<Face Analyzer>

(Project Proposal)

Project Code

<Project code assigned by the Project Office>

Project Advisor

Prof.Muhammad Fahad

Project Manager

Prof.Dr.Muhammad Ilyas

Project Team

Amna Aslam BSCS51F22S038 (TL)
Bushra Bilqees BSCS51F22S041

Submission Date

Oct 6,2025

15-10-2025

Table of Contents

1.Abstract

This project presents a web-based face analyzer that utilizes advanced computer vision and machine learning algorithms to analyze facial features and skin conditions.The platform provides users with personalized insights and recommendations on skincare, makeup, and beauty routine.By leveraging AI-powered analysis, our face analyzer offers a comprehensive and user-friendly experience,empowering individuals to take control of their skin health and beauty.The face analyzer website solves key problems like lack of personalized skincare advice, trial and error approaches, and limited understanding of skin concerns. It addresses these issues by providing recommendations, saving users time and effort.This leads to improved skin health,confidence,and skin well-being.

2.Background and Justification

Advancements in artificial intelligence and computer vision have transformed the way facial analysis is conducted across industries such as dermatology, cosmetology, and healthcare. Despite these developments, many available facial analysis systems are either limited in diagnostic depth or require professional equipment, making them inaccessible to general users. Additionally, existing platforms often lack holistic evaluation and focusing on singular aspects such as acne or wrinkles rather than providing a comprehensive analysis of multiple skin parameters. This gap underscores the need for an accessible, AI-driven solution that delivers accurate, multi-dimensional skin assessments and actionable recommendations.
There are some website also made for this purpose like [1,2,3,4].
To address this need, the proposed **AI Face Analyzer** project aims to develop an intelligent system capable of identifying and analyzing key facial concerns, such as spots, redness, dark circles, dryness, and texture irregularities, while determining the user's skin type through region-based mapping (T-zone and U-zone analysis). The platform will further integrate personalized skincare recommendations, progress tracking, and a skin-age evaluation feature to promote consistent and informed skin management.
By implementing this solution, the project seeks to bridge the gap between professional dermatological expertise and consumer accessibility. It will not only contribute to the advancement of AI-based health technologies but also empower users with an innovative tool to monitor and improve their skin health effectively, aligning with current trends in personalized digital wellness. Researchers have developed various AI skin analysis tools, many website and apps.
Benefits of AI Skin Analyzers:
- Convenience: Accessible online, eliminating the need for clinical visits.
- Accuracy: High accuracy rates, with some tools boasting 95% test-retest reliability.
- Personalization: Tailored skincare advice and product recommendations.
- Early Detection: Identifying skin concerns early, potentially preventing more severe issues.

3.Project Methodology

The development of the AI Face Analyzer will follow a structured and iterative approach grounded in the Machine Learning Life Cycle and Software Development Life Cycle (SDLC) principles. The methodology combines data-driven AI modeling with user-centered interface design to ensure both technical accuracy and usability.

The proposed methodology is based on a Five-Phase Model.

Phase 1: Data Collection and Preprocessing

Dataset Acquisition: Facial image datasets will be obtained from publicly available sources and dermatological databases that contain labeled facial features and skin conditions.

dataset should be tagged by professional or use a pre-tagged dataset?

Data Annotation: Each image will be annotated with specific skin concern labels such as acne, redness, dark circles, or dryness.

Preprocessing: Images will be resized, normalized, and augmented (rotation, brightness adjustment, and noise reduction) to enhance model generalization and accuracy.

Phase 2: Model Development

Feature Extraction: Convolutional Neural Networks (CNNs) will be utilized to automatically extract facial features and texture patterns.

Too many models and frameworks. Narrow the selection

Model Training: The model will be trained to detect multiple facial issues using deep learning frameworks such as TensorFlow or PyTorch.

Skin Type Classification: A region-based analysis (T-zone and U-zone) will be implemented to identify skin types (oily, dry, combination, etc.).

Integration of Additional Modules: Algorithms for skin age estimation and progress tracking will be developed using regression and comparison models.

Phase 3: System Integration

Frontend Development: A user-friendly web interface will be designed using modern web technologies (HTML, CSS, ReactJS) to allow users to upload facial images.

