Report on automated detection of Lens Flare in images and blurry images

I. INTRODUCTION

It is well known that machine learning has considerable impacts on our lives and made daily tasks easier and faster. It has very extensive range of applications such as in the human lives, industry and medicine. One of the important aspects of machine learning is that it can assess large amount of data within short time. One of the applications of the machine learning is related to the image classification, and thus it allows to collect data to find a fault and critical features. This report is related to the this topic and we want to use the available algorithms in the machine learning and detect the presence of lens flare in images and detection of blurry images.

In the Sec. II , we refer to the algorithms that we employed for choosing these algorithm. Sec.III is devoted to the summary of results and potential future work.

II. ALGORITHMS AND METHODS

Lens flare and ghosting can be prevalent artifacts when taking pictures of a scene with a direct bright light. Those artifacts are usually caused by internal reflections of the lens due to a thin anti reflective coating and can easily ruin a beautiful picture. This project aims at automatically detect those lens artifacts and blurry image via post-processing from a single input image. For the former task (lens flare), we employed the template matching algorithm [1], where the algorithm search an image for things that look like a test image, while for the later task (blurry image) the variation of the Laplacian algorithm [2] was utilized in this work. In this method, we take a single channel of an image (presumably grayscale) and convolve it with a 3×3 kernel and then take the standard deviation squared or variance of the response. As indicated in Ref. [2], If the variance falls below a predefined threshold, then the image is considered blurry; otherwise, the image is not blurry.

III. SUMMARY AND FUTURE WORK

In this project, we employed the template matching algorithm and variation of the Laplacian algorithm for detecting the lens flare in images and blurry image, respectively. We were able to employ these algorithms in the framework of openCV 3 and run them successfully for detecting lens flare and blurry image in 75 images. For my future work, I am eager to learn and employ other powerful algorithms to perform image classification allowing for instance to detect patterns and features in large-scale data, on the terabyte level, which might have application in some important infrastructures (dams, bridges, tunnels and etc) in a large city like Sydney.

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[1] R. Brunelli, Template Matching Techniques in Computer Vision: Theory and Practice, Wiley, ISBN 978-0-470-51706-2, (2009).

[2] J. L. Pech-Pacheco *et al* "Diatom autofocusing in brightfield microscopy: a comparative study" Proceedings 15th International Conference on Pattern Recognition 1-7 (2000).