SUBJECT DESCRIPTION FORM

Subject title: Digital Image Processing

Subject code: EIE529

Credit value: 3

Responsible staff and department:
Dr Chris Y.H. Chan and Prof. W.C. Siu, EIE

Pre-requisite:
Nil

Recommended background knowledge:
The student is expected to have some background knowledge of Digital Signal Processing in his undergraduate studies. In particular, he is expected to have a basic understanding of the following topics: linear systems, FIR & IIR Digital Filters, DFT and FFT.

Mutual exclusions: Nil

Learning approach:
Lecture/Seminar/Tutorial 33 hours
Laboratory/Demonstration 9 hours

Assessment:
Examination 50%
Continuous Assessment 50%
Total : 100%

Objectives:
This subject is to enable students to learn a number of important applications of digital signal processing. After the completion of the subject, the student should be able to appreciate and master some image and vision techniques for industrial applications. This subject is also suitable for students who are preparing to carry out research in related areas.
Keyword syllabus:


3. Image Transforms; 2-D Orthogonal and unitary transforms, realisation of 2-D DFT, cosine transform etc.

4. Image Enhancement: Histogram modeling; spatial operations, median filtering, spatial operations and filtering, linear interpolation, zooming, cepstrum and pseudocoloring.


6. Image Analysis and Computer Vision: Feature extraction, histogram; template matching approach; edge detection, gradient operations, sobel operations, laplacian; line, circle and ellipse detection, Hough and generalized transforms; graph-theoretic techniques, thresholding.

7. Image Coding and Compression Techniques: Scalar and vector quantizations, codeword assignment, entropy coding; waveform coding, PCM, DPCM, pyramid coding and adaptive approach; transform image coding, DCT, blocking effect; image model coding; color image coding; halftoning, binary image coding; industrial standards: JBIG, JPEG, Fax.

8. Image Representation and Description Chaincodes, boundary segments, skeletonizing; Fourier descriptors moments and moment invariants, distance measures.

Indicative reading list and references:


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