IMAGE ENHANCEMENT

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Introduction

A technique for enhancing the contrast and overall quality of an input image in the most efficient manner possible.

Medical imaging, computer vision, meteorology, astronomy, remote sensing, and other related fields make use of this technology for fast enhancement of the images.

Since enhancing the image can be costly affair in some cases so parallelizing it can give an effective solution to this problem.

Objectives

- Increasing the speed of the DHE, HE and CLAHE – by optimizing it & allocating number of processors to these algorithms and executing them in parallel.

- A comparative study of various image enhancement algorithms executing in parallel.

Problem Statement

A study of different parallel libraries can help to improve the implementation of our approach.

Histogram equalization and bilateral denoising was used to enhance the image by leveling out the distribution of pixel values and revealing hidden features of the image.

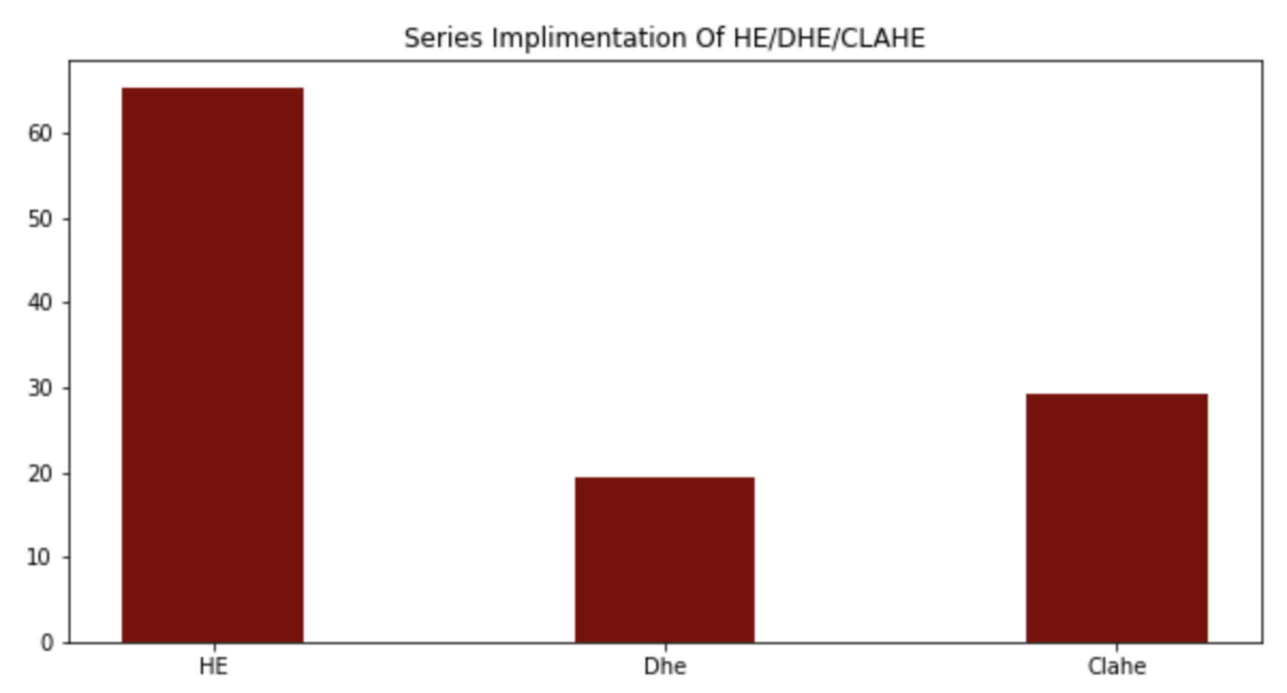
To be used on large data files, the image enhancement algorithm must have fast processors.

