**Image restoration using cycle-consistent adversarial networks.**

# 1) Normalization of HE-stained histological images using cycle consistent generative adversarial networks

**REVIEW:**   
Using routine clinical data, this study examines CycleGAN's (cycle consistent generative adversarial network) capacity for colour normalisation in hematoxylin-eosin stained histological pictures. The network is made up of a discriminator network DB to discriminate between actual and produced images and a generator network GB that learns to translate an image X from a source domain A to a target domain B. The method is validated using data sets from the follicular thyroid carcinoma challenge and the breast cancer challenge.

**REFERENCE:**  
Runz, M., Rusche, D., Schmidt, S. *et al.* Normalization of HE-stained histological images using cycle consistent generative adversarial networks. *Diagn Pathol* 16, 71 (2021). <https://doi.org/10.1186/s13000-021-01126-y>

# 2) Three-Dimensional Virtual Optical Clearing With Cycle-Consistent Generative Adversarial Network

**REVIEW:**  
To digitally enhance image quality and tissue transparency of biological materials, 3D-VoCycleGAN is a three-dimensional virtual optical clearing approach based on an unsupervised cycle-consistent generative adversarial network. On incompletely cleared mouse brain and kidney tissues, it showed good picture deblurring and denoising capabilities, and the signal-to-background ratio (SBR) of images in incompletely cleared brain tissue sections improved by more than 40%.

**REFERENCE:**  
Chen J, Du Z and Si K (2022) Three-Dimensional Virtual Optical Clearing With Cycle-Consistent Generative Adversarial Network. Front. Phys. 10:965095. doi: 10.3389/fphy.2022.965095

# 3) A Smart Surveillance System for Uncooperative Gait Recognition Using Cycle Consistent Generative Adversarial Networks (CCGANs)

**REVIEW:**  
Gait Recognition is the study of identifying persons by their gait even when they are unwilling to comply, and surveillance is a significant research topic. A deep learning-based approach is put forth to address this issue. It is trained on people who have normal walking conditions and use a cycle-consistent generative adversarial network to transform a GEI disrupted by various covariate factors to a normal GEI. A publicly accessible data set was used to evaluate the suggested system, and it produced outstanding results. It can be used for security reasons in sensitive regions.

# REFERENCE: Wafaa Adnan Alsaggaf,1Irfan Mehmood,2Enas Fawai Khairullah,1Samar Alhuraiji,3Maha Farouk S. Sabir,4Ahmed S. Alghamdi,5and **Ahmed A. Abd El-Latif**6 A Smart Surveillance System for Uncooperative Gait Recognition Using Cycle Consistent Generative Adversarial Networks (CCGANs) Volume 2021 | Article ID 3110416 | <https://doi.org/10.1155/2021/3110416>

# 4) Finger-Vein Recognition Using Heterogeneous Databases by Domain Adaption Based on a Cycle-Consistent Adversarial Network

**REVIEW:**  
A technique to increase finger-vein recognition accuracy via domain adaptation between heterogeneous databases and cycle-consistent adversarial networks (CycleGAN) is proposed by Kyoung Jun Noh, Jiho Choi, Jin Seong Hong, and Kang Ryoung Park. The SDUMLA-HMT-DB and HKPolyU-DB open databases were used for the studies. The equal error rate (EER) of finger-vein recognition was 0.85% in SDUMLA-HMT-DB and 3.4% in HKPolyU-DB, according to the results.

**REFERENCE:**  
Noh, K.J.; Choi, J.; Hong, J.S.; Park, K.R. Finger-Vein Recognition Using Heterogeneous Databases by Domain Adaption Based on a Cycle-Consistent Adversarial Network. Sensors 2021, 21, 524. <https://doi.org/10.3390/s21020524>

# 5) Attention mechanism enhancement algorithm based on cycle consistent generative adversarial networks for single image dehazing

**REVIEW:**  
Cycle consistency-based generative adversarial networks are employed by the attention mechanism enhancement algorithm (AMEA-GAN) for single picture dehazing. To enhance the perception of visual colour and the colour authenticity of the augmented image, it makes advantage of the attention mechanism of the human retina and an upgraded FUNIE-GAN symmetrical structure. Results from experiments are satisfactory.

**REFERENCE:**  
Robot technology Used for Special Environment Key Laboratory, Southwest University of Science and Technology, Mianyang 621010, SiChuan, People’s Republic of China

# 6) ESA-CycleGAN: Edge feature and self-attention based cycle-consistent generative adversarial network for style transfer

**REVIEW:**  
An edge feature and self-attention based cycle-consistent generative adversarial network called ESA-CycleGAN has been proposed to overcome issues with style transfer. In order to improve the network, a perceptual loss term was included. It consists of a generator, discriminator, and edge feature extraction network. The results of the experiments demonstrate superiority in style transfer, maintaining details, and enhancing image quality.

