Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	27 October 2023
Team ID	593151
Project Name	Predicting Mental Health Illness Of Working Professionals Using Machine Learning
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2
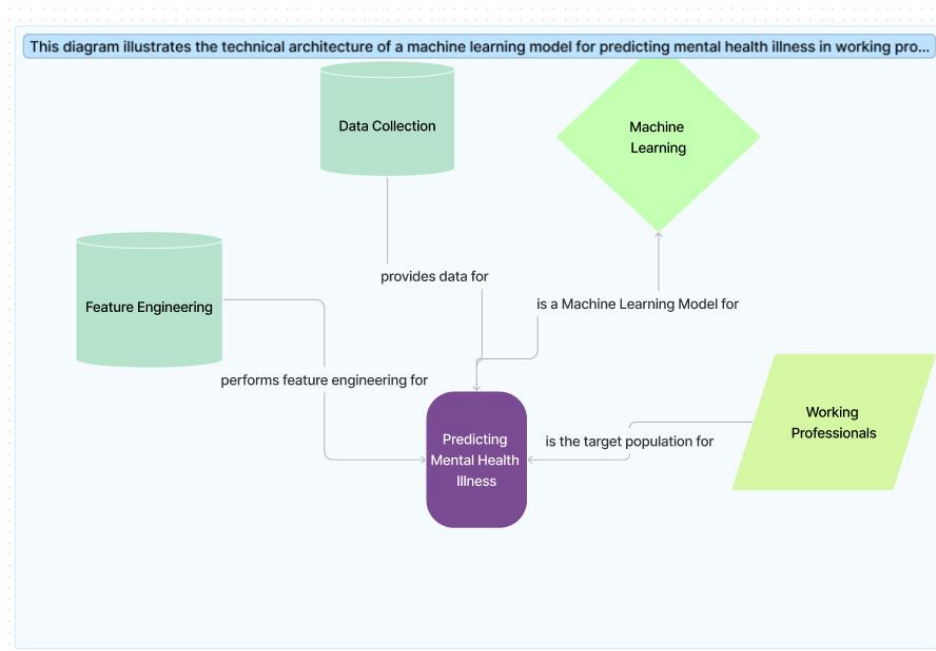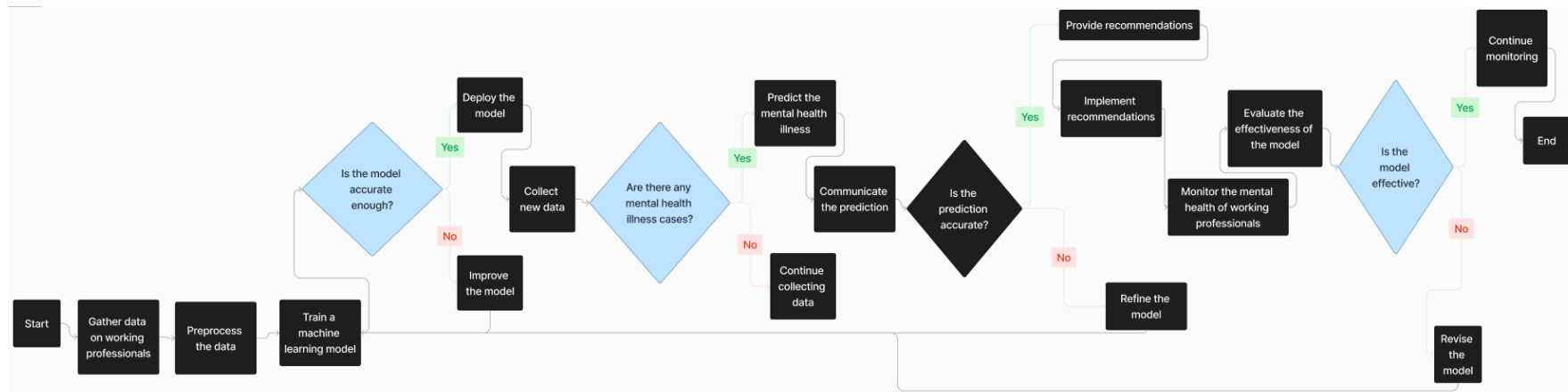
Table-1 : Components & Technologies:

