Medical Image Processing

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Assignment 2
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Instructions:

- All your code should be uploaded in a folder named as 'Code'.
- The report should be in a '.pdf' format with your roll number as the filename.
- In the case of computing-based questions, the pdf should clearly report the experimental settings, results/observations and a discussion/conclusions based on the results.
- Upload the code and report in a single .zip file which has the following naming format: r_An where r is your full roll no; n is the assignment number.
- Any report without conclusions/recommendations will get only 50% marks.

Outline: *In this assignment, you will implement algorithms on Image Conditioning and Illumination Correction that are discussed in the class.*

DATA: The data required for this assignment can be downloaded from the following link: https://iiitaphyd-my.sharepoint.com/:f:/g/personal/prathyusha_akundi_research_iiit_ac_in/Ej1FphgA2jhOlm3j5WxS6kgB-dtvcSOzoD83XYzOoqTYPw?e=vrPajo

Question 1: Take the CT_scan.dcm and implement Windowing/Leveling operation under different window settings. Report your observations with recommendations and conclusion.

Question 2: Implement the first version of MUSICA algorithm on xray.bmp and chest.jpg images provided in the given link.

Question 3A: Implement Retinex algorithm on following images: 1) retina.JPG 2) skin.jpg and 3) Image of your choice

Question 3B: Read and implement the following paper: *Colour Retinal Image Enhancement Based on Domain Knowledge*[1] (PDF can be downloaded from the given link) on retina.JPG. Compare your results with the Retinex algorithm and report which algorithm you would recommend along with reasons.

[Note]

1. *DICOM stands for Digital Imaging and Communications in Medicine. It is a standard, internationally accepted format to view, store, retrieve and share medical images.*
2. *You can also view the metadata of the image that contains information on the acquisition equipment, encrypted patient details, dimensions of the scan etc.*
3. *DICOM images can be read directly in Matlab or install pydicom package if you are programming in Python.*

4. *You can also view DICOM images using ITK-SNAP software. Follow the instructions given in* http://www.itksnap.org/pmwiki/pmwiki.php?n=Downloads.SNAP3 *to install the software.*

References

[1] G. D. Joshi and J. Sivaswamy, "Colour retinal image enhancement based on domain knowledge," in *2008 Sixth Indian Conference on Computer Vision, Graphics Image Processing*, 2008, pp. 591–598.