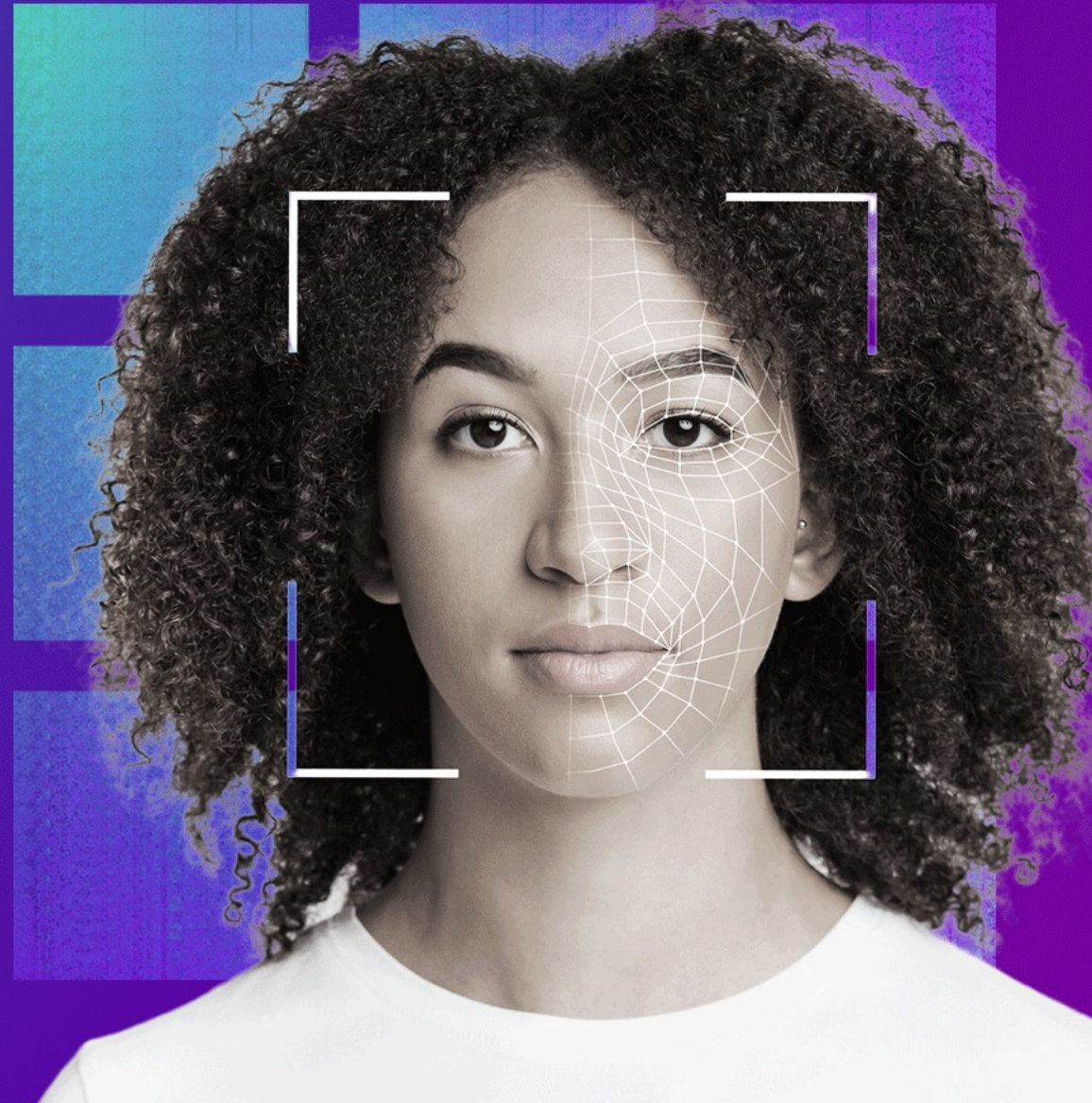


Developed a ML-based Face Morphing & Age Progression Application for a Leading Biopharma Company





Client Requirement

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.

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.

