Frontal Face Generation: A Survey

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Abstract — *Face recognition is a critical task in various applications, including security systems, surveillance, and social media. However, the performance of face recognition algorithms can be limited when working with side view profile images. To address this challenge, researchers have explored the use of 3D modeling, deep learning techniques such as CNN, generative adversarial networks (GANs) to generate frontal face images from side view profiles. This review paper provides a comprehensive overview of the current state-of-the-art techniques and research papers in this field. Firstly, the paper discusses the challenges of face recognition from side view profiles and how generating frontal faces can improve its efficiency. Secondly, the paper provides an overview of the different techniques and how it has been used for face generation. Thirdly, the paper reviews various GAN-based approaches for generating frontal faces, including conditional GANs, progressive GANs, and TP-GANs. Additionally, the paper provides insights into the evaluation metrics used for measuring the quality of generated images, such as the Frechet Inception Distance (FID) and Perceptual Path ´ Length (PPL). Furthermore, the paper discusses the datasets used for training and testing the GAN-based frontal face generation models, including Multi-PIE, AFLW, and 300W-LP. Finally, the paper summarizes the current challenges and future research directions in this field, including improving the quality of generated images, addressing variations in facial expressions and lighting conditions, and exploring the potential of using GANs for face recognition tasks. Overall, this review paper provides a comprehensive understanding of the use of GANs for generating frontal faces from side view profiles and its potential implications for improving face recognition systems.*

Keywords: *Frontal face synthesis,Side-view to frontal face conversion, Face recognition, Generative adversarial networks (GANs), Lighting conditions, Evaluation metrics, Dataset specification, Multi-PIE, AFLW.*