Image Processing
Project Delivery

Image-Enhancement

Team members:

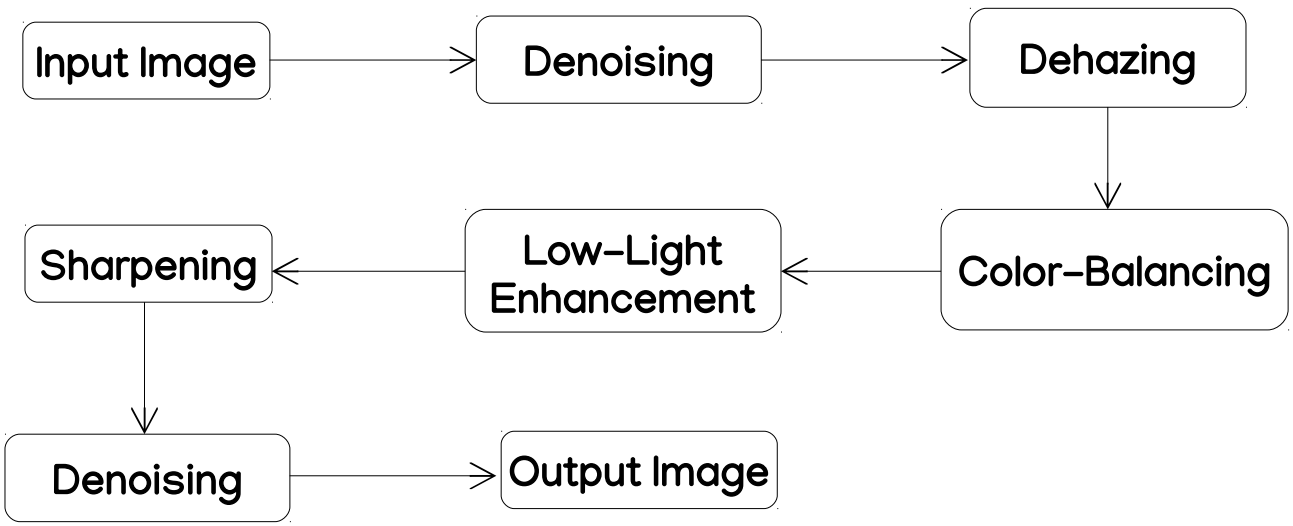
Ahmed Mahmoud AbdelMonaem	**1**	**6**
Ali Khaled Mohamed	**1**	**35**
Aly Ramzy Hassan Aly	**1**	**36**
Philopateer Nabil Atia	**2**	**4**

Introduction:

Image enhancement techniques are aimed at realizing improvement in the quality of a given image. The result is another image that demonstrates certain features in a manner that is better in some sense as compared to their appearance in the original image.

In this paper we propose different algorithms, each one enhance different feature for a given image, each one is adaptive and has its own parameters that enable it to specify accurately when to apply and if it's applied, it can achieve the best results.

- The proposed algorithms can be summarized in the following graph:



Algorithms:

