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Date:- 5,Apr.'2024

PRACTICUM REVIEW II

CSL306

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Batch No.	B-26	**Semester**	IV
Branch	CSE	**Supervisor**	Dr. Shivdutt Sharma

1. **Title of the Project :-**
   "HeartGuard" Predictive Modelling for Cardiovascular Wellness

2. **Introduction :-**
   - HeartGuard focuses on the development of a robust machine learning model designed to predict heart disease risks. With a growing global concern for cardiovascular health, early detection and preventative measures are essential.
   - Heart disease is a prevalent and life-threatening health condition that requires early detection for effective treatment. Machine learning models have shown promise in predicting heart disease, offering a proactive approach to healthcare.
   - This machine learning (ML) model is used for predicting heart disease based on a set of relevant features. The objective is to assist healthcare professionals in early detection and proactive management of cardiovascular conditions.
   - The model utilizes a dataset containing patient information and associated heart disease outcomes to train and validate its predictive capabilities.

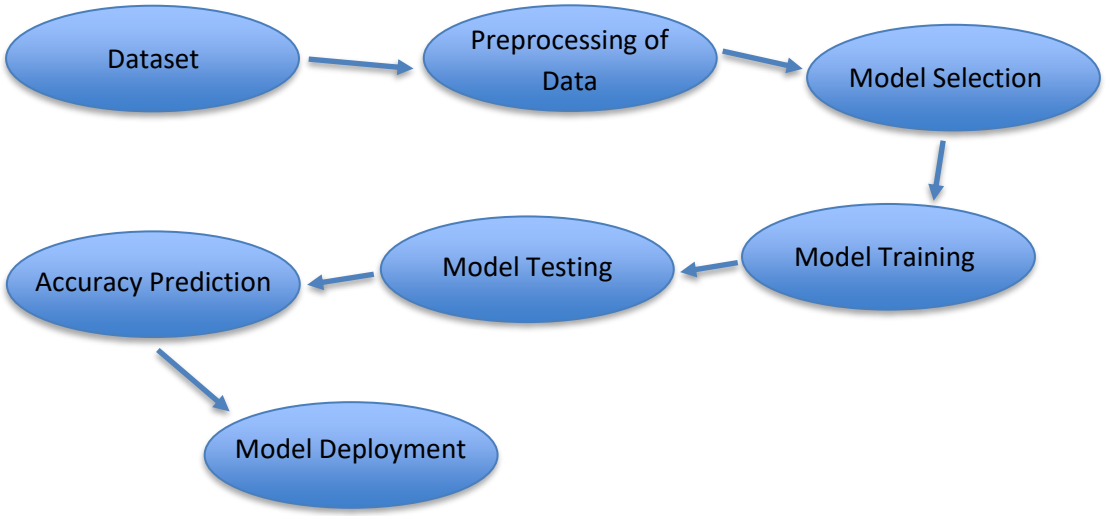
3. **Problem Definition :-**
   This project endeavours to create a machine learning model to forecast the probability of heart disease in individuals by analysing diverse health-related attributes. By leveraging data-driven insights, such as medical history, lifestyle factors, and physiological indicators, the aim is to develop a predictive tool aiding in early detection and intervention for improved cardiovascular health management.

4. **Objectives :-**
   - To collect a comprehensive dataset containing relevant health features.
   - To collect information regarding various features related to heart.
   - To explore and analyse the dataset to understand the relationships between features and the target variable (heart disease).
   - To design and implement a machine learning model for heart disease prediction.
   - To evaluate the model's performance using appropriate metrics.

5. **Skillset additionally required to solve the problem :-**
   - Machine Learning :-
     Machine learning is a field of artificial intelligence that uses data to enable computers to learn and improve performance autonomously.
   - Feature Engineering :-
     Feature engineering involves selecting, transforming, and creating input variables to improve model performance and extract meaningful patterns from data.
   - Data Visualization :-
     Data visualization is the graphical representation of data to uncover insights, patterns, and trends for better understanding and decision-making.
   - Domain Knowledge (Healthcare) :-
     Domain knowledge in healthcare involves understanding medical practices, terminology, regulations, and patient needs to develop effective solutions and innovations.
   - Model Evaluation :-
     Model evaluation assesses the performance of machine learning models using metrics like accuracy, precision, recall, and F1-score for validation.
   - Ethics and Privacy Awareness :-
     Ethics and privacy awareness ensures responsible data handling, protection of individual rights, and mitigation of biases in AI applications.

6. **Timeline to achieve the skillset :-**
   - Almost 16 weeks to complete the project.

7. **Block schematic :-**



8. Weekly milestones :-

Week	Major Activities to be Completed
Week 1	Domain Exploration for ideas.
Week 2	Idea Exploration.
Week 3	Exploration different platforms for collecting data.
Week 4	Dataset filtration.
Week 5	Explore the Basics of Python and ML.
Week 6	Explore the Basics of ML Algorithms.
Week 7	Training of the model.
Week 8	Training of the model.
Week 9	Test and tune model to increase accuracy and finalize model.
Week 10	Testing and debugging.
Week 11	Finalize model after testing.
Week 12	Deployment.
Week 13	Ethical considerations.
Week 14	Updates and improvements.
Week 15	Updates and improvements.
Week 16	Finalize all aspects of the project.

9. Completed Milestones :-

- Idea exploration.
- Dataset Exploration.
- Basic Python and Basic Libraries Learning.

- Exploration of Machine Learning Models Theory.
- Confusion Matrix.
- Training and Testing of the Model.
- Selection of Model for Project.

10. Milestones to be Completed :-

- Searching better model or neural networks for the Prediction Model.
- Checking Ethical considerations.
- Finalizing the Model.
- Deployment of the Model.

11. Expected Challenges :-

- Imbalanced Data :- Unequal representation of positive and negative cases.
- Data Quality and Cleaning :- Noisy or inaccurate data.
- Feature Selection :- Identifying the most relevant features.
- Overfitting :- Model fitting the training data too closely.
- Ethical Considerations :- Ensuring fairness and avoiding bias.
- Continuous Model Monitoring and Updating.

12. References :-

- D. Zhang, Y. Chen, Y. Chen, S. Ye, W. Cai, and M. Chen, "An ECG Heartbeat Classification Method Based on Deep Convolutional Neural Network," Journal of Healthcare Engineering, vol. 2021, 2021, doi: 10.1155/2021/7167891
- B. Deepak Kumar, S. Yellaram, S. kothamasu, S. Puchakayala, and A. Professor, "Heart Stroke Prediction using Machine Learning," 2021. [Online]. Available: www.ijcrt.org

Name and Signature of Student **Name and Signature of Supervisor**