**Project Initialization and Planning Phase**

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| Date | 20th June,2025 |
| Team ID | SWTID1750057522 |
| Project Title | Unlocking Silent Signals: Decoding Body Language with Mediapipe |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution) template**

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

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| **Project Overview** | |
| Objective | To develop a computer vision system that can interpret human body signals and movements in real time using Mediapipe, allowing us to unlock non-verbal communication and translate it into actionable data. |
| Scope | The project covers capturing live video, detecting key body points with Mediapipe, analyzing movements, and classifying these signals into predefined categories or messages. It focuses on upper body signals — gestures, postures, and movements — to interpret human intentions or emotions. |
| **Problem Statement** | |
| Description | Communication is not limited to words; body signals can convey messages, emotions, and intentions without speaking. There is a need for a way to automate the understanding of these non-verbal signals, which can be useful in numerous fields, from education and psychology to human-computer interaction and surveillance. |
| Impact | Without proper understanding and automation of non-verbal signals, we miss a huge amount of information in interpersonal communication. This limits applications such as enhancing human-machine interaction, improving accessibility for people with communication disorders, and understanding human behavior in real time. |
| **Proposed Solution** | |
| Approach | The approach involves using Mediapipe’s pose and landmark detection to extract key points of the human body from video, then applying machine learning algorithms to classify these signals into predefined categories. The pipeline comprises data collection, keypoint extraction, training, testing, and deployment. |
| Key Features | - Non-invasive, real-time body pose detection.  - Accurate keypoint extraction using Mediapipe.  - Machine-learning classifiers to interpret signals.  - Support for different scenarios (gestures, signals, movements).  - Customizable and adaptable to various applications (such as health care, education, surveillance). |

**Resource Requirements**

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| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** | | |
| Computing Resources | CPU/GPU specifications, number of cores | CPU with at least 4 cores, 2.5GHz |
| Memory | RAM specifications | 8 GB |
| Storage | Disk space for data, models, and logs | 500 GB HDD or 128 GB SSD |
| **Software** | | |
| Frameworks | Python frameworks | Streamlit (for UI), scikit-learn (for ML pipeline) |
| Libraries | Additional libraries | Mediapipe, scikit-learn, pandas, numpy, pickle, OpenCV |
| Development Environment | IDE, version control | VSCode, Jupyter Notebook, Git |
| **Data** | | |
| Data | Source, size, format | CSV files with Mediapipe key points; Size ≈ 500–1000 samples; Format: CSV with labeled landmarks (happy, sad, victorious, fight) |