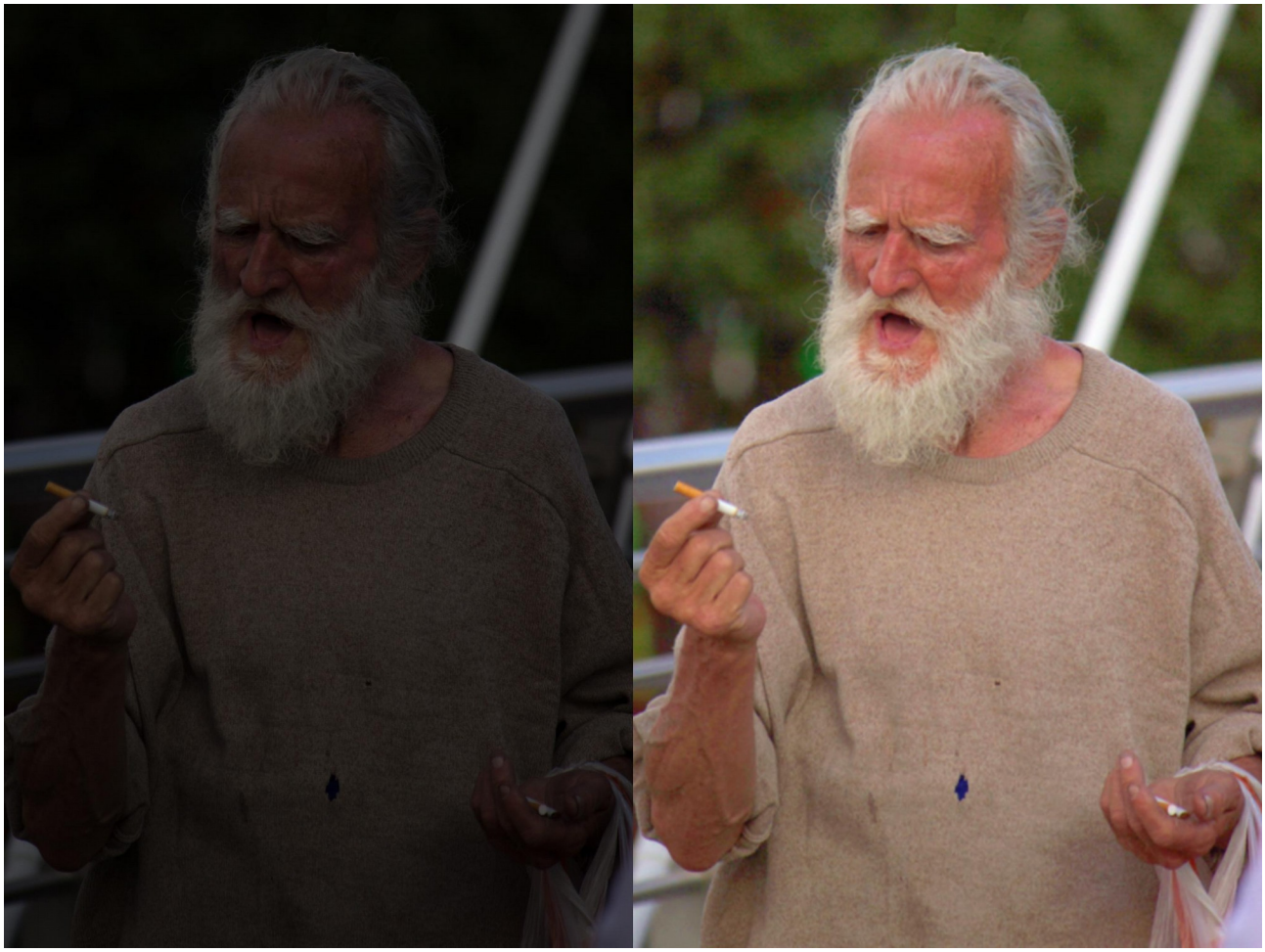
Denoising: Multiresolution Bilateral Filtering for Image Denoising with wavelet coefficients

Dehazing: Fast Image Dehazing Using Improved Dark Channel Prior

Color-Balancing: data-driven new method for estimating the illumination's R, G, B components, that can be implemented as part of a camera ISP pipeline.

Low-Light Enhancement: Simple Nonlinearity Upgradation Based Method of Enhancing Low Light Images

Experimental Results:



Work Division:

Name	Work Load
Ahmed Mahmoud	Dehazing, Color-Balancing
Aly Ramzy	Low Light Enhancement, Sharpening
Ali Khaled	Bilteral Filter, Cython
Philopateer Nabil	Denoising, GUI

Analysis:

Image Size	Run Time
341 * 512	0.93 secs
373 * 282	0.54 secs
315 * 560	1.15 secs
380 * 569	1.24 secs
501 * 666	2.18 secs
533 * 800	2.36 secs
576 * 1024	3.28 secs
667 * 1000	4.3 secs
768 * 960	4.81 secs

References:

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[3] Fang Li, Jinyong Wu, Yike Wang, Yong Zhao and Xing Zhang, 2012 IEEE fifth International Conference on Advanced Computational Intelligence(ICACI) October 18-20, 2012 Nanjing, Jiangsu, China **A Color Cast Detection Algorithm of Robust Performance**

[4] Sharafat Hossain, Masud An Nur Fahim,Nurun Nahar Jui, Md. Tarifuzzaman, 2019 IEEE canadian conference of Electrical and Computer Engineering, **A Simple Nonlinearity Upgradation Based Method of Enhancing Low Light Images**

[5] Jun Mao, Uthai Phommasak, Shinya Watanabe and Hiroyuki Shioya College of Computer Science and Technology, Henan Polytechnic University, 2001, Century Avenue, Jiaozuo (454003), Henan, P.R. China **Detecting Foggy Images and Estimating the Haze Degree Factor**

[6] Ming Zhang and Bahadir K. Gunturk, IEEE Trans Image Process. 2008 Dec; 17(12): 2324–2333., **Multiresolution Bilateral Filtering for Image Denoising**