



GLOBAL INITIATIVE OF ACADEMIC NETWORKS  
(GIAN)



Ministry of Human Resource Development  
Government of India

**MANGALORE UNIVERSITY**



**ONE WEEK GIAN COURSE ON**

**VISUAL OBJECT RECOGNITION**

**[15<sup>th</sup> Jan.2018 to 19<sup>th</sup> Jan. 2018]**

## **OVERVIEW**

Due to the rapid development in electronics, communication and hardware technology, there is a high demand for the design of automated intelligent systems in industrial works, medical imaging, defense and biometrics. The performance of such automated intelligent systems depends upon suitable choice of machine learning algorithms. The machine learning process involves object extraction, representation and classification. Hence, object representation and classification constitute a deeply entrenched and ubiquitous component of any automated intelligent systems. Here, visual object recognition problem is central to computer vision research. From robotics to information retrieval, many desired applications demand the ability to identify and localize categories, places, people and objects. In this course, we provide an insight into various state of the art computer vision algorithms for visual object recognition classification. We introduce primary representations and learning approaches, with an emphasis on recent advances in the field. The target audience consists of researchers or students working in AI, Robotics, Machine Learning, or Computer Vision who would like to understand what methods and representations are available for these problems. This lecture summarizes what is and isn't possible to do reliably today, and overviews key concepts that could be employed in systems requiring visual categorization.

## **OBJECTIVES**

The primary objectives of the course are as follows:

- a) Exploring the fundamentals of Machine Learning and Computer Vision
- b) To provide an overview on the types of methods that figure most prominently in object recognition research today, in order to give a survey of the concepts, algorithms, and representations that one might use to build a visual recognition system.

- c) Providing an exposure to practical problems and their solutions, through case studies on surveillance and biometrics based live projects in object recognition
- d) We wrap up our coverage of specific objects by outlining example end-to-end systems from recent work, pulling together the key steps on local features and matching.

Recognition is a rather broad and quickly moving field, and so we limit our scope to methods that are already used fairly frequently in the literature and we assume that the reader has basic familiarity with machine learning algorithms for supervised classification, and some background in low-level image processing.

**COURSE DETAILS: Duration: January 15-19, 2018 (5 days)**

### **LECTURE SCHEDULE**

- **Motivation, Problems, Machine Learning concepts**
- **Basics in Classification** (NN, Generative Classifier, Linear Classifiers, Non-Linear With Kernels)
- **Features** (Local Features, Bag Of Words, Pooling) **and Object Localization** (Viola/Jones, HOG)
- **Deep Learning** (ANN, CNN, LSTM, Current Research Directions)
- **Life-Long Learning** (Novelty Detection, Active Learning, incremental update of classifiers)

### **Who Should Attend?**

- Student at all levels (BTech/BE/ME/MCA/MSc/MTech/PhD)
- Faculty from Universities and Technical Institutions
- Researchers from Industry

### **The participation fees for taking the course is as follows:**

- UG/PG Students: Rs.1000/-
- Research Scholars:Rs.2000/-
- Faculty/ Freelancer : Rs.3000/-
- Industry Participants: Rs. 5000/-
- International Participants : 300/- USD

The participants will be provided with accommodation on payment basis.

## Teaching Faculty: Prof. Dr. Joachim Denzler

Joachim Denzler, earned the degrees 'Diplom-Informatiker', 'Dr.-Ing.' and 'Habilitation' from the University of Erlangen in years 1992, 1997, and 2003, respectively. Currently, he holds a position of full Professor for computer science and is head of the Computer Vision Group, Department of Mathematics and Computer Science, Friedrich Schiller University. He is also Director of the Michael Stifel Center for Data-Driven and Simulation Science, Jena. His research interests comprise the automatic analysis, fusion, and understanding of sensor data, especially development of methods for visual recognition tasks and dynamic scene analysis. He contributed in the area of active vision, 3D reconstruction, as well as object recognition and tracking. He is author and co-author of over 250 journal and conference papers as well as technical articles. He is a member of IEEE, IEEE computer society, DAGM, and GI.



## Course Coordinator: Prof. B H Shekar

Earned M.Sc., in Computer Science from the University of Mysore, Mysore, INDIA in 1994. Between 1994-1997, he worked in the College as a Lecturer. Since 1997, worked as Lecturer, Senior Lecturer, Reader, Associate Professor and currently working as Professor in the Department of Computer Science, Mangalore University, Mangalore. Received the Ph.D. degree (2007) in Computer Science from the University of Mysore, India. Specialized in Pattern Recognition, Image Processing, Database Systems and Data Structures. Published nearly 145 articles in International and National level Journals and Conferences. Awarded DAAD fellowship to carry out part of his research work University Nurenburg, Germany during 2004 and Commonwealth Academic fellowship to carry out his Post-doctoral work at University of Surrey, UK during 2014 and Teachers Fellowship, DRDO Fellowship and NMS scholarship during his Research, Master's and Graduate Studies. Successfully completed two collaborative project work with Moscow State University, Moscow awarded under DST-RFBR sponsorship and a bilateral workshop with Moscow State University, awarded under DST-RFBR sponsorship: Emerging Applications of Computer Vision-2011.



### CONTACT DETAILS:

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