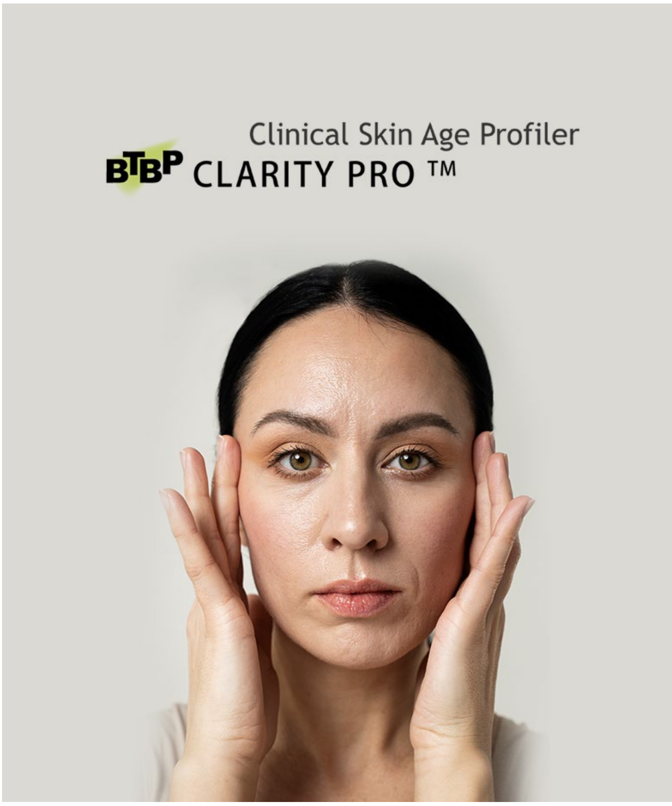
BTBP Clinical Skin Age Profiler

AI -Driven Classification & Quantification of Visible Skin Aging



Summary

The BTBP Clinical Skin Age Profiler merges BTBP's scientifically validated AI models with multispectral imaging to deliver a reliable, data-driven measure of visible skin aging.

With clinically grounded biomarkers, international diversity in training data, and proven reproducibility, it sets a new benchmark for quantitative skin health assessment.

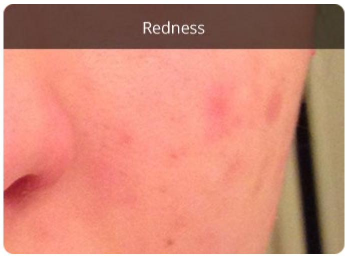
The **BTBP Clinical Skin Age Profiler** is a next-generation AI module that delivers a single, objective **Skin Age Index**—a quantitative measure of visible skin health derived from **multispectral imaging** and **dermatologist-validated biomarkers**.

This technology transforms skin evaluation into a reproducible, evidence-based measurement suitable for clinical, research, and consumer applications.

Authors: Ashutosh Chhibber, CTO, BrighTex Bio-Photonics LLC,

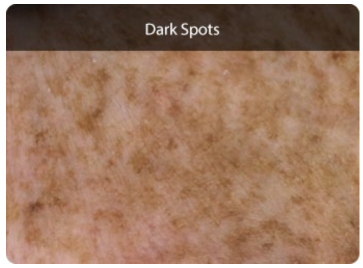
Clinically Relevant Biomarkers

The Profiler quantifies seven key dermatological indicators that most strongly correlate with visible aging:



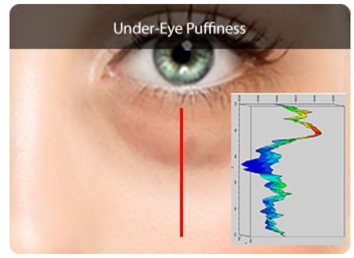
Redness

Inflammation and vascular reactivity



Dark Spots

Hyperpigmentation and UV damage

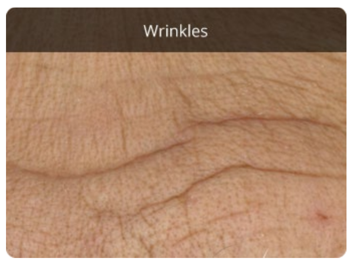


Under-Eye Puffiness

Dermal swelling and laxity

Skin Texture

Surface roughness and micro-relief

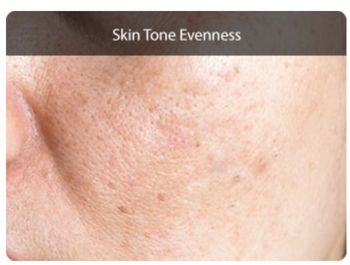


Wrinkles

Fine and deep line analysis

Visible Pores

Pore size and prominence



Skin Tone Evenness

Color uniformity and blotchiness

Each parameter is independently analyzed and combined into a unified **Skin Age Index**, benchmarked against age-calibrated spectral reference curves.

AI Foundation and Model Training

Sample Data:

Subject	Actual Age	Chronological Age AI	Skin Age AI
1	53	55	51
2	44	38	44
	56	52	64
3	43	37	44
	53	54	43
4	23	30	33
5	25	28	28
	36	33	41
6	34	29	31
	43	36	42
	43	38	41
7	48	36	41
8	26	26	35
	40	31	35
9	24	23	33
10	31	29	37
11	45	37	42
12	47	43	49
13	26	27	37
14	24	24	26
15	20	22	26
16	40	44	31
17	23	21	26
	32	22	31

Contributor: Uday Shankar Pantangi

The Skin Age model was developed using a dataset of **over 4,000 images**, representing **an equal distribution of subjects from Europe, the U.S.A., and East Asia** emphasizing diverse **Fitzpatrick skin types (I–VI)** and **age representation over 35 years**, ensuring robust and inclusive performance. Each image was paired with the subject's **biological age**, allowing researchers to determine how **15 DeepTag skin measurements** could be optimally combined to estimate skin age.

The resulting model achieved a **0.8 Pearson correlation** with biological age on an **independent validation set of 800 images**, demonstrating strong predictive performance and generalizability across skin tones and ethnicities.

Reliability and Reproducibility

The system ensures high reproducibility through:

- **Standardized multispectral illumination and calibration**
- **<3% intra-subject variance** across repeated captures
- **Stable performance** across diverse skin tones and lighting conditions

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Applications

- **Dermatology & Aesthetic Clinics:** Track treatment outcomes with objective metrics
- **Cosmetic R&D:** Validate anti-aging formulations and claims
- **Consumer Devices & Apps:** Enable real-time, privacy-safe selfie-based skin assessment

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