

# **AURA SKIN**

## **SOFTWARE REQUIREMENTS SPECIFICATION (SRS)**

**AI 7993 – Section W01 - Fall 2025**

**September 21, 2025**



**Nyah Robinson**

## Table of Contents

<b>Table of Contents.....</b>	<b>1</b>
<b>1. Introduction.....</b>	<b>2</b>
1.1 Purpose.....	2
1.2 Scope.....	2
1.3 Project Goals.....	2
1.4 References.....	2
<b>2. Overall Description.....</b>	<b>3</b>
2.1 Product Perspective.....	3
2.2 Product Functions.....	3
2.3 Environment.....	3
2.4 User Characteristics.....	3
2.5 Constraints.....	3
2.6 Assumptions and Dependencies.....	3
<b>3. Functional Requirements.....</b>	<b>4</b>
3.1 Launch Page.....	4
3.2 Login Page.....	4
3.3 Register Page.....	4
3.4 Image Capture & Upload.....	4
3.5 Image Analysis.....	4
3.6 Recommendations.....	4
3.7 History Tracking.....	4
<b>4. Non-Functional Requirements.....</b>	<b>5</b>
4.1 Performance.....	5
4.2 Accuracy.....	5
4.3 Security.....	5
4.4 Usability.....	5
4.5 Scalability.....	5
4.6 Reliability.....	5
<b>5. Use Cases.....</b>	<b>5</b>
5.1 Upload and Analyze Skin Images.....	5
5.2 Receive Recommendations.....	5
5.3 Save Recommendations.....	5
5.4 Update Database.....	6
<b>Appendix A: Glossary.....</b>	<b>6</b>
<b>Appendix B: Future Enhancements.....</b>	<b>6</b>
<b>Appendix C: Analysis Models.....</b>	<b>7</b>

## 1. Introduction

### 1.1 Purpose

The purpose of this document is to define the requirements for AuraSkin, a mobile app that uses machine vision and artificial intelligence to analyze user's skin conditions from images. The app provides personalized skincare recommendations, empowering individuals to make informed decisions about their routines. This document serves as a reference for developers, project managers, and testers to ensure alignment on system requirements.

### 1.2 Scope

AuraSkin will be a cross-platform mobile app for iOS and Android that allows users to capture or upload images of their face, processes those images through a trained computer vision model, and identifies common skin concerns such as acne, hyperpigmentation, dryness, and oiliness. Based on the analysis, the app will provide tailored product and routine recommendations. The system will be built using Flutter for cross-platform development, TensorFlow Lite for mobile ML inference, and a backend database for product and recommendation mapping.

### 1.3 Project Goals

- Develop a cross-platform mobile app for iOS and Android for accessible skincare analysis.
- Train and deploy a machine learning model for skin concern detection.
- Provide a recommendation system that maps detected issues to curated skincare products and routines.
- Enable users to track skincare progress through saved history.

### 1.4 References

TensorFlow Lite Documentation. <https://www.tensorflow.org/lite>

Flutter Framework Documentation. <https://flutter.dev>

Firebase Documentation. <https://firebase.google.com/docs>

IEEE Std 29148-2018 – *Systems and Software Engineering – Life Cycle Processes – Requirements Engineering*.

IEEE Std 1016-2009 – *IEEE Standard for Information Technology – Systems Design – Software Design Descriptions*.

## 2. Overall Description

### 2.1 Product Perspective

AuraSkin is a standalone mobile app but depends on external libraries and frameworks such as Flutter, TensorFlow Lite and a backend database service. It will integrate computer vision models into the mobile interface and communicate with a product recommendation database.

### 2.2 Product Functions

- Capture or accept uploaded skin images.
- Preprocess and analyze images using a trained model.
- Identify common skin concerns.
- Provide personalized skincare recommendations.
- Allow users to save results and revisit recommendations.

### 2.3 Environment

- The app must operate on both iOS and Android platforms using Flutter.
- Backend services will use Firebase Authentication and Firestore Database.
- The machine learning model must be deployed in a mobile-friendly format.

### 2.4 User Characteristics

- **Primary Users:** Everyday individuals interested in skincare, typically ages 16-45.
- **Secondary Users:** Dermatologists, skincare professionals, or researchers who may use the app for quick reference.

