmission risks, disease progression, and staff nurse attendance patterns.

Operational Efficiency Optimization: Expand algorithms for hospital operations, considering the impact of staff nurse attendance patterns on scheduling and resource allocation. Use predictive analytics to forecast patient admission rates and determine staff nurse attendance requirements, optimizing operational efficiency.

Real-time Monitoring and Alerts: Develop alert mechanisms that promptly notify relevant stakeholders of critical changes in patient conditions and issues related to staff attendance. Ensure the real-time monitoring system is responsive and capable of providing actionable insights for timely decision-making.

Data Visualization and Reporting: Integrate visualizations and reports specifically focused on staff nurse attendance patterns, and patient records into the user-friendly dashboard.

Drug Recommendations: Analyse the Emergency Medicine Protocol list and patient anomalies (age, weight, condition) to recommend suitable drugs along with the dosage. Integrate drug recommendations into the broader system to enhance the decision-making process of duty nurses in emergency life-threatening conditions if the doctor is not available at the moment for patient care.

11. **List of facilities available in the college to develop the prototype of the project**
    - Computing resources.
    - Collaboration with working professionals.
    - Ethical considerations.
    - Regulatory Compliance experts for legal data access and storage.
12. **Nature of Industry support for the project**, (if any)
    - Technology providers: Software, and cloud infrastructure for handling data securely.
    - Medical facilities: Early adapters for testing the model.
13. **Details of Financial assistance required:** For analysing healthcare data, using tools like Tableau, Power BI, or SAS are the platforms that allow us to visualize and analyse patient data like insurance information, claims history, including financial assistance details, to derive insights for hospitals medical records and institutions.
14. **Expected outcomes/results**
    - Healthcare Analytics Platform for patient care, operational efficiency, resource management, and staff nurse attendance.
    - User-Friendly Dashboard: Textual and visually appealing dashboard, incorporating attendance metrics to improve patient care through timely remote access with drug recommendations into the broader system to enhance the decision-making process of duty nurses in emergency life-threatening conditions.
    - Real-time Monitoring System: Implementation of a system with real-time RPM (remote patient monitoring) for enabling remote access.

UNDERTAKING

1. The college will provide the basic infrastructure and other required facilities to the students for timely completion of their projects.
2. The college assumes to undertake the financial and other management responsibilities of the project.
3. The college will ensure that the funds provided are utilized only for the purpose provided and any remaining amount will be returned back to the University after the time of completion of the project.

31/01/2024

Signature of the Mentor
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31/1/24

Signature and seal of the principal
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