# Optimizing Machine Learning Through Python Based Image Processing Techniques

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**Abstract :** This work reviews some of the advanced image processing techniques for deep learning applications. Object detection by template matching, image denoising, edge detection, and super-resolution modelling are but a few of the tasks. The paper looks in into great detail, given that such tasks are crucial preprocessing steps that increase the quality and usability of image datasets in subsequent deep learning tasks. We review some of the methods for the assessment of image quality, more specifically sharpness, which is crucial to ensure a robust performance of models. Further, we will discuss the development of deep learning models specific to facial emotion detection, age classification, and gender classification, which essentially includes the preprocessing techniques interrelated with model performance. Conclusions from this study pinpoint the best practices in the preparation of image datasets, targeting the best trade-off between computational efficiency and retaining important image features critical for effective training of deep learning models.

**Keywords :** image processing, machine learning applications, template matching, emotion detection
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