**REFERENCE:**  
Jiajun Song, Peigen Li, Qiang Fang, Haiting Xia, Rongxin Guo, Data Augmentation by an Additional Self-Supervised CycleGAN-Based for Shadowed Pavement Detection, Sustainability, 10.3390/su142114304, 14, 21, (14304), (2022).

**7) Generating Cartoon Images from Face Photos with Cycle-Consistent Adversarial Networks**

**REVIEW:**  
A traditional GAN model with a broad range of style transfer situations is CYCLE-GAN. Each convolutional kernel is given spectral normalisation to address this issue, and a pretrained model (VGG16) is utilised to manage the loss of image information. Experimental findings demonstrate that the suggested model outperforms the state-of-the-art in terms of convergence speed and FID scores.

# REFERENCE: [Zhang, T](https://opus.lib.uts.edu.au/browse?type=author&sort_by=2&order=DESC&value=Zhang%2c+T)  [Zhang, Z](https://opus.lib.uts.edu.au/browse?type=author&sort_by=2&order=DESC&value=Zhang%2c+Z)  [Jia, W](https://opus.lib.uts.edu.au/browse?type=author&sort_by=2&order=DESC&value=Jia%2c+W)  [He, X](https://opus.lib.uts.edu.au/browse?type=author&sort_by=2&order=DESC&value=He%2c+X)  [Yang, J](https://opus.lib.uts.edu.au/browse?type=author&sort_by=2&order=DESC&value=Yang%2c+J) Generating cartoon images from face photos with cycle-consistent adversarial networks Computers, Materials and Continua (Tech Science Press Computers, Materials and Continua, 2021, 69, (2), pp. 2733-2747

# 8) Effective Data Generation for E-banking Transactions Using Cycle-Consistent Adversarial Networks

# REVIEW: Data for the minority class is generated using CycleGAN and is based on actual e-banking transaction data. A fraud detection model is trained using both synthetic and actual samples, and experimental results indicate that the model performs better when using synthetic data.

**REFERENCE:**  
Xiaoguo Wang1 and Han Zhao1 [Journal of Physics: Conference Series](https://iopscience.iop.org/journal/1742-6596), [Volume 1575](https://iopscience.iop.org/volume/1742-6596/1575), [5th Annual International Conference on Information System and Artificial Intelligence [ISAI2020] 22-23 May 2020, Zhejiang, China](https://iopscience.iop.org/issue/1742-6596/1575/1) Xiaoguo Wang and Han Zhao 2020 J. Phys.: Conf. Ser. 1575 012070

# 9) Through-the-Wall Micro-Doppler De-Wiring Technique via Cycle-Consistent Adversarial Network

**REVIEW:**  
For through-the-wall micro-Doppler de-wiring, this research suggests a Cycle-Consistent Adversarial Network (Cycle GAN) architecture. Range-max time-frequency representation (R-max TFR), a feature-enhanced micro-Doppler signature, is obtained using an ultra-wideband (UWB) radar system. To reduce wire clutters, a loss function called identity loss is implemented. The suggested Cycle GAN architecture performs better than other cutting-edge de-wiring techniques, according to the results.

**REFERENCE:**  
Wang, S.; Miao, K.; Li, S.; An, Q. Through-the-Wall Micro-Doppler De-Wiring Technique via Cycle-Consistent Adversarial Network. Electronics 2022, 11, 124. <https://doi.org/10.3390/electronics11010124>

# 10) Improving Dysarthric Speech Intelligibility Using Cycle-consistent Adversarial Training

**REVIEW:**  
Millions of people worldwide suffer from the motor speech problem known as dysarthria. In this work, we use cycle-consistent GAN to construct a model for the conversion of dysarthric to healthy speech. After adversarial training, objective examination reveals increased recognition performance compared to the original dysarthic speech.

**REFERENCE:**  
[Seung Hee Yang](https://arxiv.org/search/eess?searchtype=author&query=Yang%2C+S+H), [Minhwa Chung](https://arxiv.org/search/eess?searchtype=author&query=Chung%2C+M) 24th February in BIOSIGNALS 2020. arXiv admin note: text overlap with [arXiv:1904.09407](https://arxiv.org/abs/1904.09407) <https://doi.org/10.48550/arXiv.2001.04260>