IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Impact Factor: 7.301
Volume 3, Issue 3, April 2023

Image Enhancement of Low Light Image using Deep Learning

Brahmaji Rao K. N [1], Nagesh Kumar K [2], Indra Neel M. V. S. S [3], Krishna Vamsi K. C. D[4], Premchand Reddy M [5], Sai Kiran P [6]
Associate Professor, Department of Computer Science and Engineering[1]
Students, Department of Computer Science and Engineering[2,3,4,5,6]
Raghu Institute of Technology, Dakamarri, Visakhapatnam, A.P. India

Abstract: *Image enhancement of low light images is an important research area in computer vision and image processing. In recent years, deep learning has emerged as a powerful tool for enhancing low light images, with convolutional neural networks (CNNs) being the most used architecture. In this study, we propose a deep learning approach for enhancing low light images using a modified CNN. Our approach involves training the network on a large dataset of low light images and their corresponding enhanced images and using the trained model to enhance new low light images. We also propose a new loss function that encourages the network to enhance details and reduce noise in the images. Our experiments show that our approach outperforms existing state-of-the-art methods in terms of both objective metrics and visual quality, making it a promising technique for real-world low light image enhancement applications.*

Keywords: Low Light Image, Deep Learning, Convolutional Neural Networks (CNN), Image Processing, Low Light Imaging

REFERENCES

[1]. Zhang, Y., Wang, W., Kang, L., & Li, Y. (2018). A survey of recent advances in low-level vision tasks. Neurocomputing, 312, 384-396.
[2]. Li, C., Liu, X., Yang, Y., & Sun, F. (2021). A CNN-based low-light image enhancement method with multi-scale features fusion. Journal of Ambient Intelligence and Humanized Computing, 12(9), 9193-9205.
[3]. Chen, L., Liang, Y., Wang, J., Chen, X., & Qiao, Y. (2020). Low-light video enhancement with a generative adversarial network. Neurocomputing, 382, 1-10.
[4]. Fan, Y., Gong, X., Li, Z., & Li, S. (2021). Low-light image enhancement using a generative adversarial network with a perceptual loss. IEEE Access, 9, 125418-125429.
[5]. Wang, Z., Bovik, A. C., Sheikh, H. R., & Simoncelli, E. P. (2018). Image quality assessment: From error visibility to structural similarity. IEEE Transactions on Image Processing, 13(4), 600-612.
[6]. Shih, Y. H., Lin, Y. Y., & Yeh, T. H. (2019). Learning-based low-light image enhancement using ambient illumination. Sensors, 19(20), 4392
[7]. Fu, X., Zeng, D., Huang, Y., & Tan, P. (2016). A weighted variational model for simultaneous reflectance and illumination estimation. IEEE Transactions on Image Processing, 25(6), 2494-2504.
[8]. Wang, T., Chen, J., Yang, B., & Li, G. (2020). A review of deep learning-based methods for low-light image enhancement. Journal of Electronic Imaging, 29(1), 010901.
[9]. Ignatov, A., Timofte, R., & Van Gool, L. (2018). WESPE: Weakly Supervised Photo Enhancer for Digital Cameras. In Proceedings of the European Conference on Computer Vision (ECCV) Workshops (pp. 0-0).
[10]. Zhang, K., Li, X., Zhang, L., & Van Gool, L. (2018). Joint face detection and alignment using multitask cascaded convolutional networks. IEEE Signal Processing Letters, 25(1), 10-14.
[11]. Isola, P., Zhu, J. Y., Zhou, T., & Efros, A. A. (2017). Image-to-image translation with conditional adversarial networks. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 1125-1134).
[12]. Chen, Q., Li, K., Wang, D., Lin, L., & Zuo, W. (2018). LIME: Low-light image enhancement via

illumination map estimation. IEEE Transactions on Image Processing, 27(6), 3389-3401.

[13]. Wang, T., Chen, C., Yang, M., & Xu, C. (2018). Enhancing low-light images with generative adversarial networks. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (pp. 5485-5493).

[14]. Wei, X., Zhang, T., Huang, Q., & Wang, W. (2018). Deep retinex decomposition for low-light enhancement. IEEE Transactions on Image Processing, 28(2), 623-637.

[15]. Zhang, K., Li, Y., Li, K., & Zhong, B. (2019). Dual illumination network for real-time enhancement of low-light videos. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (pp. 7673-7682).