

AUTOENCODER FOR IMAGE COMPRESSION USING GAN (GENERATIVE ADVERSARIAL NETWORK)

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AUTOENCODER IMAGE COMPRESSION USING GAN

Autoencoder:

- Image compression and reconstruction using autoencoders.
- Deep learning architectures for unsupervised learning.
- Dimensionality reduction and feature extraction.

Generative Adversarial Network (GAN):

- Generative modeling and image generation using GANs.
- Adversarial training and optimization.
- Unsupervised learning for image synthesis.

AGENDA

- Introduction
- Problem Statement
- Project Overview
- Modeling
- Evaluation
- Conclusion



PROBLEM STATEMENT

- Image compression is essential for efficient storage and transmission of images in various applications.
- Traditional compression methods may lead to loss of important visual details.
- There's a need for more advanced techniques that can compress images while preserving essential features.



PROJECT OVERVIEW



- **Objective:** To develop an autoencoder-based image compression system using Generative Adversarial Networks (GANs).
- **Approach:** Utilize autoencoders to compress images into a lower-dimensional representation, and employ GANs to generate high-quality images from the compressed representation.
- **Significance:** This approach combines the benefits of efficient image compression with the ability to generate realistic images, offering a novel solution for various applications.



WHO ARE THE END USERS?

- Researchers and practitioners in the field of computer vision and image processing.
- Developers and engineers working on applications that involve image compression, reconstruction, or generation.
- Enthusiasts or hobbyists interested in deep learning and artificial intelligence.

YOUR SOLUTION AND ITS VALUE PROPOSITION



Innovative Compression:

Our approach combines autoencoder-based compression with GANs, ensuring efficient data reduction while preserving image quality.

Quality Preservation:

By leveraging GANs, we maintain high visual fidelity in reconstructed images, overcoming the limitations of traditional compression methods.

Adaptability and Versatility:

Our solution is adaptable to various image types and can be tailored to specific compression needs, making it suitable for diverse applications.

Practical Applications:

With minimal loss of quality, our method facilitates image storage, transmission over limited networks, and enhances data utilization in machine learning.

THE WOW IN YOUR SOLUTION



- The ability to compress images using autoencoders while preserving important features.
- Leveraging the power of GANs to generate high-quality, realistic images.
- Potential applications in various domains such as data compression, image editing, and artistic image generation.
- Demonstrations of visually appealing generated images and accurate reconstructions.



MODELLING

- **Autoencoder Architecture:**
 - Autoencoders are selected for their capability to learn compact representations of data.
 - Our architecture is designed to efficiently encode and decode input images.
- **Data Preprocessing:**
 - Preprocessing steps are applied to enhance data quality and model robustness.
 - Techniques such as normalization ensure uniformity across features.
 - Image resizing and augmentation techniques are utilized to increase dataset diversity.
- **Training Process:**
 - The dataset is partitioned into training and testing sets to assess model performance.
 - Model parameters are initialized, and optimization algorithms are selected.
 - Training iterations and batch sizes are optimized to enhance model convergence and efficiency.

RESULTS

Epoch 2000, Discriminator Loss: 0.0037922323681414127, Generator Loss: 8.99685287475586
1/1 [=====] - 0s 25ms/step

Epoch 9300, Discriminator Loss: 0.2715258002281189, Generator Loss: 2.9560341835021973
1/1 [=====] - 0s 42ms/step