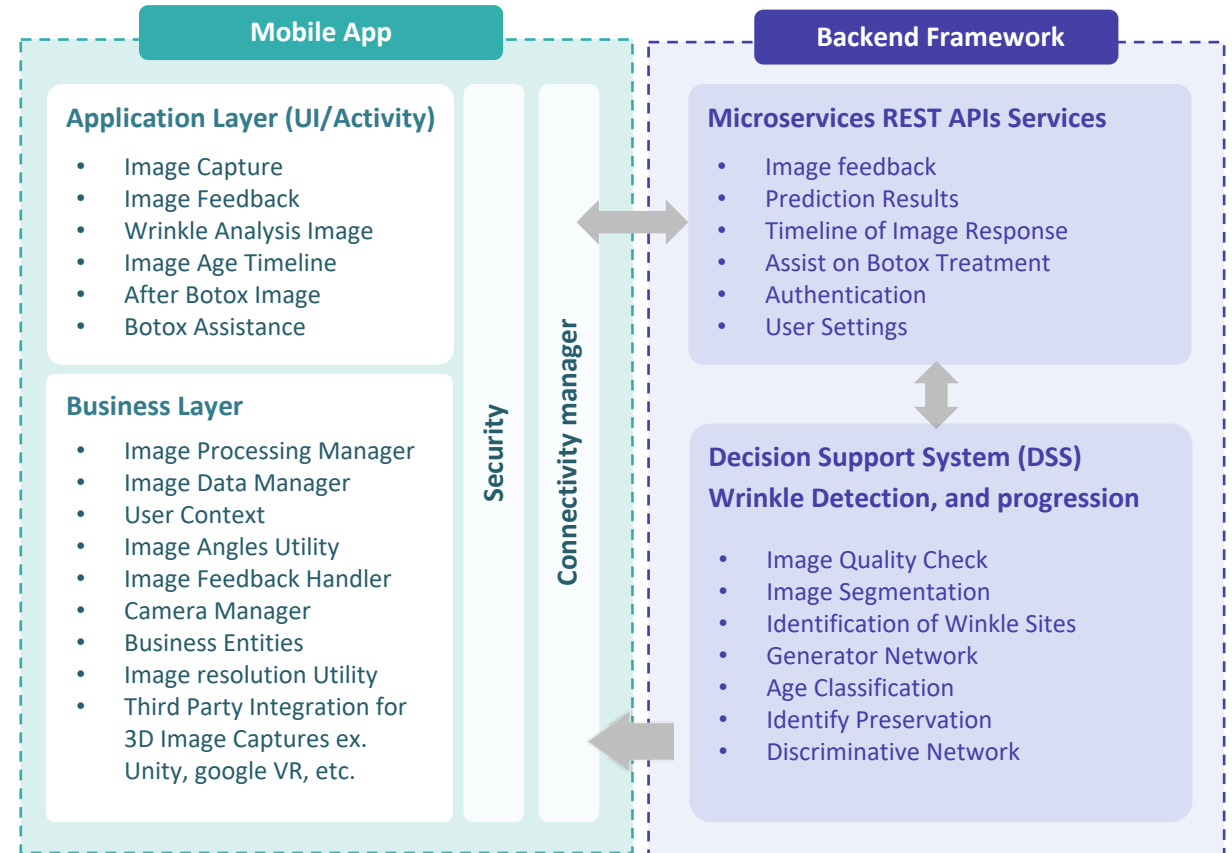
The team utilized public data-sets with clustering-based ML algorithms and statistical concepts for wrinkle measurement, pre-trained models for facial landmark detection, and GAN based models for age progression functionality.

Solution Highlights

- 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.

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



Solution Architecture

A woman in a lab coat and blue gloves is examining a patient's face in a clinical setting. The patient is wearing a white headband and a white lab coat. The background is a blurred laboratory or clinic with shelves and equipment. The image has a blue and purple color overlay.

CitiusTech

Our vision is to inspire new possibilities for the health ecosystem with technology and human ingenuity. At CitiusTech, we constantly strive to solve the industry's greatest challenges with technology, creativity, and agility. Together with the world's leading Healthcare and Lifesciences organizations and our partners, we aim to accelerate the transition to a human-first, sustainable, and digital healthcare ecosystem.

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