CSE428/EEE476 Image Processing

Course Outline, Fall 2022

Course Description (Updated)

Digital image fundamentals: Visual perception, sensing, acquisition, sampling, and quantization.
Intensity transformation and spatial filtering: Different transformations, histogram, correlation and convolution, smoothing and sharpening filters.
Filtering in frequency domain: Discrete Fourier Transform (DFT) of image, smoothing and sharpening in frequency domain, selective filtering.
Image restoration: Noise models, spatial filtering for noise, frequency filtering for noise
Color image processing: Color models, color transformation.
Image transforms: Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT), Discrete Cosine Transform (DCT), Discrete Wavelet Transform (DWT) and subband decomposition.
Image compression: Redundancy, fidelity criteria, some basic compression techniques, some popular image compression standards such as JPEG, JPEG-2000.
Machine Learning and Deep Learning pipeline for image processing tasks: Deep Convolutional Neural Network (CNN), State of the art classical & deep learning techniques for Image Classification, Segmentation, Object Detection & Image Generation.

Course Content

Content

Week 1 - DIP Intro	Week 7 - DL/ML Primer - 2
Week 2 - Point Processing	Week 8 - Classification
Week 3 - Spatial Filtering	Week 9 - Object Detection
Week 4 - DFT & freq. filt.	Week 10 - Segmentation
Week 5 - Restoration	Week 11 - Image Generation
Week 6 - DL/ML Primer - 1	Week 10 - Compression

Assessments

- Assignments ~6/7 (Lab)
- Project (submission, report, presentation)
- Midterm (TBA)
- Final (TBA)

Important Dates

- Midterm: USIS Schedule
- Final: USIS Schedule
- Project presentation: TBA

Marks Distribution

Assessment	Percentage	Total number of assessments	Comment
Lab Assignment	25%	~6/7 (=n)	Best of n-1
Lab Project	25%	1	Submission, presentation
Theory Assign.	5%	TBA	TBA
Midterm	20%	1	Open book (**no electronics**)
Final	20%	1	Open book (**no electronics**)
Attendance	5%	-	90% or higher for full marks

Communication and Update

https://discord.gg/vM2Npk3V2q

Live Class

- Theory (**3:30 PM - 4:50 PM**)
  - Monday
  - Wednesday
- Lab (**2:00 PM - 4:50 PM**)
  - Sunday
- Attendance mandatory as per university policy

Course Team

Tanvir Ahmed

Mohammed Abid Abrar

Beig Rajibul Hasan

DOs and DON'Ts

- Ask questions!
- Ask for help!
- Facing problems? Let us know
- Practice & make mistakes – only way to learn
- Work hard, stay honest - your honesty and integrity will be rewarded

- DO NOT COPY/CHEAT
- DO NOT SHARE YOUR WORK
- DO NOT GIVE EXCUSES - "It won't happen again", "I didn't know they would copy"...
- Punishment - from 0 on that assessment to F, grade capping,suspension
- No DM/@mention related to coursework outside office hours

Questions?