



Optimization of Cartoon Face Conversion Algorithm Based on Facial Emotion Analysis

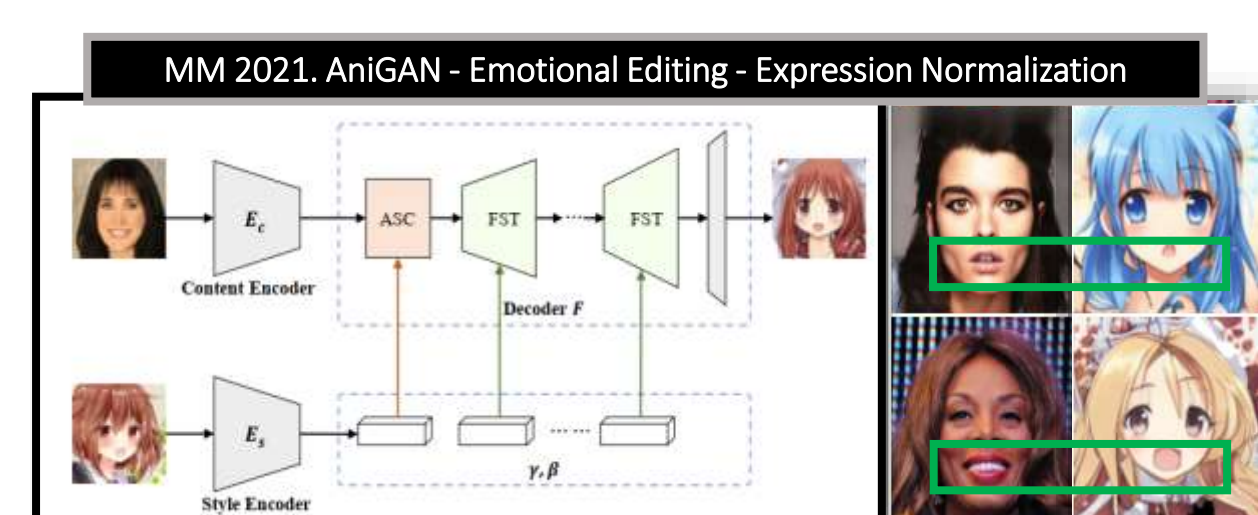
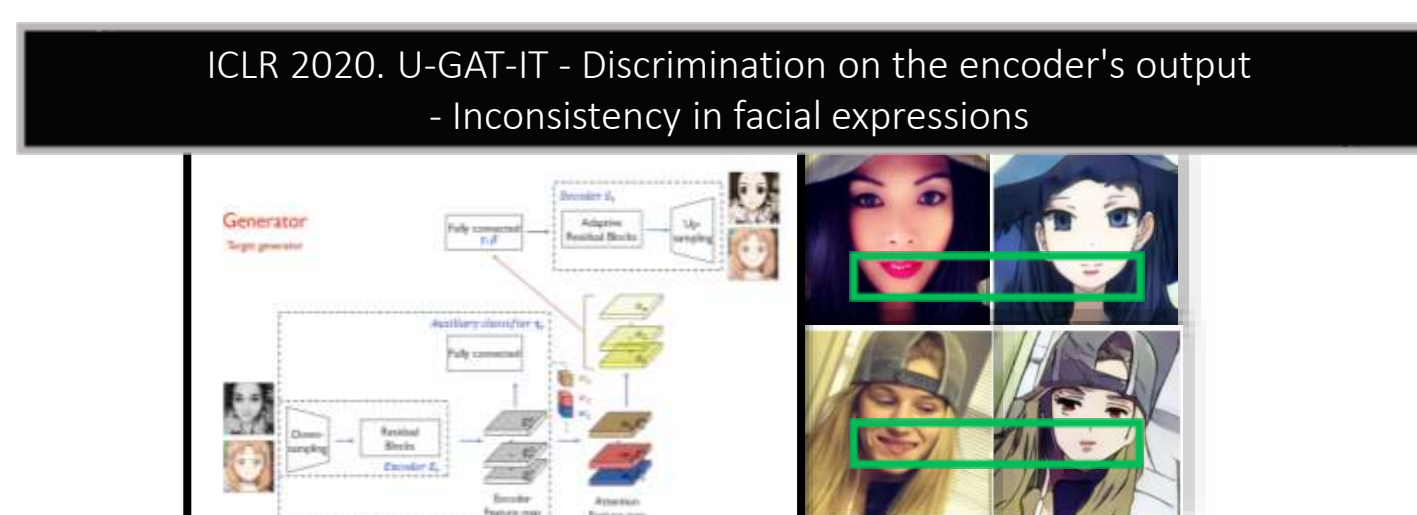
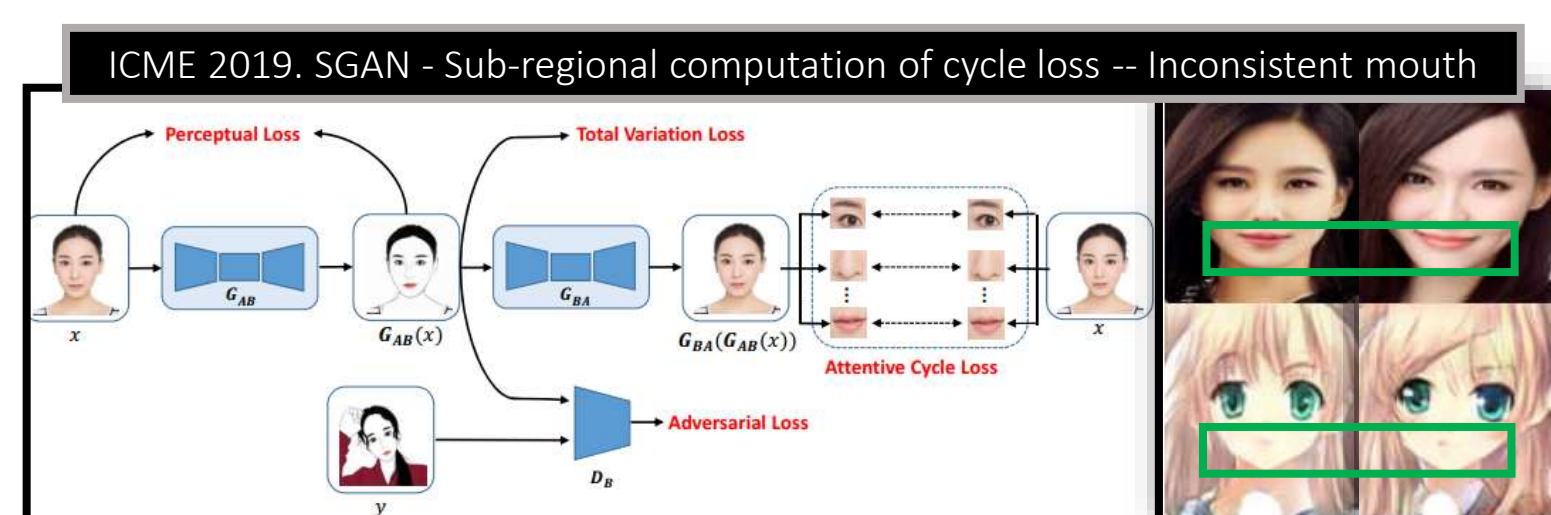


