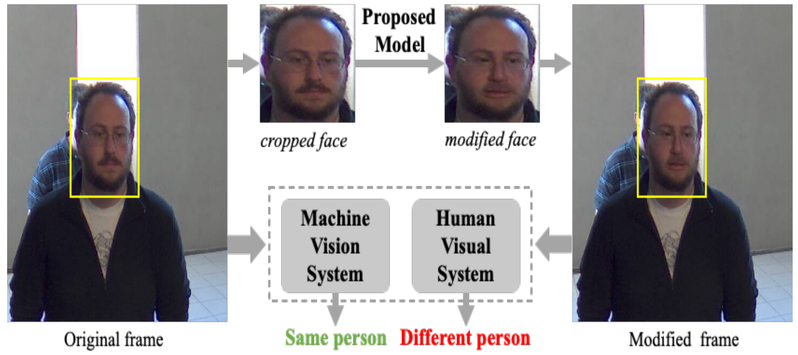
Learning Disentangled Representations for Identity Preserving Surveillance Face Camouflage

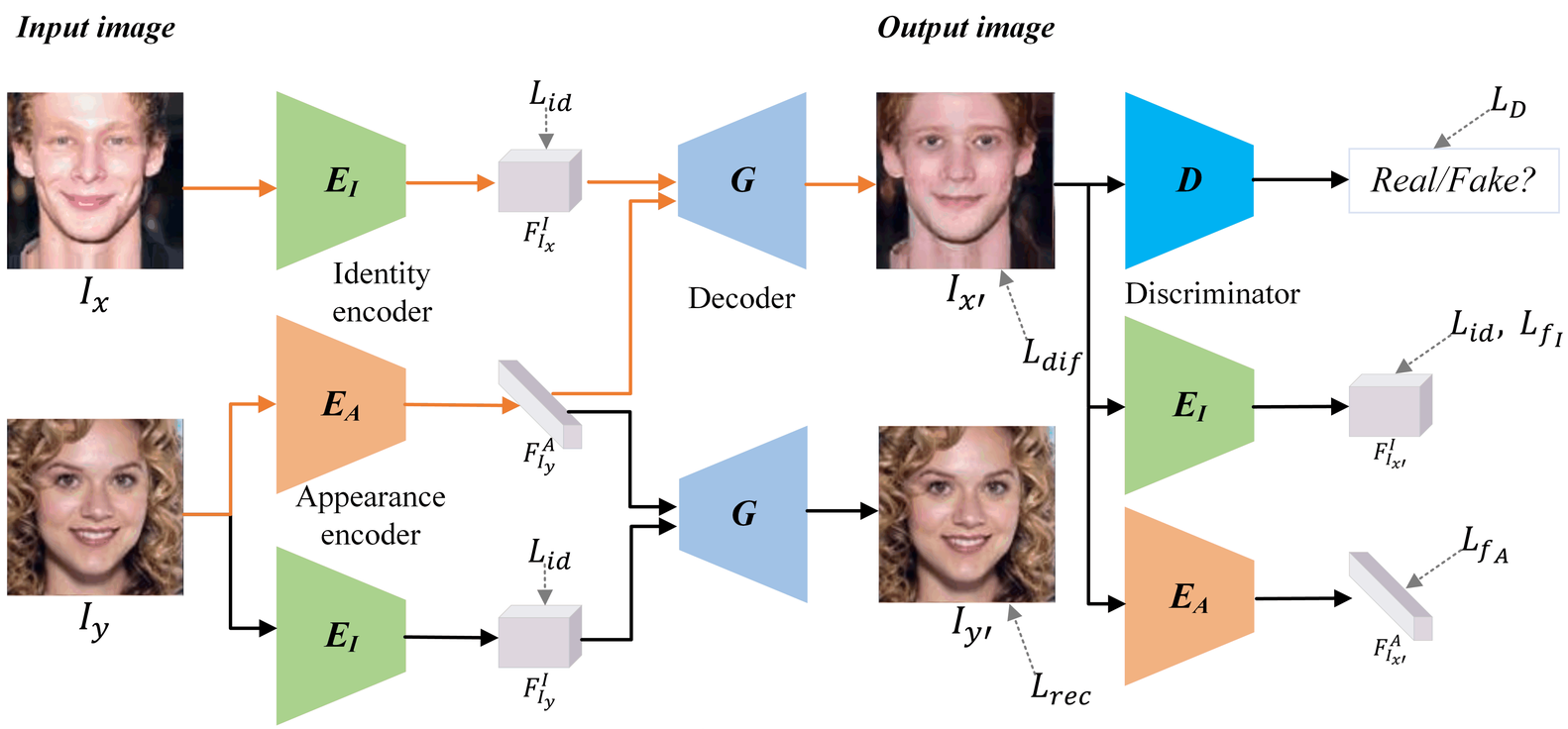
ZhangJingzhi Li[1], Lutong Han[1], Hua Zhang[1], Xiaoguang Han[2], Jingguo Ge[1], Xiaochun Cao[1]
[1]Institute of Information Engineering, CAS [2]Shenzhen Research Institute of Big Data