Backend Integration: The trained AI model will be connected to the backend (Python Flask/Django API) for real-time processing and result generation.

Database Management: User profiles, image history, and analysis results will be stored securely using a relational database such as MySQL or Firebase.

Phase 4: Testing and Evaluation

Model Evaluation: The AI model's performance will be evaluated using metrics such as accuracy, precision, recall, and F1-score.

System Testing: Functional, usability, and performance testing will be conducted to ensure smooth operation and accurate output.

User Feedback: Beta testing will be conducted with real users to assess the reliability and interpretability of results.

Phase 5: Deployment and Maintenance

Deployment: The final system will be deployed on a cloud-based platform (e.g., AWS or Azure) for scalability and real-time accessibility.

Continuous Improvement: Feedback-driven updates and retraining of the model will be conducted periodically to maintain accuracy and relevance.

Documentation: Comprehensive system documentation and a user manual will be prepared for project submission and future maintenance.

4.Project Scope

Functional Scope

- Analyze facial images uploaded by users to detect and evaluate multiple skin-related concerns such as acne, dark circles, redness, dryness, oiliness, spots, texture irregularities, and pores.
- Determine the user's **skin type** through region-based (T-zone and U-zone) analysis.
- Estimate **skin age** and track progress over time using stored data for comparison.
- Provide **personalized skincare recommendations** and routine suggestions based on identified conditions.
- Enable **user account creation** for saving results, viewing progress history, and receiving tailored updates.
- Generate comprehensive visual and textual reports for each analysis session.

Project Boundaries

The project will focus exclusively on **facial skin analysis** and **cosmetic-related insights**.
It will **not** include:

- Medical diagnosis or treatment recommendations for skin diseases.
- Real-time video analysis (the system will work with still images only).
- Integration with third-party dermatological equipment or hardware sensors.

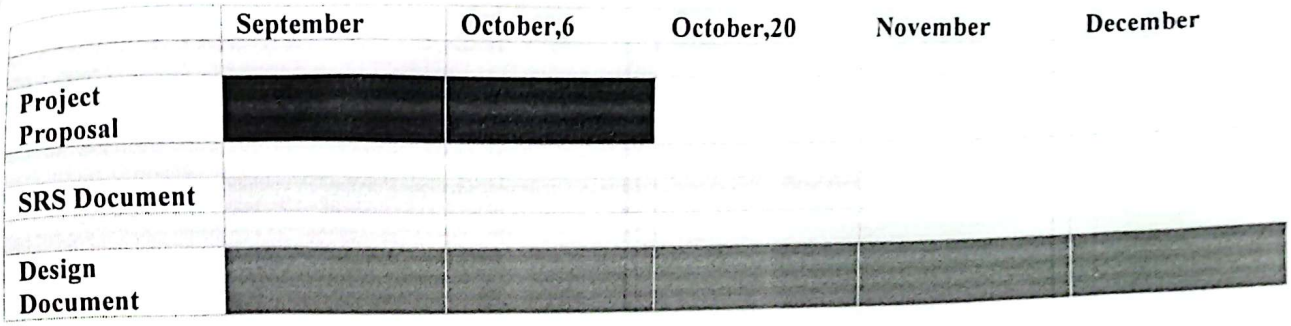
Target Users

The system is intended for:

- **General Users:** Individuals seeking personalized skin analysis and care guidance.
- **Dermatologists and Beauty Consultants:** Professionals who can use the tool for preliminary assessments.
- **Research and Educational Use:** Academic environments exploring AI applications in skincare and facial analysis.

5.High level Project Plan

GANTT CHART



6.References

use standard APA or IEEE style

1. AI skin analysis tool for custom skincare routine | Cetaphil US. (n.d.). https://www.cetaphil.com/us/skin-analysis.html
2. Beauty AR company and makeup AR technology platform. (n.d.-c). https://www.perfectcorp.com/business/showcase/skincare/hd-diagnostics
3. Professional Face analyser. (n.d.). https://pinkmirror.com/
4. Minimalist. (2024, September 30). Skin insights. Minimalist. https://beminimalist.co/pages/skin-insights?srsltid=AfmBOooFTGGrYpKB-izU4nR3prFiXScREoi-7CT0lCI3QGoAOnlYe24X