

**NOVEL GANS ARCHITECTURE IMPROVING THE  
QUALITY FOR 3D MODEL GENERATION USING 2D  
IMAGES**

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## ABSTRACT

In the domain of the generative modelling since the first introduction of Generative Adversarial Networks (GANs) in 2014, GANs and its variations are identified as the finest image generative models in the *state-of-art* research. In addition, the problems regarding the 2D image synthesis have now been solved using GANs variations, specifically the quality. There are hardly any research filling out the gaps in 2D to 3D model generation aspect using GANs. The resolution and the quality of the synthetic 3D models of the existing works is yet to be improved. Moreover, these approaches lack in many other ways when they are trying to solve one issue related to GANs. In this work, the aim is to use an untested architecture using GANs to improve the quality and resolution the synthetic 3D models. Variational Autoencoder (VAEs) are also deep generative models which are used in combination with GANs architecture with a proved effectivity. Combining a 2D VAE with a 3D Progressive Growing GAN (3D-PGGAN), a novel architecture is proposed. This employs the VAE to extract features of the 2D image and map the features to a latent space where the 3D-PGGAN can consume the latent space features and produce a 3D synthetic model.

**Keywords:** Generative Adversarial Networks, Variational Autoencoders, Image Synthesis, 3D Reconstruction, Deep Learning