ARIA
APPLIED RESEARCH IN ACTION

Latent DeepFakes: Fast High-Resolution Face Swap

Autoencoder based DeepFake face swap trained in Stable Diffusion latent space with reduced identity leakage using Vector Quantization layers.

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PROJECT SUMMARY

The DeepFakes technologies are applied immensely in the movie VFX industries, where actors' faces are replaced onto the stuntsmen in the movie shots. Recent Deepfakes pipeline like DeepFaceLab[1] can achieve high-fidelity face swaps between two identities, but the training is costly to produce movie-resolution image generation. In this research paper, we present a novel approach to deepfake generation that adopts DeepFaceLab as the underlying framework. Our research focuses on improving the training efficiency, image quality, and stability of the deepfake generation process. Leveraging a stable diffusion[2] Variational Autoencoder (VAE) as the core architecture, we enhance the latent space representation, resulting in higher-quality deepfake content with reduced artifacts. Notably, our method enables high-resolution deepfake training in a significantly shorter timeframe, facilitated by the efficient latent space. Additionally, we propose a stable diffusion pipeline that optimizes image generation, addressing challenges in maintaining coherence and fidelity. Our experimental results underscore the efficacy of our approach in enhancing deepfake generation, offering advancements in training efficiency, image quality, and stability within the deepfake creation process.

REFERENCES

[1] Ivan Perov, Daiheng Gao, Nikolay Chervoniy, Kunlin Liu, Sugasa Marangonda, Chris Umé, Mr. Dpfks, Carl Shift Facen-heim, Luis RP, Jian Jiang, Sheng Zhang, Pingyu Wu, Bo Zhou, and Weiming Zhang. Deepfacelab: Integrated, flexible and extensible face-swapping framework, 2021
[2] Robin Rombach, Andreas Blattmann, Dominik Lorenz, Patrick Esser, and Björn Ommer. High-resolution image synthesis with latent diffusion models, 2022

DNEG

Computer Science
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Master of Science in
Applied Computing