OVERVIEW OF THE COURSE

Imaging technology has the potential to provide great benefits in terms of public safety and security. Applications such as object detection and collision avoidance have been the subject of sustained worldwide infrastructure investment. However when imaging in adverse atmospheric conditions over short ranges or typical atmospheric conditions over longer ranges (>1 KM), images have poor contrast and little colour. Examples of adverse conditions include fog, rain, mist and blown sand. Automatic image processing may fail in such circumstances. Electronic image processing has been shown to improve both subjective image quality and the reliability of automatic processing in moderate to poor visibility conditions (for example category II and category III fog). Hence it is important to understand and exploit research into processing algorithms for image enhancement. This series of lectures will cover the mechanisms by which contrast loss occurs in visible and Infrared (IR) images, the algorithms which are available for mitigating contrast loss and the practical image processing architectures which can be used to deliver the required electronic processing. The teaching will be reinforced using hands-on practical laboratory work using the SAMEER-TU Outdoor Database of visible and IR images.

The course is intended as a meeting for discussing various imaging technologies, to provide a mechanism for exchange of ideas and technologies between academics and industrial staffs and to attract a global audience.

OBJECTIVES

i) Exposing participants to the fundamentals of atmosphere-induced contrast loss and basic image enhancement technology.
ii) Providing an overview of more advanced techniques for mitigating contrast loss taking into account other factors such as range and scene structure,
iii) Providing practical laboratory exercises to reinforce understanding of basic concepts and to provide interactive illustrations of algorithm capability using samples images from the SAMEER-TU Outdoor Database,
iv) Enhancing the capability of the participants to understand the cause of atmospheric visibility issues and to impart research skills to the beginners and quality development of researchers in writing various research reports, thesis, dissertation, research papers, articles, essays in the domain of security and surveillance.

WHO CAN ATTEND

- Engineers and researchers from manufacturing, service and government organizations including R&D laboratories.
- Students at all levels (B.Tech/M.Sc/M.Tech/Ph.D) or Faculty from reputed academic institutions and technical institutions.

REGISTRATION FEES

- Participants from abroad : US $300
- Industry/ Research Organizations: Rs. 5000/-
- Faculty from Academic Institutions: Rs. 3000/-
- Research Scholars/Students: Rs. 2500/-

HOW TO REGISTER

1. First, 'web register' at GIAN 'Courses Registration Portal': https://goo.gl/AhcCyS. If you're already registered, skip this step.
2. Then, log in, click 'Course Registration' tab on the GIAN Portal, and 'check box' to select this course (Contrast Enhancement in Poor Visibility) from the list. Click 'save' to register, and 'Confirm Course(s)' to confirm.
3. Now, pay the requisite Course Fee online in favour of the Tripura University ,**A/C No: 30371209938, IFSC Code: SBIN0010495, MICR Code:799002524**. Keep the copy of payment info (transaction # & date) handy.
4. Fill up the attached registration form and send it along with the payment proof to the course coordinator.

P.S. Registering on the GIAN portal does not guarantee participation in the course. Please do not confuse with web registration with course registration. You might have been 'shortlisted' after paying the 500/-, but your selection is subject to paying the requisite course fee to Tripura University. For successful enrolment, make sure you've made both the payments.

**The local applicants may also submit the registration form along with registration fee in cash to the course coordinator on hand.

A limited number of rooms may be available in Tripura University Guest House on a first-come-first serve basis. Extra charges are needed for room and board.

Number of participants for the course is limited to 35.

Last date for registration is 9th February, 2018.

In case of any queries, you send an email to the course coordinator.

Course Coordinator:
Dr. Mrinal Kanti Bhowmik
Assistant Professor,
Department of Computer Science & Engineering
Tripura University (A Central University)
Mobile: +91-9436129933 (M)
Email: mrinalkantibhowmik@tripurauniv.in

THE FACULTY

Dr John Peter Oakley (BSc University of Warwick 1978, MSc Brunel University 1984, PhD University of Manchester 1987, CEng) is a Senior Lecturer in the School of Electrical and Electronic Engineering at the University of Manchester and is also Technical Director of Dmist Research Ltd. His research interests are in image processing and optics, with particular emphasis on techniques for the mitigation of contrast loss due to scattering. He has been researching image enhancement techniques for over twenty years and has published over 40 academic journal papers and several international patents in this area. He has pioneered the use of statistical methods to estimate the level of scattered light in images. His group was one of the first to develop automated methods for recovering images taken in conditions of adverse visibility by processing the pixel data according to a physical model for the contrast degradation.

Mrinal Kanti Bhowmik (B.E. (CSE) Tripura Engineering College, Govt. of Tripura 2004, M.Tech (CSE) Tripura University (A Central University) 2007, Ph.D. (Engineering), Jadavpur University 2014) is an Assistant Professor at Tripura University (A central University). His research interests are related to the field of biometric, Computer Vision, Artificial Neural Network, Information Security and Medical Image Processing, etc.

