**Project Initialization and Planning Phase**

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| Date | 15 March 2024 |
| Team ID | PNT2022TMID124356 |
| Project Title | SmartLender - Applicant Credibility Prediction for Loan Approval |
| Maximum Marks | 3 Marks |

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| **Project Overview** |  |
| Objective | The objective of this project is to develop a real-time body language decoding system using the MediaPipe framework and machine learning. It aims to detect and classify facial expressions and body gestures like happiness, sadness, fighting, and victory poses from a live video stream. This will improve how machines interpret non-verbal human communication. |
| Scope | The scope includes designing a system capable of recognizing emotional and behavioral cues through facial and skeletal landmark detection. It will assist in various domains such as education, healthcare, surveillance, and human-computer interaction by providing a meaningful analysis of human gestures. |
| **Problem Statement** |  |
| Description | Most intelligent systems lack the ability to perceive and respond to non-verbal communication. This leads to ineffective interaction in areas where emotional and behavioral recognition is crucial—such as online learning, mental health assessment, or security. A solution that accurately interprets body language is highly needed. |
| Impact | Addressing this issue will bridge the communication gap between humans and machines. It will allow systems to respond more appropriately to emotional and physical cues, leading to smarter, more responsive applications in safety, education, therapy, and customer engagement. |
| **Proposed Solution** |  |
| Approach | The solution leverages MediaPipe’s face and pose modules to track landmarks in real-time and uses a machine learning model to classify expressions and gestures. The system processes webcam input to detect specific emotional states and gestures, and then annotates the output accordingly. |
| Key Features | - Real-time face and pose tracking using MediaPipe  - Classification of emotional expressions: happy, sad, angry (fighting), victory pose  - ML model integration with MediaPipe for gesture recognition  - Visual display of detected gestures and facial cues |

**Resource Requirements**

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| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** | | |
| Computing Resources | |  | | --- | |  |  |  | | --- | | Required for real-time landmark processing | | T4 GPU or equivalent |
| Memory | |  | | --- | |  |  |  | | --- | | RAM for frame buffering and ML inference | | 8–16 GB RAM |
| Storage | Disk space for datasets, models, logs | 512 GB–1 TB SSD |
| **Software** | | |
| Frameworks | |  | | --- | |  |  |  | | --- | | Python, Flask | | Python 3.10+, Flask |
| Libraries | ML and CV support | OpenCV, Mediapipe, NumPy, scikit-learn |
| Development Environment | Code development and testing | Jupyter Notebook, pycharm |
| **Data** | | |
| Data | Training/Testing Media or CSV formats | Custom samples, image sequences, CSVs |