

The research focuses on applying Generative Adversarial Networks (GANs) [1] to enhance the clarity of low-resolution images. This research was inspired by a recognized limitation of the capabilities of the current camera and video systems. Systems with higher image resolution require expensively complex equipment and an excessive amount of digital storage to function, effectively limiting their practicality and availability. The capability of GANs to selectively enhance the resolution of the desired image without increasing costs impacts a substantial range of industries and practices. Our research focuses on applying GANs to objects with shared static characteristics such as license plates. Based upon preliminary results, the focus on objects with static characteristics in combination with researched optimization methods [2] increased the effectiveness of the network in relation to its training speed, computational load [3], and produced image quality. Possible applications of the proposed system include enhancing images of license plates for traffic monitoring systems and improving still images from body camera footage to reveal crucial details otherwise left unseen. Beyond the scope of surveillance, resolution-enhancing GANs may be applied to develop media content or national defense capabilities. The possible uses for such a system are as varied and dynamic as they are interesting. By using a GAN to enhance the resolution of low-quality images, we hope to bring valuable research contributions to the field of artificial intelligence and machine learning.

[1] Goodfellow, Ian, et al. "Generative adversarial nets." *Advances in neural information processing systems*. 2014.

[2] Nah, Seungjun, Tae Hyun Kim, and Kyoung Mu Lee. "Deep multi-scale convolutional neural network for dynamic scene deblurring." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*. 2017.

[3] Salimans, Tim, et al. "Improved techniques for training gans." *Advances in neural information processing systems*. 2016.