Project Design Phase-I
Solution Architecture

Team ID	PNT2022TMID24632
Project Name	Project - Detecting Parkinson's Disease using Machine Learning
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

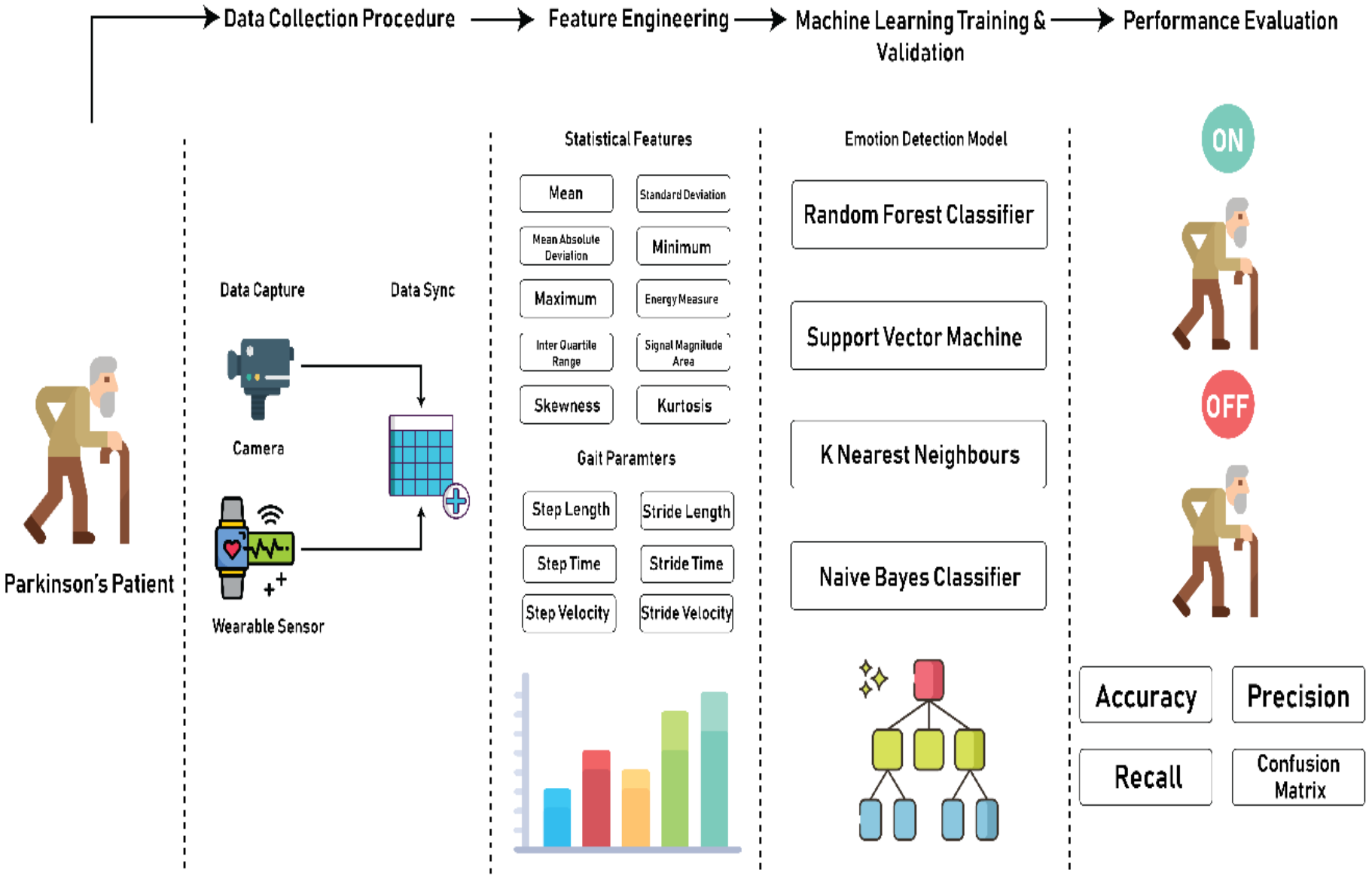
- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

Problem Statement & Approach:

Parkinson's Disease (PD) is a neurodegenerative disease which affects, movement, posture and agility. It involves the gradual loss of dopamine producing neurons in the substantia nigra of the brain which severely affects, fine motor movement, posture, muscular dexterity and strength. Long before Parkinson's is officially diagnosed, a myriad of symptoms start to appear. The earliest ones are trouble having control over fine motor movement like drawing figures and shapes. The "Spiral & Wave Test" is a scientifically designed diagnostic tool that helps the neurologist in assessing the degree of Parkinsonian symptoms exhibited by the test taker by evaluating the drawing pattern and using Artifical Intelligence to make a better estimate at determining the degree of Parkinsonian symptoms.

Example - Solution Architecture Diagram:

Figure 1: Architecture and data flow of the Parkinson disease detection application which is done using Machine Learning.


Data Collection Procedure
Feature Engineering
Machine Learning Training & Validation
Performance Evaluation
Parkinson's Patient
Data Capture
Data Sync
Camera
Wearable Sensor
Statistical Features
Mean
Standard Deviation
Mean Absolute Deviation
Minimum
Maximum
Energy Measure
Inter Quartile Range
Signal Magnitude Area
Skewness
Kurtosis
Gait Paramters
Step Length
Stride Length
Step Time
Stride Time
Step Velocity
Stride Velocity
Emotion Detection Model
Random Forest Classifier
Support Vector Machine
K Nearest Neighbours
Naive Bayes Classifier
ON
OFF
Accuracy
Precision
Recall
Confusion Matrix

Main Flow of Architecture: