

Intelligent Transportation Systems

Overview of the course:

Due to the increasing number of vehicles on road traffic congestion in Indian roads is affecting every citizen very badly. Traffic and transportation play an important part in modern national economics. Specifically, smart construction and operation management plays a key-role in the efficient use of transportation infrastructure and thus can lead to huge economic benefits. However, many areas still suffer from unused potentials. Highway capacity strongly depends on unpredictable incidents and accidents, which can lead to severe traffic congestions and infrastructure damage. Work zones, although being planned, result in high capacity reductions while increasing the risk of accidents. Furthermore, critical spots like tunnels and bridges mean a high risk for individual road users. The main challenge of traffic and transport management in these application fields is the necessity of high quality information, in order to be able to perform efficient management strategies and decisions. In future, additional challenges in traffic and transportation have to be handled, concerning new applications like assisted, autonomous and connected driving.

In order to provide high quality traffic data, video systems are already used at high risk potential spots of the road network today, while being manually observed. Intelligent video detection systems enable automatic observation of traffic flow and safety and generate additional efficiency. It can play a vital role in accident detection, traffic light violation, traffic management, traffic state recognition, automatic toll collection etc.

Every driver has a smart phone now. Sensor fusion of smart phone, accelerometer, camera and GPS can provide solutions for safety driving, warning for line changing, informing the traffic police about accidents, alerting driver about sudden pedestrian crossing, alerting driver if is feeling sleepy, traffic volume calculation, traffic state prediction etc.

On completion of this one week course, the course participants will have an enhanced understanding of video processing and its various applications in designing an intelligent transportation system. Also students will be empowered to design autonomous vehicles

Modules	This course consists of one module only. 27th November, 2017 to 1st December, 2017.
You Should Attend If You are	<ul style="list-style-type: none">▪ Students of B.Tech, M.Tech, Ph.D. research scholars and faculty members of academic institutions and technical institutions.▪ Executives, engineers and researchers from utilities, services and government organizations, including R&D laboratories.
Registration Fees	<p>The participation fees for attending the course is as follows: Overseas Participants: US\$ 200 Industry/ Research Organizations: Rs. 5000 Participants from Academic Institutions: Rs. 2000 (Rs. 1000 for SC/ST participants) Research Scholars/Students/Alumni: Rs. 1000 (Rs. 500 for SC/ST participants)</p> <p>After registration on GIAN portal http://www.gian.iitkgp.ac.in/GREGN/index, the candidates are advised to submit the prescribed fee in the form of DD in favor of “Registrar, DTU” payable at Delhi along with printout of online submitted application form to Dr. N. S. Raghava, Course Coordinator (GIAN), Department of Electronics and Communication Engineering, Delhi Technological University, Bawana Road, Delhi-110042 on or before 19.11.2017. The shortlisted participants will be informed through e-mail.</p> <p>The above fee includes all instructional materials, computer use for tutorials and assignments and laboratory equipment usage charges. The course fee does not include boarding and lodging. The paid hostel/guest house accommodation may be provided on first come first serve basis with prior request.</p>

Teaching Faculty



Miguel Angel Sotelo was born in Talavera de la Reina, Spain, in October 1971. At present, he is Full Professor at the Computer Engineering Department of the **University of Alcalá, Spain**. He received the Dr. Eng. degree in Electrical Engineering in 1996 from the Technical University of Madrid, the Ph.D. degree in Electrical Engineering in 2001 from the University of Alcalá (UAH), Madrid, Spain, and the Master degree in Business Administration (MBA) from the European Business

School in 2008. He is Head of the INVETT Research Group and Vice-President for International Relations at the University of Alcalá. He was Director General of Guadalab Science & Technology Park (2011-2012) and Head of the Robe Safe Research Group (2006-2010). In May-June 2010 he was Dean of the Technical School of UAH and Vice-dean of the same School in the period 2004-2010. His research interests include Driverless Vehicles, Cooperative ITS Systems, and Traffic Technologies. He is the author of more than 200 refereed papers in journals and international conferences, and corresponding author of 15 national patents and 1 PCT patent. He has been recipient of the Prize for the Best Team with Full Automation of GCDC 2016, the 2013 ITSS Outstanding Application Award, the 2010 Outstanding Service Award of the IEEE ITS Society, Best Research Award in the domain of Automotive and Vehicle Applications in Spain, 2002 and 2008, the 3M Innovation Awards in the category of e-Safety in 2003, 2004 and 2009, and the Best Young Researcher Award of the University of Alcalá in 2004.

