

20MCA246 MAIN PROJECT

ABSTRACT

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Forensic Sketch to Real Image Using DCGAN

Abstract

Recent advancements in machine learning have enabled significant progress in understanding images. This is particularly relevant in the domain of converting sketches into realistic images, a task crucial in forensic analysis for identifying individuals. In a crime report, when witnesses recall the appearance of a suspect from memory, they often struggle to provide accurate descriptions, especially when it comes to facial features. As the human face is so diverse and variable, it's tough to predict the person from a forensic sketch expert's low-quality sketch. This project propose a deeplearning model using DCGAN to convert a foriegn sketch to real image. It explores the application of Deep Convolutional Generative Adversarial Networks (DCGAN) in the realm of law enforcement and forensic science. This approach aims to generate realistic images from forensic sketches, potentially revolutionizing suspect identification and criminal investigations. DCGAN is a type of artificial intelligence technology that uses deep learning to generate realistic images, often employed in various fields including art generation, medical imaging, and video synthesis. The process involves collecting a dataset of paired images comprising forensic sketches and corresponding real images, which are used to train the DCGAN. The trained model then takes a forensic sketch as input and generates a realistic image. This model consists of a generator network and two discriminator networks. The generator uses convolutions to transform input sketches into photos. The first discriminator, known as a patch GAN(PGAN), assesses the difference between generated and real images. The generator then adjusts based on the feedback from this discriminator. After iterative training epochs, a second discriminator,known as Cycle GAN(CGAN) comes into play. Unlike the first, this one has an added dense layer and evaluates the similarity between the generated image and the target photo. Through iterative training epochs, this model learns to produce realistic facial images from forensic sketches and it performs efficiently with the dataset used. In this project, ethical considerations regarding privacy and dataset biases are also highlighted. The proposed approach holds significant promise for forensic analysis, as it enhances the accuracy and reliability of identifying individuals based on forensic sketches. By generating high-quality images from low-quality sketches, it assists forensic experts in visualizing suspects more accurately, thereby aiding investigations and ensuring justice. Ultimately, this could enhance forensic sketch analysis and aid law enforcement agencies in solving crimes.

Keywords: Generative Adversarial Network(GAN), Deep Convolutional Generative Adversarial Networks (DCGAN), Cycle GAN(CGAN), Patch GAN(PGAN), Dense layer