

Smart Face Age Editing with GANs

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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 (ArcFace embeddings)
- 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

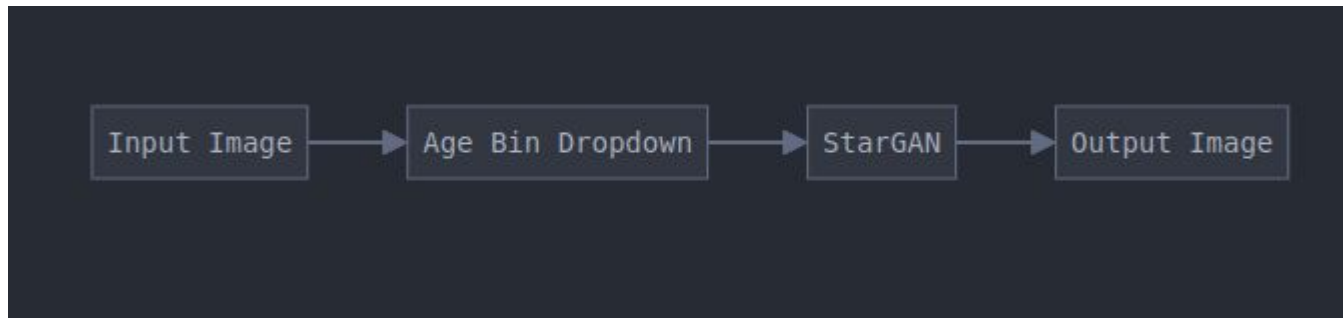
System Design (UI + Backend)



Frontend: React.js + Tailwind CSS

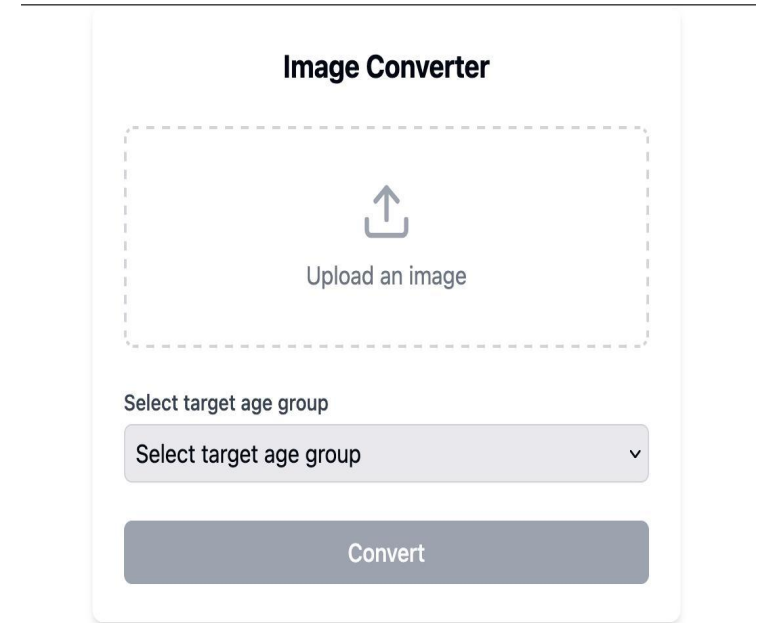
Backend: FastAPI

Pipeline:



Progress:

- UI & dropdown done
- API in progress
- Preprocessing pipeline in development



Work Done and Next Steps



Completed:

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

Ongoing:

- Training & evaluation

Next Steps:

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

