**SRS: Facial Analysis - Proof of Concept**

# 0. User Requirement Analysis

* **Core Functions:**
  + Detection of facial landmarks (eyes, nose, mouth, etc.)
  + Emotion recognition based on facial expressions
  + Age estimation from facial features
  + Image processing for feature analysis (acne, hyperpigmentation, wrinkles, etc.)
* **User Expectations:**
  + Web-based platform for image upload and analysis
  + Accurate and reliable feature detection and analysis
  + User-friendly interface
* **Assumptions**
  + Users will input relatively clear, front-facing facial images.
  + Image sizes will be reasonable for web upload (consider specifying limits).
  + PoC may operate on a basic dataset for age and emotion; full datasets would be in later phases.
* **Open Questions**
  + What are the accuracy targets for each feature type?
  + Desired granularity of emotion detection (e.g., basic happy/sad or more nuanced)?
  + Specific definitions for "acne," "hyperpigmentation," etc., as these can be subjective.

# 1. Introduction

* **Purpose:** This Proof of Concept (PoC) will validate the feasibility of developing a web-based facial analysis application with the core functionalities defined in the User Requirement Analysis.
* **Scope:** The PoC will focus on:
  + Implementing a core algorithm for facial feature detection.
  + Developing a basic emotion recognition module.
  + Building a prototype web interface for image uploads and result display.
* **Definitions, Acronyms, Abbreviations**
  + PoC - Proof of Concept
  + SRS - Software Requirements Specification
  + AI - Artificial Intelligence
  + ML - Machine Learning
  + REST - Representational State Transfer
* **References**
  + Raw client communication
* **Overview**
  + This SRS outlines the essential components, development patterns, and success criteria for the PoC, establishing a foundation for future project expansion.

# 2. Overall Description

* **PoC Context:** This PoC is a critical first step in building a comprehensive facial analysis system. Its successful outcome will provide insights into algorithm reliability, usability, and the overall project's potential.
* **Key PoC Functions**
  + Facial Landmark Detection
  + Basic Emotion Classification (e.g., happy, sad, neutral)
  + Image upload and processing via a web interface.
* **User Characteristics:** Potential users could include researchers, demo users, or initial clients depending on the project's focus.
* **Constraints:**
  + Limited development time.
  + Simplified algorithms for fast PoC iterations.
* **Assumptions/Dependencies:**
  + Access to pre-processed facial image datasets (may be small initially)
  + Availability of necessary image processing and machine learning libraries.

# 3. Specific Requirements (PoC-Centered)

## Functional Requirements

* **FR1: Image Upload**
  + System allows for upload of standard image formats (JPEG, PNG).
  + Reasonable image size limit (to be agreed upon with the client).
* **FR2: Facial Landmark Detection**
  + System detects core landmarks (eyes, nose, mouth corners, jawline) with [threshold]% accuracy.
* **FR3: Emotion Recognition**
  + System classifies basic emotions (happy, sad, neutral, [others TBD]) with [threshold]% accuracy.
* **FR4: Result Display**
  + System presents clear visual overlay demonstrating landmark detection.
  + System displays recognized emotion in a text format.

## External Interface Requirements

* **UI1: Minimalist Web Interface**
  + Simple form for image upload
  + Result area for image viewing and text output.

## Design Patterns

* **Prototype Pattern:** Create a simplified working model for early feedback and iterations.
* **Facade Pattern:** Initially mask back-end complexity for UI interaction.

## Success Criteria

* Algorithm accuracy targets achieved within the time constraint.
* Positive user feedback regarding interface intuitiveness.

## Design Constraints

* Prioritize development speed over extensive code optimization.

## Non-Functional Requirements

* **Security:** Basic measures to protect uploaded images.
* **Performance:** Aim for results within a few seconds of image upload.

# 4. Other Requirements (If Needed)

* A brief outline of the PoC testing strategy.