1. Introduction

We find that in the privacy protection technology under video surveillance scenes, the biometrics, that is, the recognition of individuals, is the attribute that should be prserved for public safety. Based on our observation, we propose a new face camouflage model, which can learn the explicit and complementary appearance and identification features to generate realistic face images. We manage to decorrelate individuals by human vision while the face identification system can be recognized. More importantly, we introduce a new concept of face privacy, which distinguishes human perception from machine recognition.



2. Face Camouflage



Our proposed encoder-decoder network architecture is based on generative adversarial network as shown in Figure, which is composed of four modules: i) An identity encoder EI is used to extract the identification features; ii) An appearance encoder EA is used to extract the appearance features; iii) A generator G is developed to generate the disguised face with the latent codes; iv) A discriminator D is introduced to distinguish between generated and real images.

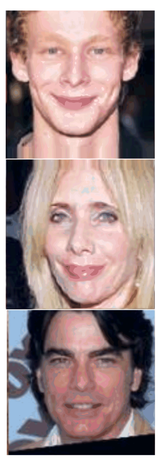
3. Experimental Results

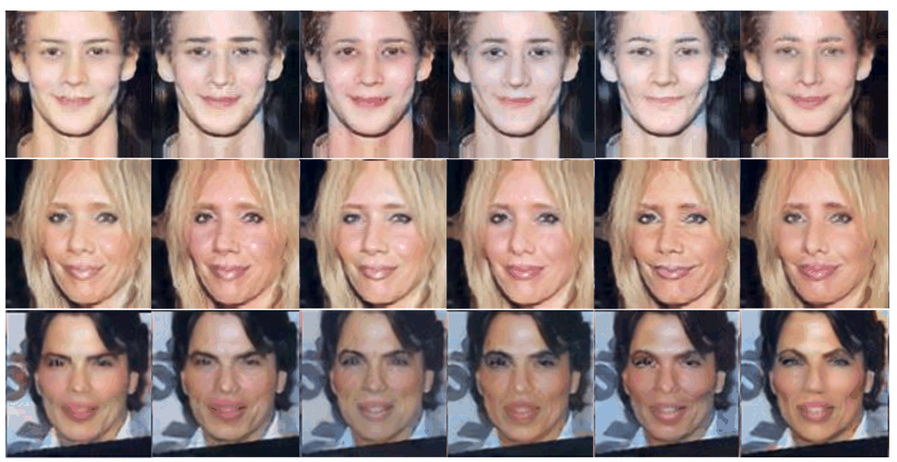
- Evaluate the realism and diversity

Methods	Realism (FID)	Diversity (SSIM)
Original real images	11.86	0.37
PA-GAN [40]	138.21	0.11
IPCGANs [39]	87.16	0.12
our model (appearance)	70.68	0.19
our model (identification)	71.23	0.29

- Evaluate the performance of Identification Preservation

Methods	Face Verification	Face Identification
Original Real Images	97.05%	76.41%
Human	85.75%	-
our model (w/o)	82.63%	42.43%
our model	92.63%	85.64%





25th International Conference on Pattern Recognition (ICPR2020) , Milano, Italy, January 10-15, 2021

* Please contact *lijingzhi@iie.ac.cn* for further information.