S.No	Component	Technology
1.	**Programming Language**	Python: Widely used for machine learning and has extensive libraries and frameworks.
2.	**Data Collection and Storage**	SQL or NoSQL databases (e.g., PostgreSQL, MongoDB) for storing structured or unstructured data related to professionals' mental health.
3.	**Data Preprocessing**	• Pandas: For data manipulation and cleaning. • NumPy: For numerical operations on the data.
4.	**Machine Learning Framework**	• Scikit-learn: Offers a variety of tools for data mining and data analysis. • TensorFlow or PyTorch: Deep learning frameworks for building and training neural networks.

5.	**Model Selection**	• Logistic Regression, Decision Trees, Random Forests: For simpler models. • Neural Networks: For complex patterns in the data.
6.	**Model Evaluation**	• Cross-validation techniques to assess model performance. • Metrics like accuracy, precision, recall, and F1 score to evaluate the model's effectiveness.
7.	**Hyperparameter Tuning**	GridSearchCV or RandomizedSearchCV in Scikit-learn for optimizing model parameters.
8.	**Deployment**	• Flask or Django: For building a web application. • Docker: Containerization for easy deployment and scalability. • Cloud services (e.g., AWS, Azure, Google Cloud) for hosting the application.
9.	**Monitoring and Logging**	• Implement logging mechanisms to track model performance and user interactions. • Set up monitoring tools to identify issues and ensure the system's reliability.
10.	**Security**	• Implement secure coding practices. • Protect sensitive user data and comply with data protection regulations.
11.	**User Interface**	• HTML, CSS, JavaScript for creating a user-friendly interface. • Visualization libraries like D3.js or Chart.js for displaying insights.
12.	**Collaboration and Version Control**	• Git: For version control. • Platforms like GitHub or GitLab for collaboration.

Table-2: Application Characteristics:

S.No	Characteristics	Description
1	**Data Privacy and Security**	• Implement robust data encryption and ensure compliance with data protection regulations. • Prioritize user consent and clearly communicate how their data will be used.
2	**User-Friendly Interface**	• Design an intuitive and user-friendly interface to encourage regular usage. • Include simple and clear instructions for users to input relevant data.
3	**Comprehensive Assessment**	• Incorporate a diverse range of factors such as work-related stressors, sleep patterns, physical activity, and social interactions. • Utilize validated mental health assessment tools to ensure accuracy.
4	**Real-time Monitoring**	• Enable continuous monitoring to detect changes in mental health over time. • Provide timely alerts or recommendations based on the analysis of user data.
5	**Personalized Insights**	• Tailor recommendations based on individual profiles and preferences. • Consider factors like personality traits and coping mechanisms in the analysis
6	**Integration with Wearables**	• Allow users to connect their wearable devices to provide additional data for analysis. • Incorporate features that leverage biometric data for a more holistic understanding
7	**Education and Resources**	• Offer educational content on mental health, stress management, and coping strategies. • Provide links to relevant resources and support networks.

8	**Multilingual Support**	• Ensure the application is accessible to a diverse user base by offering multiple language options. • Consider cultural nuances in the design and recommendations.
9	**Machine Learning Algorithms**	• Use advanced machine learning algorithms for accurate prediction. • Continuously update and refine the algorithms based on user feedback and evolving research
10	**Feedback Mechanism**	• Include a feedback system to gather user input and improve the application over time. • Encourage users to report any concerns or inaccuracies in predictions.
11	**Collaboration with Professionals**	• Provide an option for users to share insights with mental health professionals. • Collaborate with mental health experts to enhance the accuracy of predictions and recommendations
12	**Scalability**	• Design the application to handle a growing user base and evolving technology. • Ensure the infrastructure can support increased data volume without compromising performance.