AI -Based Diabetes Prediction System

Data collection and Integration:

* Gather a comprehensive dataset that includes various health-related features such as age, gender, BMI, blood pressure, family history, glucose levels, cholesterol levels, lifestyle factors (diet, exercise), and medical history.
* Integrate data from various sources, including electronic health records, wearable devices, and patient self-respect

Data Preprocessing and Cleaning:

* Clean and preprocess the data by addressing missing values, outliers, and inconsistencies.
* Normalize or scale the features to ensure they have a consistent range.

Feature Selection and Engineering:

* Identify the most relevant features using techniques like correlation analysis, mutual information, or feature importance scores from machine learning models.
* Create new features through engineering, such as calculating the body adiposity index (BAI) or adding interaction terms.

Model Selection and Development:

* Choose appropriate machine learning algorithms, which may include logistic regression, decision trees, random forests, support vector machines, or deep learning models like neural networks.
* Develop an ensemble of models or use a combination of techniques to improve predictive accuracy.

Training and Validation:

* Split the dataset into training, validation, and testing sets.
* Train the selected models on the training data and validate their performance on the validation set.
* Use techniques like cross-validation to tune hyperparameters and optimize model performance.

Model Interpretability:

* Employ interpretability techniques like SHAP (SHapley Additive exPlanations) values or LIME (Local Interpretable Model-agnostic Explanations) to explain the model's predictions, making it understandable to healthcare professionals and patients.

Risk Stratification:

* Categorize individuals into risk groups (e.g., low, moderate, high risk) based on model predictions.
* Provide personalized risk scores and recommendations for each group

Deployment and Integretion:

* Integrate the AI system into healthcare facilities, electronic health records (EHR) systems, or mobile health apps for widespread use.
* Ensure compliance with regulatory requirements and data privacy standards (e.g., HIPAA)

Monitoring and Updates:

* Continuously monitor the model's performance in real-world settings.
* Update the model periodically to adapt to changing patient demographics, treatment guidelines, and emerging medical knowledge.

Patient Engagement:

* Develop user-friendly interfaces and patient engagement strategies to encourage individuals to participate in diabetes risk assessment and management.

Healthcare professional development:

* Facilitate collaboration between AI systems and healthcare professionals to provide comprehensive care and treatment recommendations.

Ethical Consideration:

* Address ethical concerns related to data privacy, informed consent, bias, and fairness in AI prediction

Feature Selection/

Engineering

Flow Chart:-

Data Collection

Data Preprocessing

Model Selection

Training

Hyperparameter Tuning

Predict Diabetes Risk

Risk Stratification

Model Monitoring

Team Members:

Amina Shafrin

Apshana

Mydeen fathima

Nilofer nisha

Sankarammal

JP College Of Engineering