

ABSTRACT

GENERATIVE MODEL FAKE PORTRAIT PAINTING DETECTION WITH CONVOLUTIONAL NEURAL NETWORK-TRANSFORMER

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The combination of art and technology has led to remarkable innovations, with a focus on using Generative Adversarial Network (GAN) to create portrait paintings, the prowess of GANs can give rise to copyright-related fraud. This research aims to explore designing an architecture with a Convolutional Neural Network-Transformer (CNN-T) approach in distinguishing between AI paintings and portrait paintings created by artists. The survey results show that most respondents have difficulty distinguishing between AI portrait paintings and artist portrait paintings. The data obtained by the author from the survey results, shows that 63 out of 100 respondents answered inappropriately in distinguishing between AI portrait paintings and portrait paintings. While the remaining 37 answered accordingly. In the face of this challenge, this research utilizes Convolutional Neural Network-Transformer (CNN-T). CNNs are used to extract spatial features in images, recognizing local patterns such as edges, textures, and shapes. Transformers are used to understand the relationships between features extracted by CNNs, using an effective self-attention mechanism to capture long-term dependencies and overall visual context. The study was conducted for 100 epochs, 4 batch sizes, validation was performed after every epoch and early stopping was applied with a patience value of 8 to stop training if the model did not improve over 8 iterations. Model evaluation showed optimal performance at the 19th epoch, with 97% accuracy, 96% precision, 98% recall, and F1-score of 97%. The results show that the model is able to effectively distinguish between AI portraits and artist portraits with high accuracy.

Keywords: *cnn, cnn-t, art, technology, transformer*