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**Course- B. Tech CSE**

**Health Monitoring System Project Report**

**1. Introduction**

The Health Monitoring System is designed to analyze patient health data using big data processing frameworks such as Apache Spark and Hadoop. The system collects, processes, and predicts health conditions based on historical data. A machine learning model is used to make predictions, and a Flask-based web application provides an interactive user interface.

**2. Objectives**

* Develop a predictive model for patient health monitoring.
* Utilize Spark and Hadoop for efficient data processing.
* Create a user-friendly web interface to display predictions.
* Maintain persistent input values post-prediction.

**3. Technologies Used**

* Backend: Python, Flask
* Frontend: HTML, CSS
* Database: CSV for storing patient data
* Big Data Frameworks: Apache Spark, Hadoop
* Machine Learning: Linear Regression Model (Pickle .pkl file)

**4. Project Components**

* Dataset (patient\_data.csv): Contains patient health records such as blood pressure, sugar levels, and cholesterol.
* Machine Learning Model (health\_model.pkl): A pre-trained linear regression model for predictions.
* Web Interface (index.html, styles.css): Provides an interactive user experience.
* Backend (app.py): Manages backend processing, takes user input, and integrates with the machine learning model.
* Background Image (staticbg.jpg): Enhances the aesthetic appeal of the UI.

**5. System Workflow**

1. The user inputs health-related data via the web interface.
2. The input data is sent to the backend Flask application.
3. The pre-trained machine learning model predicts health risks.
4. The prediction result is displayed on the webpage.
5. User inputs remain persistent for ease of modification and re-evaluation.

**6. Implementation Details**

**6.1 Data Processing**

* Apache Spark and Hadoop handle large-scale patient health data processing.
* The system loads structured patient data from patient\_data.csv and preprocesses it.

**6.2 Model Prediction**

* The backend loads the pre-trained model (health\_model.pkl) and applies it to the user’s input data.
* The model computes a predicted health parameter based on patient attributes.

**6.3 Web Interface**

* The HTML and CSS files ensure an intuitive and responsive UI.
* The form fields retain input values even after submitting predictions**.**

**7. Results & Outcomes**

* The system provides accurate health predictions based on patient data.
* Apache Spark improves data processing speed, making it scalable.
* The user-friendly interface enhances accessibility and usability**.**

**8. Conclusion**

The Health Monitoring System effectively predicts potential health risks by integrating machine learning, big data frameworks, and an interactive web-based interface. It offers a scalable solution for monitoring patient health trends, ensuring efficiency in data processing and predictions**.**

**9. Future Enhancements**

* Integration with real-time IoT medical devices.
* Use of relational databases (SQL) for structured storage.
* Enhancement of prediction accuracy with deep learning models.
* Mobile-friendly UI for better accessibility**.**

**10. References**

* [**Apache Spark Documentation**](https://spark.apache.org/documentation.html)
* [**Flask Web Framework**](https://flask.palletsprojects.com/en/2.0.x/)
* [**Machine Learning Techniques**](https://scikit-learn.org/stable/modules/machine_learning_map.html)