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PlasticGAN: Holistic generative adversarial network for facial plastic and aesthetic surgery

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Facial plastic surgery is a discipline that requires years of training for a surgeon to gain the necessary experience, skill, and talent. As the demand for minimally invasive procedures (MIP) increases rapidly, the patient wants to know how the changes are reflected on their face after the surgery. Nevertheless, in these procedures, the surgeon's vision often relies entirely on their own and the patient's imagination. In the absence of suitable visualization techniques and technology, surgeons rely on their skills and imagination to perform the surgery, making it more challenging. Several face-related applications have benefited significantly and achieved unparalleled success by embracing the Conditional Generative Adversarial Network (cGAN). We present PlasticGAN based on the latest advancements to solve the issue of facial aging and rejuvenation on faces that have undergone plastic surgery. Specifically, age and gender are passed as conditional information into the discriminator and generator to acquire more fine-grained information between input and synthesized results. Additionally, BlockCNN-based residual blocks remove artifacts and improve convergence behavior. This preliminary model works as a helping hand in assisting surgeons, biometric researchers, and practitioners in clinical decision-making by identifying patient cohorts that require building up of confidence with the help of vivid visualizations prior to treatment. It helps them better provide the tentative alternatives by simulating aging patterns. Based on qualitative and quantitative experiments conducted on various plastic surgery faces (teeth, face, ear, lips), PlasticGAN model proved to be robust and versatile, mainly when applied to aging and rejuvenation with face completion compared with state-of-the-art models.

Biography

Neeta Nain was presently working as Associate Professor, Department of Computer Science and Engineering, Malaviya National Institute of Technology Jaipur, has a teaching experience of over 25 years. Her research area is Pattern Recognition, Machine Learning, Deep Learning and Biometrics. She has published more than 75 papers on these topics for various International Journals and conferences like Elsevier Pattern Recognition and Journal of Visual Comm. Information Representation, ACM Transactions on Asian Language Information Processing, IETE Journal of Research, Springer Multimedia Tools and Applications etc. She has acted as Program Chair, of The 13th IEEE International Conference on SITIS2017 and IAPR endorsed Fourth International Conference on Computer Vision and Image Processing, CVIP2019 .

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