GAN-generated Faces Detection: A Survey and New Perspectives

1 Summary

1.1 Motivation

"GAN-generated Faces Detection: A Survey and New Perspective" is a work that attempts to provide an extensive overview of the latest developments in GAN-face recognition. Driven by the growing prevalence of GAN-generated faces, the authors acknowledge the social implications that result from these applications and point out the necessity for reliable detection techniques. The main goal is to solve the difficulties caused by the growing complexity of GAN models in producing realistic faces by providing a thorough grasp of the field of GAN-face detection.

1.2 Contribution

The systematic division of GAN-face detection techniques into four classes is the paper's main contribution. It offers a thorough foundation for comprehending the broad field of GAN-face identification by distinguishing methods based on deep learning, physical qualities, physiological characteristics, and human visual performance evaluation. The research also presents a unique physiological-based approach that focuses on abnormal pupil shapes in faces generated by GANs. This unique strategy improves the interpretability and efficacy of GAN-face detection tactics by broadening the range of detection methods and illuminating anatomical details that GAN models miss.

1.3 Methodology

The methodology includes a chronological summary of major GAN-face generation milestones. First, a historical summary of key developments in GAN-face generation is presented. This entails following the evolution of Generative Adversarial Networks (GANs) from their initial release in 2014 to the most recent developments in GAN models, with a particular emphasis on those intended to produce lifelike human faces. This chronological summary serves as the foundation for understanding the progression of GAN technology, highlighting key innovations and improvements over time. In separating GAN-generated faces from actual ones, the research takes a human perspective in addition to computational methods. Comprehending the difficulties encountered by human observers in distinguishing between the two is necessary for this investigation. Notably, the physiological-based method looks at the iris colour, pupil shapes, symmetry, and facial landmarks, explaining why GAN faces can have artefacts.

1.4 Conclusion

The conclusion highlights the review's thoroughness by going over difficulties and potential future study areas. It emphasises how important the paper's discoveries on GAN-generated faces, their identification, and their consequences for human visual performance are.

2 Limitations

2.1 First Limitation

A possible drawback in the choice and classification of GAN-face detection techniques is acknowledged in the article. This restriction stems from the subjective nature of classification techniques, which might bring biases into the assessment and contrast of various strategies. A more thorough explanation of the selection criteria, any biases introduced during classification, and the effects of these decisions on the final results would be beneficial to the study.

2.2 Second Limitation

The absence of a standardised assessment mechanism for GAN-face detection techniques is another drawback. The importance of explainable outcomes is acknowledged in the study, but a more in-depth examination of the difficulties in doing this across many approaches would improve the debate. Additionally, this constraint may be related to the different levels of intricacy in GAN models and the absence of a common mechanism to assess the effectiveness of detection techniques along this range. A clearer explanation of how the variety of GAN architectures, from the first models to the most recent innovations like StyleGAN3, poses difficulties in creating a consistent assessment framework would be beneficial for the study.

3 Synthesis
The practical applications of the paper's findings are highly significant, since they offer insightful guidance in the field of GAN-face identification and have ramifications for adjacent fields. It provides a thorough research path by tackling the growing issues associated with GAN-generated faces, which will help to build more reliable and understandable GAN-face detection techniques. The constraints that have been mentioned serve to both identify certain areas that require development and to provide a more sophisticated understanding of the difficulties associated with GAN-face identification. Moreover, the implications of the article for face morphing and swapping demonstrate its relevance and potential influence in several sectors, broadening its reach. In conclusion, the synthesis highlights the concrete applications in the actual world and lays out encouraging future paths motivated by the paper's diverse contributions.