**Software Requirement Specification (SRS) for Gesture Control Document Navigation System**

**1. Introduction**

**1.1 Purpose**

The purpose of this document is to define the requirements for a Gesture Control Document Navigation System, which allows users to navigate through digital documents using hand gestures.

**1.2 Scope**

This system will use computer vision and machine learning to recognize predefined hand gestures to perform document navigation functions such as scrolling, zooming, and page flipping. The system will enhance accessibility and efficiency, especially for users with mobility impairments.

**1.3 Definitions, Acronyms, and Abbreviations**

* **SRS**: Software Requirement Specification
* **GUI**: Graphical User Interface
* **ML**: Machine Learning
* **CV**: Computer Vision
* **API**: Application Programming Interface

**1.4 References**

* IEEE Standard for Software Requirements Specifications (IEEE 830-1998)
* OpenCV Documentation for Gesture Recognition
* ML frameworks such as TensorFlow and Mediapipe

**1.5 Overview**

This document outlines the functional and non-functional requirements, system architecture, and constraints for the Gesture Control Document Navigation System.

**2. Overall Description**

**2.1 Product Perspective**

The system is a standalone software application or a plugin that integrates with document viewers like PDF readers, web browsers, and word processors.

**2.2 Product Functions**

* Recognize hand gestures using a webcam.
* Perform document navigation functions such as:
  + Scroll up/down
  + Zoom in/out
  + Page next/previous
  + Close document
* Provide real-time feedback for gesture recognition.
* Offer customization for gesture mapping.

**2.3 User Characteristics**

* End users: General users, professionals, people with disabilities.
* Technical knowledge: Basic familiarity with gesture-based interfaces.

**2.4 Constraints**

* Requires a webcam or depth sensor.
* Real-time processing must be efficient to minimize lag.
* Should support major document formats (PDF, DOCX, PPT, HTML, etc.).

**2.5 Assumptions and Dependencies**

* The user has a functional webcam.
* The system will use third-party libraries (e.g., OpenCV, TensorFlow).
* The document viewer application supports external control inputs.

**3. Specific Requirements**

**3.1 Functional Requirements**

**FR1: Gesture Recognition**

* The system shall recognize hand gestures using a webcam.
* The system shall differentiate between predefined gestures for navigation.

**FR2: Document Navigation**

* The system shall allow users to scroll up/down using hand gestures.
* The system shall allow users to zoom in/out using hand gestures.
* The system shall allow users to navigate between pages.

**FR3: Customization**

* Users shall be able to configure custom gestures for different actions.
* The system shall provide an interface for modifying gesture settings.

**FR4: Feedback System**

* The system shall provide visual/audible feedback when a gesture is recognized.

**3.2 Non-Functional Requirements**

**NFR1: Performance**

* The system shall process gestures in real-time with minimal latency (<100ms delay).

**NFR2: Usability**

* The system shall have an intuitive UI for configuration and debugging.

**NFR3: Compatibility**

* The system shall be compatible with Windows, macOS, and Linux.

**NFR4: Security**

* The system shall not store or transmit video data to third-party servers.

**4. External Interface Requirements**

**4.1 User Interfaces**

* A settings panel for configuring gestures.
* A real-time overlay indicating recognized gestures.

**4.2 Hardware Interfaces**

* Requires a standard webcam or depth sensor.

**4.3 Software Interfaces**

* Integrates with document viewers via APIs or accessibility services.

**5. System Features**

**5.1 Gesture-Based Scrolling**

* Users can scroll through documents using hand gestures.

**5.2 Gesture-Based Zooming**

* Users can zoom in/out using pinch or spread hand gestures.

**5.3 Page Navigation**

* Users can move to the next or previous page with swipe gestures.

**5.4 Custom Gesture Mapping**

* Users can define and modify gestures through the settings panel.

**6. Appendices**

* Sample dataset sources for gesture recognition.
* References to computer vision libraries used.