Introduction

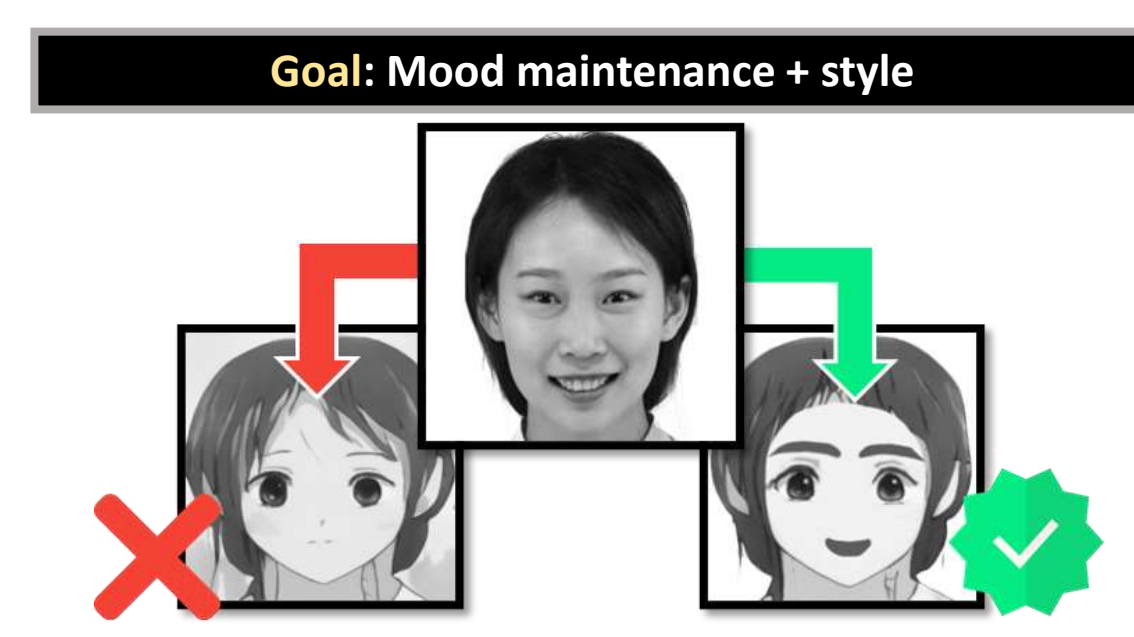
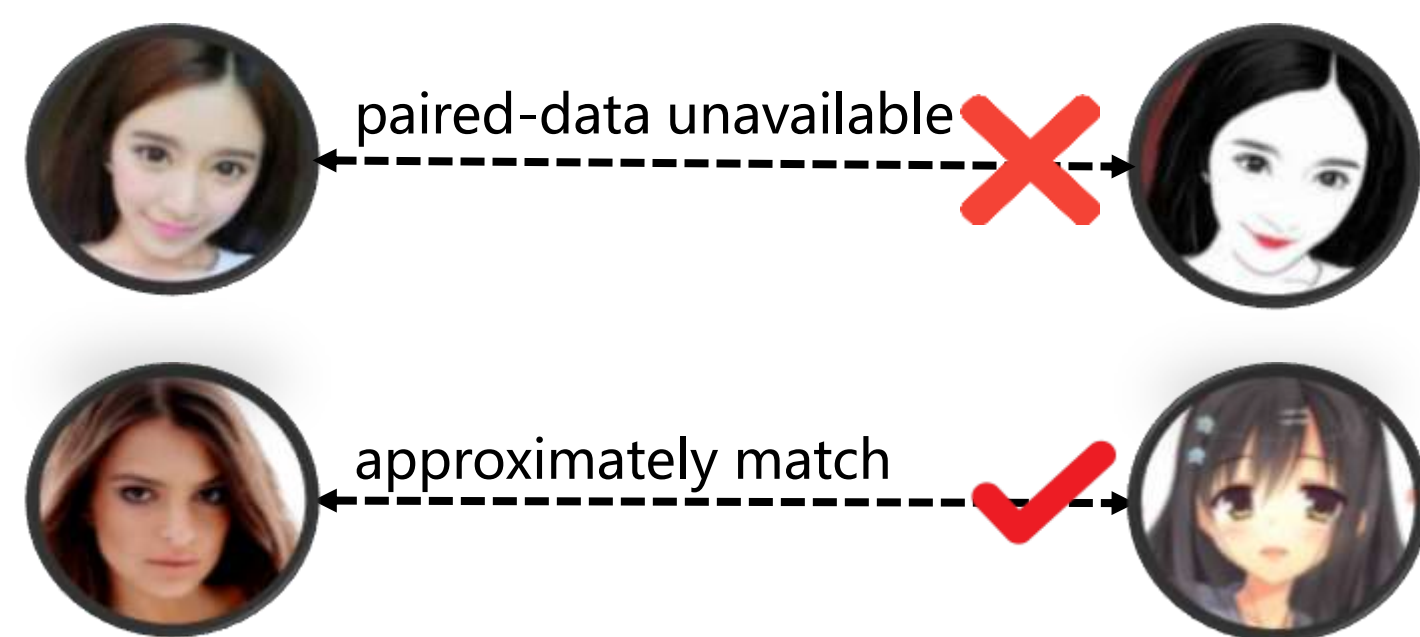
From 'virtual agents' to the 'metaverse,' algorithmically generated cartoon characters are becoming ubiquitous, offering vivid expressions for delightful emotional experiences. However, mainstream algorithms in 'human-to-cartoon facial image style transfer' often lose local features, hindering emotion recognition. This project aims to enhance this process by preserving and emphasizing facial expressions, ensuring the retention or amplification of emotional features and arousal levels.

Algorithm Research · Challenges

Algorithmic Approach: Challenges in Maintaining Facial Expression Consistency and Model Diversity Loss



No paired data · Large transformation deformation



Innovative Approach · Module Design

Backbone

U-GAT-IT: Building upon cycleGAN, activates the output of the encoder.