He is Member of the IEEE ITS Society Executive Committee, and Member of the Steering Committee of IEEE Transactions on Intelligent Vehicles. He has been a member of the IEEE ITS Society Board of Governors (2012-2014), Editor-in-Chief of IEEE Intelligent Transportation Systems Magazine, (2014-2017) Associate Editor of IEEE Transactions on Intelligent Transportation Systems (2008-2015), member of the Editorial Board of The Open Transportation Journal (2006-2015), President of the Spanish Chapter of IEEE ITS Society (2015-2016), and Editor-in-Chief of IEEE Intelligent Transportation Systems Society Newsletter (Jan 2013 – Jan 2014). He served as General Chair of the 2012 IEEE Intelligent Vehicles Symposium, as well as Program Chair and member of Program/Organizing Committees in more than 30 international conferences. Currently, he is President-Elect of the IEEE Intelligent Transportation Systems Society (starting Jan 2017). In 1997 he was Research Visitor at the RSISE department of the Australian National University. From 2004–2010 he served as Auditor and Expert at FITSA Foundation for RTD Projects in the domain of automotive applications. He has served as Project Evaluator, Rapporteur, and Project Reviewer for the European Commission in the field of ICT for Intelligent Vehicles and Cooperative Systems in the VI and VII Framework Programmes. In the period 2009-2015, he was CEO of Vision Safety Technologies Ltd, a spin-off company established to commercialize computer vision systems for road infrastructure inspection.

Host Faculty



Dr. S. Indu is currently working as Professor in Electronics and Communication Engineering Department of Delhi Technological University. She did her graduation and Post-graduation in Electrical Engineering from University of Kerala and PhD in Electronics and Communication Engineering from Delhi University. She has around 20 years of teaching experience. She has successfully completed 3 sponsored projects sponsored by Naval Research Board and DST. She has around 50 publications in Conferences and referred Journals. Her areas of interest are wireless sensor network, computer vision and image processing



Dr. N. S. Raghava is currently working as Professor in Electronics and Communication Engineering, Delhi Technological University. He has graduated and Post-graduation in Electronics and Communication Engineering from Osmania University, Hyderabad and BITS, Pilani and Doctorate degree in Electronics and Communication Engineering from Delhi University. He has successfully completed three sponsored projects in Unmanned Aerial Vehicle and automation of the same with different technical

aspects. He has 40 publications in referred journals and conferences. His areas of interest are security, antennas and propagation, wireless communication and cloud computing.

Course Coordinator(s)

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For Registration:

<http://www.gian.iitkgp.ac.in/GREGN/index>

MHRD Scheme on Global Initiative on Academic Network (GIAN)

Course Title: Intelligent Transportation Systems

Course Schedule (27th November, 2017 to 1st December, 2017)

27th November, 2017

Registration and Inauguration: 9:00 AM to 11:00 AM

Monday Nov 27	11.00 AM – 1.00 PM	Lecture 1:	Image Processing and application. Machine Learning
	2.30 PM – 4.30 PM	Tutorial 1:	Problem solving session on basics of image processing (SIFT features for image retrieval from database)
Tuesday Nov 28	9.30 AM-11.00AM	Lecture 2:	Introduction to ADAS, Autonomous Driving, and Features Detection
	11.30AM- 1.00PM	Lecture 3:	ADAS Part I: Pedestrian Detection
	2.30 PM- 4.30 PM	Tutorial 2:	Hands on experience in Pedestrian Detection and Lane Departure Warning System (LDWS)
Wednesday Nov 29	9.30 AM-11.00AM	Lecture 4:	ADAS Part II: vehicles (ACC), traffic signs, lane markers, and visual monitoring of driver attention
	11.30AM- 1.00PM	Lecture 5:	Road Scene Interpretation. Deep Learning
	2.30 PM- 4.30 PM	Tutorial 3:	Problem solving session on Traffic Signs classification using Support Vector Machines (SVM)
Thursday Nov 30	9.30 AM-11.00AM	Lecture 6:	Vision-based global localization for autonomous driving
	11.30AM- 1.00PM	Lecture 7:	Traffic monitoring and event detection
	2.30 PM- 4.30 PM	Tutorial 4:	Problem solving on image classification using Convolutional Neural Networks (CNN)
Friday Dec 1	9.30 AM-11.00AM	Lecture 8:	Autonomous Driving: present and future. Sensor fusion. Cooperative Autonomous Driving
	11.30AM- 1.00PM	Lecture 9:	Pedestrian path prediction based on body language
	2.30 PM- 4.30 PM	Evaluation	Test and Certificate distribution to the participants