### 2.5 Constraints

- Must run on both iOS and Android updated versions.
- Image analysis limited by device processing power.
- Privacy concerns restrict storage of personal images.
- Recommendation database limited to verified skincare products at launch.

### 2.6 Assumptions and Dependencies

- Users will provide clear, front-facing images with adequate lighting.
- Internet access will be required for retrieving recommendations.
- The app depends on TensorFlow Lite for on-device inference and Flutter SDK for development.
- Dataset availability and model accuracy are dependent on quality training data.

## **3. Functional Requirements**

### **3.1 Launch Page**

- The login button redirects to the login page.
- The register button redirects to the create an account page.

### **3.2 Login Page**

- Login with username/email.
- Login with password.
- Recovery/Reset of password.

### **3.3 Register Page**

- Email (username)
- Password
- First Name
- Last Name
- Phone Number

### **3.4 Image Capture & Upload**

- Image capture using device camera.
- Upload from device gallery, in JPEG or PNG format.

### **3.5 Image Analysis**

- Preprocess image (resize, normalize, noise reduction)
- Detects skin concerns (acne, dryness, hyperpigmentation, oiliness, and healthy skin).
- Output results with confidence scores.

### **3.6 Recommendations**

- Map detected concerns with product recommendations.
- Suggest at least three products or products per concern.
- Saving recommendations to user profiles.

### **3.7 History Tracking**

- View, save, and delete results in user history.
- Allow users to view previous analyses.

## 4. Non-Functional Requirements

### 4.1 Performance

Predictions shall be returned within 3 seconds on a standard mobile device.

### 4.2 Accuracy

The ML model shall achieve at least 85% accuracy on validation data.

### 4.3 Security

All user images shall be deleted from temporary storage immediately after analysis. User data and uploaded images must be stored securely using Firebase Authentication and database rules. No personal data will be shared with third parties without user consent.

### 4.4 Usability

The app shall maintain a simple, minimal design with accessible color schemes and text sizes.

### 4.5 Scalability

The system shall support integration with future APIs.

### 4.6 Reliability

The app shall function offline for image analysis but require internet access for recommendations.

## 5. Use Cases

### 5.1 Upload and Analyze Skin Images

- **Actor:** User
- **Description:** The user uploads or captures a skin image. The app processes it and displays detected conditions with confidence scores.

### 5.2 Receive Recommendations

- **Actor:** User
- **Description:** Based on detected conditions, the app presents skincare routines and product suggestions.

### 5.3 Save Recommendations

- **Actor:** User
- **Description:** The user saves recommendations for future reference and can revisit them later.

## 5.4 Update Database

- **Actor:** Admin
- **Description:** Admin updates product or skincare recommendation database through an API or backend interface.

## Appendix A: Glossary

**Acne** – a common skin condition that causes pimples, blackheads, whiteheads, and other blemishes.

**Actor** – user or other software system that receives value from a use case.

**AI** – Artificial Intelligence, the capability of computational systems to perform tasks typically associated with human intelligence

**API** – Application Programming Interface, are mechanisms that enable two software components to communicate with each other using a set of definitions and protocols.

**Dryness** – a lack of moisture in the skin.

**Hyperpigmentation** – a condition where the skin develops areas of increased pigmentation, resulting in darker patches or discoloration.

**ML** – Machine Learning, a field of study in AI concerned with the development and study of statistical algorithms that can learn from data.

**Noise Reduction** – the process of removing unwanted noise from a signal, like images, to improve clarity and quality.

**Normalize** – the process of transforming image pixel intensity values into a common and consistent range or statistical distribution.

**Oiliness** – the condition of containing or being covered with oil.

**Resize** – alter the size of the image.

**UI** – User Interface, the point of interaction between a human and a digital product, such as a website, application, or device.

**Use Case** – describes a goal-oriented interaction between the system and an actor.

**UX** – User Experience, the overall feeling a person has when interacting with a product, system, or service, encompassing every aspect of their interaction from discovery to post-use.

## Appendix B: Future Enhancements

- Multi-condition analysis
- Dermatologist chat integration

- AR-based skin process tracking

## Appendix C: Analysis Models