

COLLEGE OF ENGINEERING PERUMON, KOLLAM
DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
FACULTY DEVELOPMENT PROGRAMME ON
COMPUTER VISION AND MACHINE LEARNING

(Sponsored by KTU)

24th-26th July 2019



A brief report

Computer vision is an interdisciplinary scientific field that deals with how computers can be made to gain high-level understanding from digital images or videos. From the perspective of engineering, it seeks to automate tasks that the human visual system can do. Computer vision tasks include methods for acquiring, processing, analyzing and understanding digital images, and extraction of high-dimensional data from the real world in order to produce numerical or symbolic information, e.g., in the forms of decisions. Understanding in this context means the transformation of visual images (the input of the retina) into descriptions of the world that can interface with other thought processes and elicit appropriate action. This image understanding

can be seen as the disentangling of symbolic information from image data using models constructed with the aid of geometry, physics, statistics, and learning theory

Computer vision coupled with machine learning used for several applications like object or face recognition, verification, identification, emotional analysis, smart cars and list goes on. The FDP on 'Computer vision and Machine Learning' aims to provide the basic concepts of Computer vision and highlights the research applications associated with computer vision and machine learning

The FDP is inaugurated by Dr. Deepak Mishra, Associate Professor, and IIST Trivandrum. He articulated about Computer vision and highlighted its importance. Dr. Z.A, Principal in Charge College of Engineering Perumon presided over the meeting. Welcome Speech was delivered by Mrs. Deepa K Daniel , Assistant Professor in IT and Mr.. Bejoy Abraham, Head of the Department, Computer Science & Information Technology gave an overview of the programme .Dr. Bindu S.J, Head of the Department Electrical and Electronics Engineering , Dr.R.Bijukumar, Head of the Department, Electronics and Communication Engineering gave felicitation address. With the Vote of Thanks of Mrs. Surya S.R, Assistant Professor in IT ended the inaugural session

The resource persons of the fdp are

1. Deepak Mishra, Associate Professor, Indian Institute of Space Science and Technology, Valiamala, Thiruvananthapuram
2. Dr. Sumitra S, Associate Professor, Indian Institute of Space Science and Technology, Valiamala, Thiruvananthapuram
3. Dr. Vishnukumar S, Head of Department (Computer Engineering) at Govt. Polytechnic College, Idukki
4. Dr. Vinith R, Associate Professor, Jyothi Engineering College, Cheruthuruthy, Thrissur
5. Dr. Gopakumar G, Assistant Professor, Department of Computer Science and Engineering, NIT Calicut

24th July 2019 (Wednesday)

Morning session was handled by Dr. Deepak Mishra, Associate Professor, IIST Trivandrum.

He gave an overview on

- Computer Vision

- Related disciplines
- Difference between image processing and computer vision
- Applications of computer vision
- History of Computer vision
- Challenges in computer vision problems
- The correspondence problem
- Reconstruction from correspondence
- Pose- estimation/Camera calibration
- Characteristics of good feature points
- Corner detection
- Feature description and mapping
- The aperture problem
- SIFT descriptor

Afternoon session was handled by Dr Sumitra S, Associate Professor, IIST Trivandrum. She delivered a talk on Machine learning and neural networks .She gave an overview on various machine learning algorithms and its mathematical implications. She covered

- Machine learning basics
- Applications of machine learning
- Types of learning
- Regression
- Gradient descent , stochastic gradient descent
- Perceptron
- Construction of neural network
- Back propagation

25th July 2019(Thursday)

Morning session was handled by Dr. Vishnukumar S, Head of Department (Computer Engineering) at Govt. Polytechnic College, Idukki.. . He took a session on 'Introduction to Deep Learning and Understanding and Visualizing CNN.

He covered

- Deep learning
- Deep Neural networks
- Convolutional neural networks
- Detecting edges
- Padding and pooling
- Alexnet
- Feature maps
- Famous CNN Models
- Challenges of CNN
- Transfer learning

Afternoon session was handled by Dr. Deepak Mishra, Associate Professor, IIST Trivadrur. He handled a session on 'Recurrent neural networks'

He covered

- Recurrent neural networks
- Temporal dependencies
- Introducing recurrence
- RNN examples
- RNN training
- Back propagation through time
- Vanishing gradient
- Bidirectional RNN

26th July 2019(Friday)

Morning session was handled by Dr. Vinith R, Associate Professor, Jyothi Engineering College, Cheruthuruthy, Thrissur. He delivered a talk on ‘Applications and Research directions in Computer Vision and Deep Learning’. He discussed

- Computer vision and deep learning applications
- Research areas in computer vision and machine learning
- Structural learning concepts
- One shot learning
- Conditional Random Fields as RNN
- Conditional random fields as Recurrent Neural Networks
- Matching networks for one shot learning

Afternoon session was handled by Dr. Gopakumar G, Assistant Professor, Department of Computer Science and Engineering, NIT Calicut. He took a session on ‘Support Vector Machine and Fuzzy Logic’. He covered

- Introduction to SVM
- Properties of SVM
- Linear classifiers
- Solving the optimization problem
- Dataset with noise
- Linear and non linear SVM
- SVM Applications
- Weakness of SVM
- Text categorization using SVM
- Fuzzy classification

Valedictory session held at 4.00pm. Certificates and Text book on Machine Learning were distributed by Dr.Gopakumar G, Assistant Professor NIT Calicut. Participants gave their feedback. The session come to an end at 4.30pm on 26.07.2019. About 30 participants attended the workshop out of which 20 are external participants. The sessions were very informative and research oriented.