ENGG1003 - Thursday Week 10

Assignment 2: Image processing

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Lecture overview

1. images as 3D arrays
2. digital image formats
3. data types
4. structure of assignment
   - five (5) functions to get started; no marks, infinite help
   - eight (8) functions, write some or all for 15 marks
5. how to go about the assignment
   - week 10 lab
   - lab question sheet in BB $>$ Assessment
   - write a module called imageProcessing, upload to BB
   - test scripts; getting assessed

1) images as 3D arrays

- raster images
  - gif, jpeg, png
  - contrast with vector images: svg
- review of Sarah's material

2) digital image formats

- colourspaces
  - RGB
  - HSL
  - two different ways of represeting the *same* colour
  - key theme of assignment: RGB <--> HSL
- $[0, 1]$ and $[0, 255]$
- use colour images and links to colour picker

3) data types

- uint8
- uint16
- float32
- float64

- type conversions

4) structure of assignment

first 5 functions

- `loadImage`
  - read image file into 3D numpy array
- `saveImage`
  - save 3D numpy array as image file
- `rgb2hsl`
  - convert image in RGB format to HSL format
- `rgb2hsl`
  - convert image in HSL format to RGB format
- `showImage`
  - display image in window

5) how to go about the assignment

eight (8) functions to be graded in assignment

- `brightness`
  - adjust image brightness
- `contrast`
  - adjust image contrast
- `saturation`
  - adjust image saturation
- `toneMap`
  - adjust image by setting H and S channels of each pixel

eight (8) functions to be graded in assignment (ctd.)

- `crops`
  - crop image
- `histogram`
  - plot histogram of image
- `saturated`
  - compute percentage of pixels which have at least one RGB channel value which has undergone clipping saturation
- `unsharpMask`
  - apply image sharpening technique to image

strategies

- start small
- Lab sheet week 10 first
- test RGB/HSL conversion against colour picker
- remember first 5 functions: infinite help from discord, demonstrators, fellow students
  - no marks for these questions
- while submission to BB will be a single file imageProcessing.py with definitions and code for eight (8) functions, encouraged to develop and test as follows:
  - each function own script, test it
  - define code into function in same file, test it
  - copy/paste working function into imageProcessing.py

Lecture summary

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