

TDI2131 Digital Image Processing 2009/2010

Assignment 1: X-Ray Enhancement (8%)



Digital X-rays have been in existence for the past few decades, and with the ever-growing technology of digitization today, it has become a new way of storing them “paperless/filmless” for diagnosis and future reference by medical doctors and clinicians. However, due to the use of various types of X-ray machines, or low-dose X-ray filming, X-ray images can encounter many problems with contrast, level of brightness, or the presence of noise. Thus, it is important to enhance these image so that they can be easily used for human or automated examination and evaluation.

Task

You are required to improve and enhance a given chest X-ray image to its **best possible** output. Since the specific outcome of enhancing an X-ray image can vary depending on what the doctor wants to examine, the general rule adopted here is to obtain the **best possible** output can involve the following improvements:

- Bring out details of bone/body parts
- Remove noise from the image
- Review general condition of image (brightness, contrast, etc.) so that body/bone parts can be easily distinguished.

Identify the problems with your image, elaborate on your steps taken to solve the problem, and include an analysis of your choice of techniques/methods.

All students will be processing a different X-ray image, as indicated by their ID number. The image is in JPG format, with filename “xray_STUDENT ID.jpg”.

Please access <http://pesona.mmu.edu.my/~johnsee/teaching/tdi2131/as1> to obtain your image.

Note: There can be many possible answers or solutions to this task. Different images may require different ways of enhancement. Some images may need more enhancement steps than others. Some images may also be more difficult to process than others, so you will be evaluated fairly based on the difficulty of your task.

Deliverables

1. You are required to submit a short report, highlighting the problems with your image, your proposed steps taken to solve the problem, and an analysis of your proposed techniques/methods. There is **NO** format for the report. Feel free to present it the way you think is best. Code print-outs should be presented with fixed-width fonts (such as `Courier New`, `Consolas`).
2. Include your Matlab m-file(s) that accomplishes your task. Both scripts or functions are acceptable. If you are submitting a function, please comment clearly on its usage.

Please name your submission files with the following naming style, by filling in the “StudentID” (required) and “optionalfilename” (only needed if you have more than 1 file) accordingly.

Report	xray_StudentID.doc or for other file formats (.docx, .pdf, etc.)
Matlab Code(s)	xray_StudentID_optionalfilename.m

You are **NOT** allowed to use any graphic/image-editing softwares to enhance your images. After all, you have to hand-up your proposed steps to solve the problem, and your codes will also be run to verify your proposed solution.

Submission

Do not submit any printed hardcopy. Save the trees!

All files for submission should be zipped and sent to tdi2131@gmail.com with

Subject: **[AS1] <Your ID number>**

Please do not make multiple submissions or spam the submission email. Only submit your final version of files. For questions/enquiries about the assignment, please do not direct them to this submission email.

Deadline for Assignment 1 is at **11.59PM, 5 March 2010 (Friday of Week 7)**. Email timestamp will be regarded as submission time.

Plagiarised work and **late submissions** will be penalized. Your work will be considered plagiarised if it includes text, implementation, and/or codes from various sources (your coursemates', Internet, etc.). Remember, if you can find it in the Internet, so can everybody else!