GIAN

GLOBAL INITIATIVE OF ACADEMIC NETWORKS

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APPLICATIONS OF IMAGE PROCESSING FOR INDUSTRY & RESEARCH

January 15-19, 2018

• INTERNATIONAL EXPERT •

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• PROGRAM COORDINATOR •

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PREAMBLE

Visual information plays an important role in many aspects of our life. Much of this information is represented by digital images. Digital Image Processing is an area of information science and engineering of growing importance with applications in video conferencing/streaming, broadcasting, radar and satellite imaging, infrared imaging, surveillance and security systems, multimedia and medical applications. With the advent of powerful desktop computers and sophisticated color image collection devices color image processing attracted researchers in academia as well as industry. The aim of this short course is to cover wide range of applications of color image processing by sifting through the passage of research and its transition to an industry viable product.

COURSE OBJECTIVES

- To give an overview of Human Vision Systems and color Sensing for building a knowledge base of color image processing.
- To explore color and image appearance models for different applications.
- To study color gamut and color management for imaging devices.
- To acquire an appreciation for the color image processing issues and techniques for application to real world problems.
- Describe potential applications of color image processing to advancement of our knowledge in sciences and engineering, its benefit in policing, public safety and security.

CONTENTS

Day I   Module A: Human Vision and Sensing Color

Overview of the human visual system, optics of the eye, accommodation, rods and cones, cone sensitivities, Grassman's laws of color matching. Color matching experiments and functions. Tristimulus and chromaticity color representations. Overview of CIE Colorimetry. Visual and metameric black subspaces and their computation.

TUTORIAL I

(a) Activity: visualizing retinal blood vessels.
(b) Computational Exercises: Visual subtense and imaging geometry, computing cone responses, CIE Tristimulus values, and chromaticities.

Day II   Module B: Color and Spatial Perception

Advanced Colorimetry, uniform color spaces, color difference formulae, color appearance. Interaction of spatial and color perception, color and image appearance models and their applications.

TUTORIAL II

Transforming between color representations, assessing spatio-chromatic image differences using s-CIELAB.

Day III   Module C: Color in Imaging Devices

Color capture and rendering, physics of additive and subtractive color systems, device characterization, color gamut, and color management.

TUTORIAL III

Modeling device gamuts, comparison of gamuts for different print and display systems, manipulation of perceptual gamut representations.

Day IV   Module D: Processing of Color Images

Spatial and frequency domain representations of signals, sampling, digital image representations, representation of color images for exchange and storage, color image Compression, Color Image

Demosaicking, quantization, half toning, high dynamic range imaging.

TUTORIAL IV

Transformation of images into luma-chroma representation, discrete cosine transforms and JPEG, image demosaicking

Day V   Module E:
Color Image Processing Applications and Research

Brief contents: Color image segmentation, color for object recognition, colour invariants for pattern recognition, denoising and enhancement of color images, color considerations in virtual and augmented reality, computational photography, color in security and surveillance, application demonstrations from current research.

TUTORIAL V

Color image segmentation and denoising

WHO SHOULD ATTEND

Students of M.Tech./Ph.D./Medical and aspiring researcher within the broad domain of signal, image and video processing. Practicing engineers, industry professionals and faculty from academic institutions.

HOW TO REGISTER

Candidate must register at GIAN web portal www.gian.iitkgp.ac.in by paying one time registration fee Rs. 500 and then should apply for the course. Once applied on GIAN Website contact coordinator. DD Should be drawn in favor of "Director, College of Engineering, Pune"
Last Date of Registration: 15.12.2017
Limited Registrations: 50

REGISTRATION FEES

Students (UG & PG)   : Rs. 2,000
Research Scholars   : Rs. 3,500
Faculty Members   : Rs. 5,000
Industry/Professional : Rs.10,000
Foreigners   : USD 250

Prof. Dr. GAURAV SHARMA - PROFILE

Prof. Gaurav Sharma is presently working in University of Rochester, as a Professor in the Department of Electrical and Computer Engineering, from 2008-2010, he served as the Director for the Center for Emerging and Innovative Sciences (CEIS), a New York state supported center for promoting joint university-industry research and technology development, which is housed at the University of Rochester. From 1996 through 2003, he was with Xerox Research and Technology in Webster, NY first as a member of research and technology staff and then as a Principal Scientist and Project Leader. He received Ph.D. in Electrical and Computer Engineering from North Carolina State University, Raleigh, NC, and Master's degrees in Applied Mathematics from NCSU and in Electrical Communication Engineering from the Indian Institute of Science, Bangalore, India. He received his bachelor of engineering degree in Electronics and Communication Engineering from Indian Institute of Technology, Roorkee.

Dr. METKAR SHILPA - PROFILE

Dr. Metkar Shilpa is presently working as Assistant Professor in E & TC Department at College of Engineering, Pune. She has 16 years teaching experience. She is recipient of two National level awards in young scientist category. One Young Engineers Award by The Institution of Engineer's [India] and other Career Award for Young Teacher from All India Council for Technical Education, Delhi. She has published 35+ research papers at national and international level. She has authored two books published by international publishers CRC Press & Springer. Her areas of interest are Digital Signal Processing and Digital Image Processing.

ABOUT COLLEGE OF ENGINEERING, PUNE

College of Engineering, Pune (COEP) is a top-tier Institute in India that boasts a 160-year culture of academic excellence, scientific breakthroughs, and high-tech innovation. COEP is an autonomous engineering institute affiliated to Savitribai Phule Pune University in Pune, Maharashtra, India.

ABOUT DEPARTMENT

Dr. REGE P.P.
H.O.D.

Established in 1948, the department presently offer UG course in Electronics and Telecommunication and four PG courses. All the courses are accredited by National Board of Accreditation, New Delhi.

Department is Recognized Research Center for Ph.D. affiliated to S.P. Pune University, Pune. 50 scholars have been awarded Ph.D. and 68 are pursuing.

PUNE - CULTURAL CAPITAL OF STATE

Pune is popular as cultural capital of Maharashtra. It is well connected by air for domestic as well as international flights, Indian Railway and by road to major cities in the country. In January Pune climate is pleasant with cool atmosphere.

ACCOMODATION

Limited Accommodation can be arranged in institute hostel on prior request and payment as per availability.

CONTACT

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