CitiusTech
Shaping Healthcare Possibilities

Developed a ML-based Face Morphing & Age Progression Application for a Leading Biopharma Company

Business Challenge

The client is a leading US-based bio-pharmaceutical company focusing on specialty medicines and treatments. They wanted to provide their customers with an easy-to-use application helping them make informed decisions on skin treatments. To meet this requirement, the client needed to develop an algorithm that could localize subtle discontinuities/cracks in skin texture, caused by wrinkles, across various skin surfaces and skin tones.

The algorithm created was based on a deterministic approach, incorporating prior knowledge of wrinkles, and other factors, to generate a progression timeline with significant accuracy.

CASE STUDY

CITIUSTECH SOLUTION

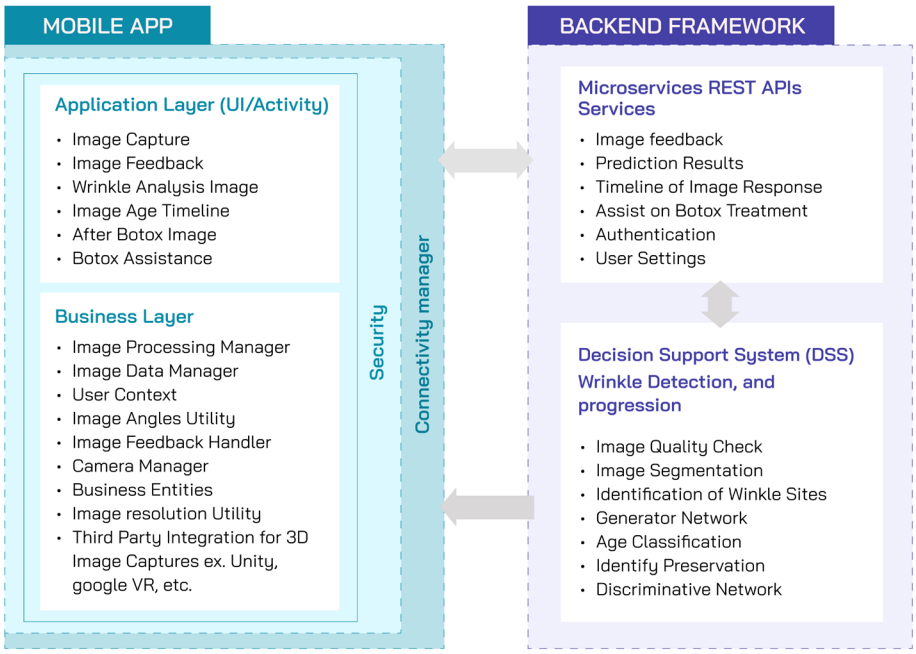
CitiusTech put together a team of domain-experts, data scientists, mobile developers, QA specialists and AI engineers to develop a mobile application and integrate it with the clients back-end services using Machine Learning (ML) APIs.

The team utilized public data-sets with clustering-based ML algorithms and statistical concepts for wrinkle measurement, pre-trained models for facial landmark detection, and GAN based models for age progression functionality.

Solution highlights included:

- An iOS mobile application was developed and tested for face morphing. The mobile app had the ability to capture face image, show wrinkle analysis and provide face-image timelines
- Images were pre-processed on mobile using iOS APIs to control brightness, face angles, distance from camera, etc.
- A Python Flask framework was used to integrate the ML functionality to the application.
- The region-of-interest detection algorithm achieved 90% accuracy, proven over 60+ unique images. The IOU (Intersection over union) concept was used for evaluation.
    - HDBSCAN clustering based algorithm, OpenCV filters were used for accurate wrinkle-scale measurement.
    - Scale detection model was used to classify the glabellar region wrinkles into 4 classes based on severity.
    - Random Forest classifier along with Gabor features was used to accomplish hyper parameter tuning, using sklearn library.

SOLUTION SCHEMATIC



VALUE DELIVERED

Enabled patients to self-analyze wrinkle-stage and seek medical advice for treatment through remote consultation

Leveraged a predictive algorithm to show age-progression images and improve outcomes

Removed prediction bias by evaluating models against industry standard fairness metrics

Provided an integrated solution for patient engagement, that focused on user empowerment and satisfaction

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