Smart Face Age Editing with GANs

NAME - Warade Atharv Abhijit
ROLL NO - 2022582
TRACK - Engineering
EMAIL - warade22582@iiitd.ac.in
COURSE - CSE344 / Computer Vision

INDRAPRASTHA INSTITUTE *of*
INFORMATION TECHNOLOGY
DELHI

Problem Statement, Scope and Users

- **Goal:** Create an AI-based system that performs realistic aging and de-aging of faces based on user-selected age bins (e.g., 21–30, 61–70).
- **Input:** Face image + target age bin.
- **Output:** Same face transformed to the selected age range.
- **Interface:** Web app with upload + dropdown for age selection.
- **Users:** Public, VFX studios, forensics, digital creators.

Related Work – StarGAN v1

- **Single generator for multi-domain translation.**
- Uses one-hot domain labels for changing the characteristics of the person in the photo.
- Employs:
    1. Adversarial Loss
    2. Domain Classification Loss
    3. Cycle Consistency Loss
- **Pros:** Identity preservation, simple architecture, lightweight.
- **Gap:** Only one style per domain; limited diversity.

Related Work – StarGAN v2

- Adds **style diversity** per domain.
- Supports reference-guided and latent-guided outputs.
- Drops cycle consistency, uses perceptual & style losses.
- **Pros:** More realism and diversity.
- **Cons:** Heavier model, less control over identity, complex to train.

Baseline Chosen – StarGAN v1

Why v1?

- One-hot age bin control fits project perfectly.
- Cycle consistency aids identity retention.
- Works well with limited compute (Colab + 4GB RTX 3050).

Not using v2 due to complexity and lack of identity guarantees.

Dataset and Evaluation Metrics

Dataset: IMDB-WIKI with ~500k images and their age

Preprocessing: Divided into 10 age bins and reduced number of images (~21k), MTCNN-aligned, resized to 128×128.

Evaluation:

- FID Score
- Identity preservation
- Cycle Consistency Loss
- Identity Loss-based consistency
- Age classification accuracy (optional)

Data Preprocessing

- Divided the dataset into 10 age bins

Age Group	Number of Images
0–10	2,000
11–20	3,000
21–30	3,000
31–40	3,000
41–50	2,000
51–60	3,000
61–70	2,000
71–80	1,500
81–90	1,000
91–100	246

Preprocessing Steps:

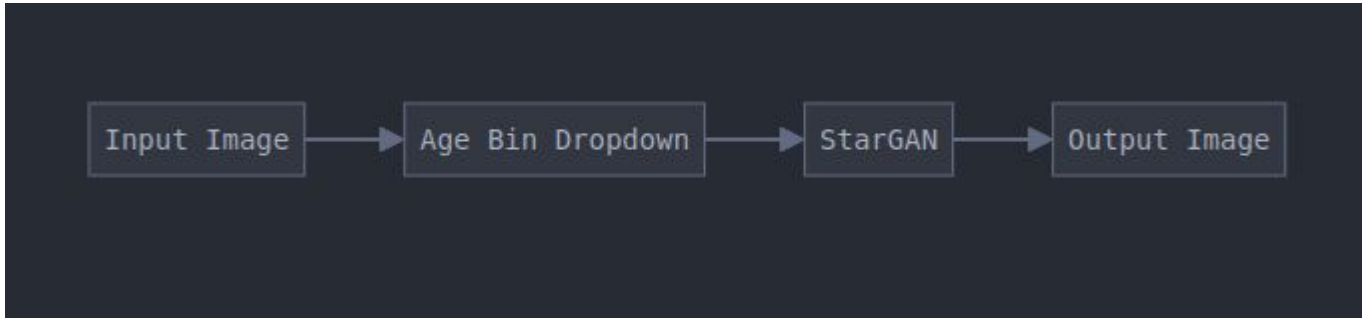
- All images aligned using **MTCNN**
- Resized to **128x128** resolution. (Will try on 256x256 if time allows)
- Balanced across bins to reduce age-related bias

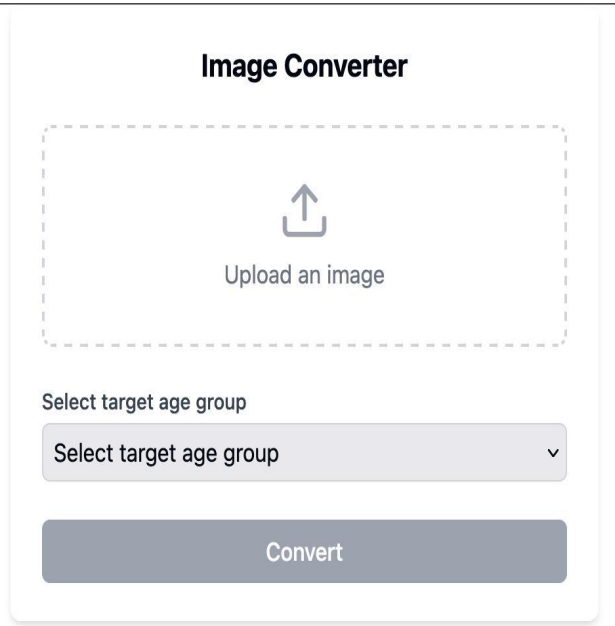
System Design (UI + Backend)

Frontend: React.js + Tailwind CSS

Backend: FastAPI

Pipeline:





Progress:

- UI & dropdown done
- API in progress

Work Done and Next Steps

Completed:

- Data collection and binning
- UI setup
- StarGAN architecture adaptation

Ongoing:

- Creating StarGAN Architecture

Next Steps:

- Full model training on balanced dataset
- Complete frontend-backend integration
- (Optional) Add age classifier for output verification

Feedback

- **Backup Plan:** Prepare an alternative approach in case StarGAN or similar GANs fail to generate desired aging results.

- **Training Timeline:** Begin training early to allow time for resolving common GAN training challenges and instability issues.