

**GLOWAI: A DESKTOP-BASED PERSONALIZED SKINCARE COMPANION
USING PYTHON AND TKINTER****R.D. NithyaPriya****Register No: 23105817**Student, Department of Computer Applications, School of Computing Sciences,
Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, India**ABSTRACT**

This paper presents GlowAI, a desktop-based personalized skincare application developed using Python 3 and the Tkinter graphical user interface framework. The system collects four user-specific health and lifestyle parameters and generates a complete five-step skincare routine across three budget tiers (Low, Mid, and High), encompassing a curated database of sixty products across four skin types. A core analytical feature, the Skin Wellness Score, computes a dynamic 100-point metric from hydration ratio, sleep adequacy, and acne severity. The application also provides natural home remedy suggestions for all four skin types, a visual AM/PM routine summary, and a downloadable PDF GlowPlan report generated using the FPDF library. The system operates fully offline and employs a Pinterest-inspired aesthetic user interface. Experimental evaluation confirms that the system correctly generates personalized routines for all 12 skin type and budget combinations, and the Skin Wellness Score accurately reflects user health inputs.

Keywords:

Personalized Skincare, Python, Tkinter, Skin Wellness Score, FPDF, Desktop Application, Home Remedies, Budget-Aware Recommendation, GUI Development, Pillow (PIL).

INTRODUCTION

GlowAI is a desktop-based personalized skincare application developed using Python and the Tkinter graphical user interface framework. The system is designed to address the growing need for accessible, individualized skincare guidance by leveraging user-provided health and lifestyle data to generate customized skincare routines. Unlike generic skincare advice found online, GlowAI tailors every recommendation to the specific user, considering their unique skin profile, daily hydration levels, sleep quality, and acne severity.

In today's era of information overload, individuals often struggle to identify skincare products and routines genuinely suited to their needs. Factors such as skin type, budget constraints, acne level, and daily wellness habits play a critical role in determining effective skincare practices. Existing digital tools tend to offer overly generalized advice or require expensive professional consultations.

GlowAI bridges this gap by providing a smart, fully offline, and budget-aware solution. The application computes a dynamic Skin Wellness Score, generates a five-step skincare routine across three budget tiers, provides natural home remedy suggestions, and exports a personalized PDF GlowPlan report — all within an elegant, Pinterest-inspired graphical desktop interface.

OBJECTIVES

The main objectives of this project are:

- To design and develop a desktop skincare application using Python and Tkinter
- To collect and process user-specific skin profile data including skin type, acne level, water intake, and sleep hours
- To generate a five-step personalized skincare routine across three budget tiers
- To compute a dynamic Skin Wellness Score on a 100-point scale
- To provide natural home remedy suggestions tailored to each skin type
- To generate a downloadable, professionally formatted PDF GlowPlan report
- To design an elegant, Pinterest-inspired user interface with a calming aesthetic

METHODOLOGY

GlowAI follows a single-tier monolithic desktop application architecture. All components — user interface, business logic, and data — reside within a single Python script. The system does not require internet connectivity and operates entirely offline. Data is stored in Python dictionary structures within the application code.

The application follows a sequential four-screen workflow:

- Screen 1 — Login: User enters their name for a personalized experience
- Screen 2 — Skin Profile Input: User provides skin type, acne level, water intake, and sleep hours
- Screen 3 — Loading: An animated screen processes the inputs (2.6 seconds)
- Screen 4 — Results Dashboard: Displays full routine, wellness score, hydration tracker, acne tip, and home remedies

A. System Modules

The Skin Wellness Score Engine computes a dynamic 100-point score from three components: Hydration Score (max 40 pts) = $\min(\text{water_intake} / 3.5, 1.0) \times 40$; Sleep Score (max 40 pts) = $\min(\text{sleep_hours} / 8.0, 1.0) \times 40$; Acne Score (max 20 pts): None=20, Low=15, Medium=8, High=2. The total score determines a wellness grade: 85–100 (Glowing, Radiant, Thriving), 70–84 (Very Good), 50–69 (Good), 30–49 (Needs TLC), 0–29 (Begin Your Glow Journey).

The Routine Generator retrieves a five-step skincare routine from the internal product database using the user's skin type and selected budget tier. The database contains 60 curated products organized as: 4 skin types \times 3 budget tiers \times 5 routine steps. The five steps are: Face Wash, Toner, Serum, Moisturizer, and Sunscreen.

The Home Remedies Module presents three natural care recommendations per skin type: a DIY Face Mask, a Weekly Scrub, and a Night Care suggestion. The PDF Export Module uses the FPDF library to generate a professionally formatted GlowPlan document containing all user data, wellness metrics, routine, and home care tips.

B. Hardware & Software Requirements

- Operating System: Windows 7/10/11 (64-bit)
- Minimum 2 GB RAM, 100 MB free disk space
- Python 3.8 or higher
- Tkinter (included in Python standard library)
- Pillow (PIL) library — version 9.0 or higher
- FPDF library — version 1.7.2 or higher

RESULTS AND DISCUSSION

GlowAI was tested using manual black-box testing across all four skin types and three budget tiers, resulting in 12 complete test runs. Each run verified correct product names, correct acne tips, and correct home remedy content. All 12 test runs produced correct results. The Skin Wellness Score was verified across multiple input combinations and consistently produced accurate scores and grades.

Table 1: GlowAI vs. Existing Skincare Systems (Table name center align, Bold Italic)

Feature	Existing Systems	GlowAI
Personalization	Skin type only	4 parameters
Budget Awareness	Not provided	3 tiers: Low/Mid/High
Wellness Integration	Not used	Water + Sleep + Acne
Internet Required	Mostly required	Fully offline
Home Remedies	Not provided	All 4 skin types
PDF Export	Not available	Full GlowPlan
Cost	Subscription-based	Free

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The table above demonstrates that GlowAI offers significant advantages over existing skincare solutions by combining multi-parameter personalization, budget-tier filtering, wellness integration, and offline operation — features unavailable in competing systems.

The hydration progress bar, implemented using nested Tkinter Frame widgets, accurately reflects the user's daily water intake as a percentage of the 3.5-litre goal. Budget switching via radio buttons updates all five product labels instantly without any screen reload, confirming the efficiency of the StringVar-based update mechanism.

ADVANTAGES OF THE SYSTEM

- Fully personalized skincare routines based on four individual parameters simultaneously
- Three-tier budget system (Low, Mid, High) covering diverse financial backgrounds
- Dynamic Skin Wellness Score that quantifies lifestyle impact on skin health
- Natural home remedy suggestions as complement to commercial product routines
- Fully offline operation — no internet connectivity required
- Downloadable PDF GlowPlan report for offline reference and sharing
- Pinterest-inspired aesthetic UI with warm muted palette and Georgia serif typography
- Comprehensive error handling for invalid inputs and missing image files
- Lightweight dependencies — only Pillow and FPDF require external installation

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CONCLUSION

GlowAI represents a meaningful contribution to the field of personal wellness technology. By collecting four user-specific parameters and applying structured skincare logic, the system generates a complete personalized skincare experience including a five-step routine, a 100-point Skin Wellness Score, natural home remedy suggestions, and a downloadable GlowPlan PDF report. The application demonstrates that thoughtful software engineering, domain-specific knowledge, and user-centric design can produce a practically impactful academic project.

The system is simple, efficient, and fully offline, making it suitable for real-world deployment and future enhancement. Future work includes machine learning-based skin type detection from camera images, mobile application development using the Kivy framework, and integration with e-commerce APIs for real-time product pricing.

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