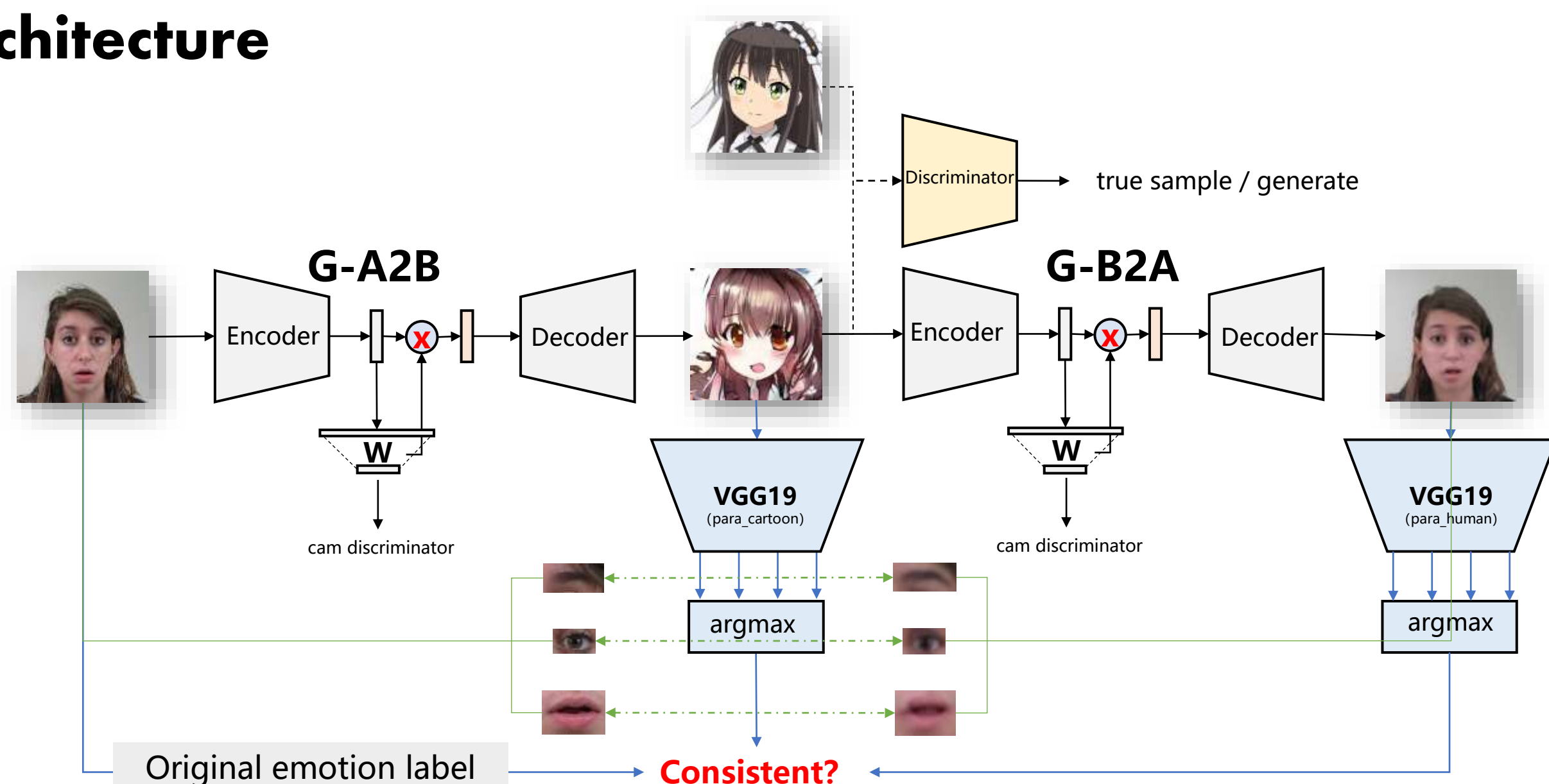
Emotion Constraint

Conducting emotion recognition on generated cartoon faces and cycled real faces to serve as network constraints.

Facial Region Segmentation

Segmenting facial features, recording corresponding key points, and ultimately calculating cycle loss on a per-region basis.

Architecture



Data Selection · Generation Results

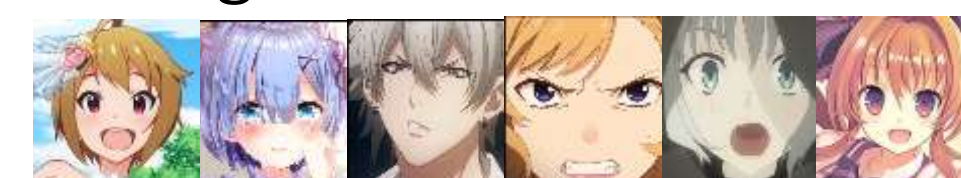
Human Dataset

The dataset provided by the Emotion Net Facial Expression Recognition Competition.



Cartoon Dataset

Search on Google and Pixiv based on emotion categories.



Facial Expression Recognition Module Performance

Designed a classifier based on the VGG19 to classify 'Happy,' 'Angry,' 'Sad,' and 'Fear.' Achieved accuracy rates exceeding 90% for real faces and over 80% for cartoon faces.

Generated Pictures