GIAN

GIAN Course
ON
Contrast Enhancement in Poor Visibility

(5th-9th March, 2018)

Organized By

Department of Computer Science & Engineering
Tripura University (A Central University)
Suryamaninagar-799022, Tripura, India

Venue
Tripura University (A Central University)
Suryamaninagar-799022, Tripura, Indi

5th March, 2018 (Monday)	
A.	Introduction, image formation and processing, aperture and the Rayleigh limit
B.	Colour representation and encoding, the human visual system
C.	Processing of Colour images using Matlab (Tutorial)
6th March, 2018 (Tuesday)	
D.	Basic filtering operations, noise reduction and sharpening
E.	Image enhancement, histogram-based equalization
F.	Image defogging using histogram-based processing (Tutorial)
G.	Demonstration of Thermal Image Acquisition (Tutorial)
7th March, 2018 (Wednesday)	
H.	Atmospheric visibility and Koschmieder's Law
I.	Infrared imaging, modeling of spectral transmittance, MODTRAN
J.	Use of MODTRAN software to predict image quality at different wavelengths (Tutorial)
K.	Analysis of Fusion based single image enhancement techniques (Tutorial)
8th March, 2018 (Thursday)	
L.	Range-based image enhancement
M.	Image enhancement based on scene structure, the dark channel prior
N.	Problems covering selection of enhancement algorithms appropriate to different imaging situations (Tutorial)
O.	Quality Assessment Metrics for performance evaluation and comparative analysis of enhancement techniques (Tutorial)
9th March, 2018 (Friday)	
P.	Real-time implementation of image enhancement, hardware architectures, DSP and FPGA implementations
Q.	Review of commercial systems for image enhancement.
Review questions covering all material (Tutorial) and Examination (Multiple Choice Questions)	

ABOUT TRIPURA UNIVERSITY

The state of Tripura is geographically isolated from the rest of India. Due to lack of infrastructure earlier it was difficult for the students of Tripura to pursue higher studies various fields within the state. The State Government took the initiative to pass the Tripura University Act in the Assembly in 1987 and the first University in the state came into being on 2nd October 1987. The objective of the University is not only be "to disseminate and advance knowledge by providing instructional and research facilities" in the state in areas of contemporary relevance to the society and the country but to make special provisions for studies in tribal life and culture and to introduce vocational subjects with a view to provide employment opportunities to the students. A total number of 42 courses run under the University, which includes Certificate Courses, Under Graduate, Post Graduate Diploma and Post Graduate Studies. In addition to these, Ph.D programmes are also offered in 33 subjects. The number of affiliated Colleges at present is 46 among which there are 23 General Degree Colleges, 17 Professional Colleges, 4 Paramedical and Nursing Colleges and 2 Medical Colleges.

ABOUT THE CITY

Agartala, the capital city of Tripura is located in the north eastern region of the country. It covers 10,491 km2 and is bordered by Bangladesh to the north, south, and west, and the Indian states of Assam and Mizoram to the east. Tripura has a picturesque surrounding covered with hills and dales, sprawling green valleys and hilly brooks. The popular Tripura attractions are Kamalasagar Lake, Dumboor Lake, Ujjayanta Palace, Neermahal, Kunjaban Palace, Tripura Government Museum, Jampui Hill, Dumboor Lake etc. The famous Tripureswari Kali Temple is situated in Udaipur city and is about 60 km away from the capital city.The weather condition of Agartala city is moderate with temperature between 21°C to 36°C during summer season and between 8°C to 25°C in winter. Tripura is adorned with a large number of attractive tourist sites. The northeastern state of Tripura is famous all over the world for its rich cultural heritage, beautiful palaces, wildlife sanctuaries, temples, museums. The city has a number of interesting tourist attractions to visit and enjoy.

Registration Form For
GIAN Course On

Contrast Enhancement in Poor Visibility

1. Full Name with Designation:

_____

_____

2. Department and Organization:

_____

_____

3. Experience (in years):

Teaching: _____ Industry: _____

4. Address for Correspondence:

_____

_____

Pin Code: _____

Phone:_____

Mobile No.:_____

E.mail:_____

5. Registration Category (Please Tick): Faculty Member/Research Scholar/ Student/Participants from Industry/Research Organisation.

6. Accommodation: Yes / No

If yes then fill up the following details

Date of arrival:_____Time:_____

Date of departure:_____Time:_____

Room will be provided in shared basis only. Accommodation charge will be accepted by the guest house authority.

7. Details of payment of course:
- Transaction No.: _____
- Date: _____
- Bank: _____
- Amount Rs: _____

8. Are you registered under 'web register' at GIAN 'Courses Registration Portal': Yes / No

9. Have you attached:
a. Pdf of web registration proof: Yes/ No

b. Online payment proof of GIAN Course registration(not the payment of web registration): Yes/ No

c. Institution Identity proof: Yes/ No

Signature of Participant with date

Forwarding Authority:

(Seal and Signature of the principal of Institute/Head of the Department)