Methodology

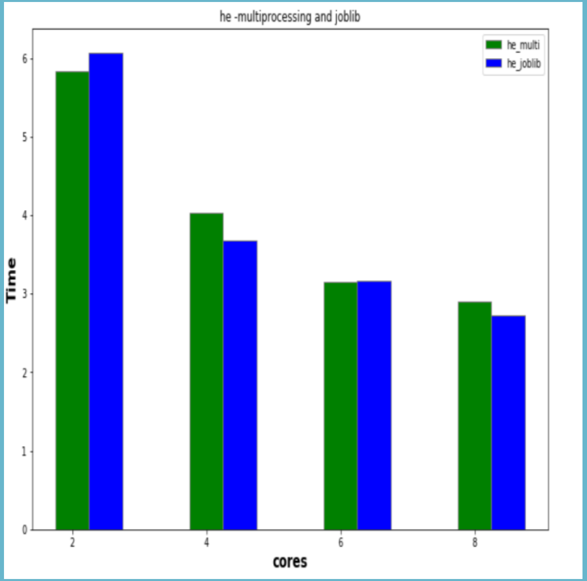
- Multiprocessing
- Joblib
- Serial

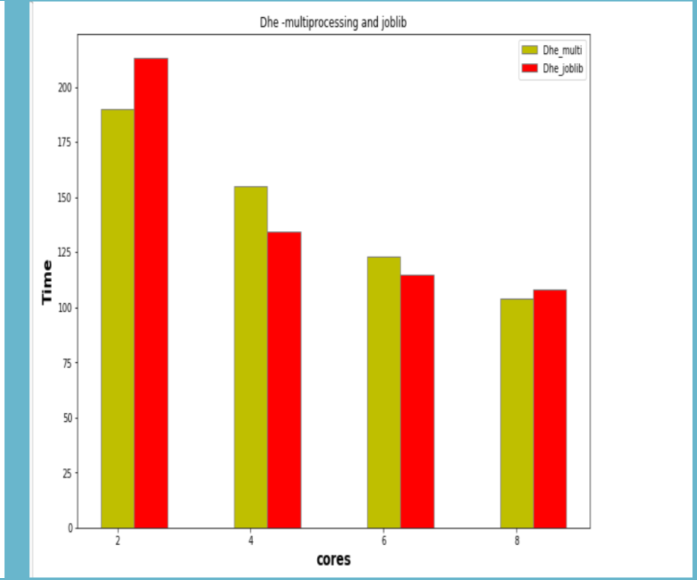
are the libraries functioning on each algorithm which is also checked by varying the number of processes.

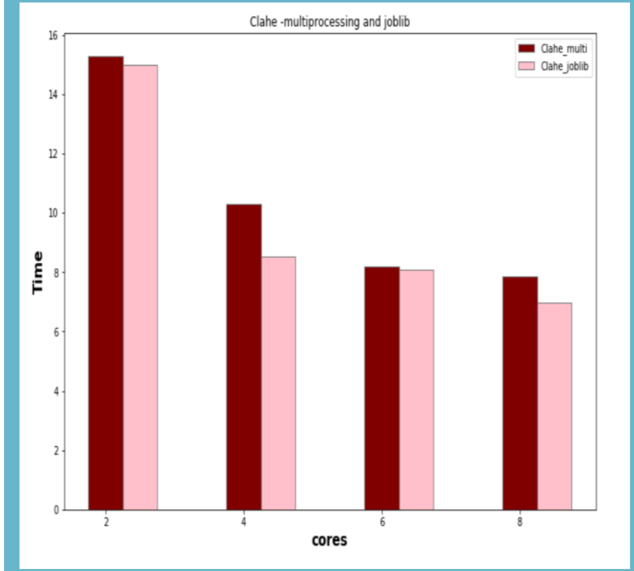
Comparative Study Results



Parallel results:







Observations

- In bilateral denoising, it averages pixels for a set of input pictures based on their spatial closeness in both sequential and parallel mode, although the overall time spent was not vastly different.

- From the graph plotted we can say that times are gradually reduced compared to series and parallel implementation for the different image and contrast enhancement algorithms

- when we compare the libraries, multiprocessing is fast compared to the joblib in the three algorithm

Conclusion

- Parallel algorithm gave good results compared to the series implementation of the algorithm.

- The no of cores are increasing in the multiprocessing and joblib libraries times are decreasing when compared to less no of cores assigned to the algorithm

- Multiprocessing gave good results which is 2 times faster than series yielding a good result.

Future Improvements!

- The image contrast technique can be designed for GPU, which runs on extra tasks to show the time and anticipate the number of processors required, given that the dataset is large e nough for the GPU to perform well.

- Furthermore, Denoising libraries can be utilised to do the same work with many threads.

- In addition, smaller pictures can be assigned to the CPU and larger pictures to the GPU, saving cost and time.