



# Facial Image Generation with StyleGAN (Generative Adversarial Network )

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# PROJECT TITLE



## Facial Image Generation with StyleGAN



# AGENDA

- Problem statement
- Project Overview
- Who Are The End Users
- Solution and Value Proposition
- The WOW in Your Solution
- Modelling
- Result
- Evaluation
- conclusion



# PROBLEM STATEMENT

- For generating high control on facial images, lack precise control over specific facial features and a clear understanding of the underlying latent space that governs image generation.
- Additionally, ethical considerations regarding privacy and consent are pertinent.



# PROJECT OVERVIEW

- Our project focuses on leveraging StyleGAN, a cutting-edge generative model, to advance facial image generation capabilities.
- We aim to tackle challenges such as precise attribute control, identity preservation, diversity enhancement, and ethical considerations.
- By implementing StyleGAN and developing innovative techniques, we seek to generate high-quality facial images with fine-grained control over attributes while addressing ethical concerns surrounding privacy and consent.



# WHO ARE THE END USERS?

- Biometrics and Security Agencies.
- Fashion and Beauty Brands.
- Healthcare and Medical Research.
- Entertainment Industry
- Virtual Reality and Augmented Reality

# YOUR SOLUTION AND ITS VALUE PROPOSITION



- ❑ Our solution involves using StyleGAN, an advanced generative model, to create highly realistic facial images.
- ❑ This technology allows for precise control over various facial attributes like age, gender, and expression, resulting in lifelike images that closely resemble real human faces.
- ❑ The value proposition of our solution lies in its versatility and potential applications across different industries.

# THE WOW IN YOUR SOLUTION



- Our solution captivates audiences and enhances user engagement.
- Our solution utilizes StyleGAN to generate facial images that exhibit an unprecedented level of realism, closely resembling actual photographs.
- StyleGAN-generated facial images can bolster facial recognition systems, aid in forensic analysis, and enhance security measures by providing highly accurate and customizable facial data.





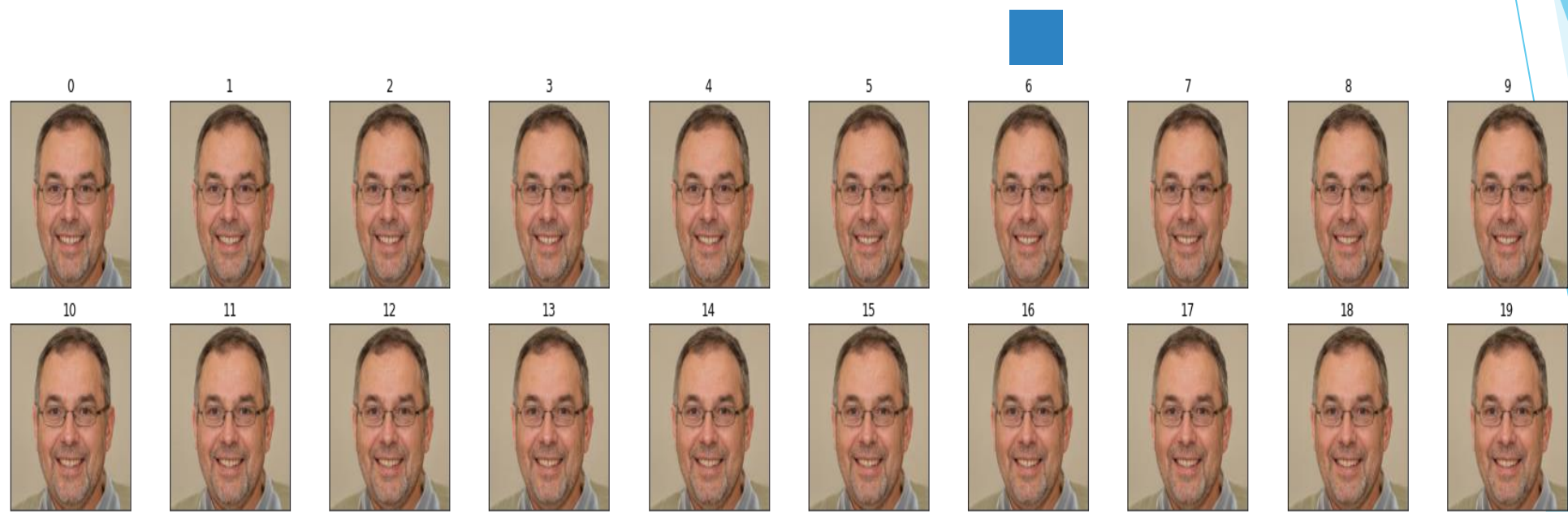
# MODELLING

- **Data Collection:** Gathering a diverse dataset of labeled facial images to train the StyleGAN model. The dataset should encompass various demographics, poses, expressions, and lighting conditions to ensure robustness and generalization.
- **Data Preprocessing:** Preparing the facial image dataset for training by standardizing image sizes, cropping faces, and applying any necessary image enhancements or corrections to ensure consistency and quality.
- **Training:** Training the StyleGAN model on the prepared dataset to learn the underlying patterns and features of facial images. This involves optimizing the model's parameters through iterative forward and backward passes to minimize the discrepancy between generated and real images.

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- **Fine-Tuning:** Fine-tuning the trained StyleGAN model to improve specific aspects of facial image generation, such as attribute control, diversity, or identity preservation. This may involve adjusting hyperparameters, modifying loss functions, or incorporating additional training data.
- **Evaluation:** Evaluating the performance of the trained StyleGAN model using quantitative metrics such as inception score or Fréchet inception distance, as well as qualitative assessment through visual inspection of generated images.
- **Deployment:** Deploying the trained StyleGAN model for practical use cases, such as generating facial images for applications in entertainment, marketing, security, or healthcare.

# RESULTS



# Evaluation

**1.Quantitative Metrics:** Assessing image quality using metrics like Inception Score (IS) and Fréchet Inception Distance (FID) to measure realism and diversity.

**2.Qualitative Assessment:** Visual inspection by human evaluators to gauge realism, diversity, and fidelity to real facial characteristics.

**3.Attribute Control:** Evaluating the system's ability to manipulate specific facial attributes accurately and effectively.

**4.User Experience:** Considering ease of use, interactivity, and user-friendliness for seamless operation.

**5.Ethical Considerations:** Ensuring privacy, addressing biases, and promoting fairness in image generation.

# CONCLUSION

- Our project successfully developed a style Generative Adversarial Network(GAN)-based system for facial image generation
- Facial image generation with StyleGAN represents a significant advancement in computer vision technology, offering remarkable capabilities in creating highly realistic and diverse facial images.
- StyleGAN enables the generation of lifelike images that closely resemble real photographs, with fine-grained manipulation of facial characteristics such as age, gender, expression, and ethnicity
- This technology opens up a wide range of possibilities across industries, including entertainment, fashion, healthcare, security, and education.