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VisionGen 3D: A Deep Learning Framework for Animation and Image Enhancement

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Abstract: *The field of 3D animation is experiencing a significant transformation driven by deep learning advancements. This paper introduces a robust and scalable system that automates 3D facial animation from a single static image, utilizing Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs). The system is optimized for real-time deployment on cloud platforms, eliminating the need for manual animation techniques or motion-capture equipment. It accepts a static facial image along with a driving video to accurately map expressions and movements with high visual fidelity. Quantitative evaluation demonstrates strong performance, with a Structural Similarity Index (SSIM) of 0.87, Fréchet Inception Distance (FID) of 23.4, and real-time processing at 23 frames per second (FPS). The proposed framework supports a wide range of facial types—including human, cartoon, and avatar faces—offering a generalized and accessible solution for 3D animation generation through deep learning.*

Keywords: 3D Animation, Deep Learning, GAN, VAE, Real-Time Processing, SSIM, Facial Animation

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