

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	BTech All (Other than CSE)
Course Code:	3CS303IE24
Course Title:	Multimedia Analytics
Course Type:	Interdisciplinary Minor- Elective
Year of Introduction:	2024-25

L	T	Practical Component				C
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Course Learning Outcomes (CLO):

At the end of the course, the students will be able to –

1. explain the basic concepts of multimedia analytics (BL2)
2. compare various techniques for image and video processing (BL4)
3. analyse audio data using multimedia analytics methods (BL4)
4. interpret applications with multimedia content mining techniques. (BL5)

Unit	Contents	Teaching Hours (Total 45)
Unit-I	Introduction to Multimedia Analytics: Overview of Multimedia Analytics, Data Representation, Multimedia Data Formats and Standards, Data Preprocessing Techniques	09
Unit-II	Audio Analysis and Classifiers: Basics of Digital Audio, Use of Neural networks, Backpropagation, Deep learning networks in Multimedia Analytics, Fuzzy Classifier, Bayesian classifier, HMM-based classifier	12
Unit-III	Image and Video Processing: Image and Video Compression Techniques, Image Processing Techniques, Video Processing and Analysis, Object Detection and Tracking in Videos	10
Unit-IV	Multimedia Content Mining: Content-Based Multimedia Retrieval, Multimedia Information Retrieval Techniques, Multimedia Data Mining Algorithms, Ethical and Legal Issues in Multimedia Analytics	10
Unit-V	Advanced Topics and Applications: Multimedia Big Data Analytics, Augmented Reality and Virtual Reality Applications, Case Studies and Real-world Applications of Multimedia Analytics	04

Self-Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/ References:

1. Ralf Steinmetz and Klara Nahrstedt, Multimedia: Computing, Communications and Applications, Pearson Education
2. Borko Furht and Oge Marques, Content-Based Image and Video Retrieval, Springer Science and Business Media
3. Nilanjan Dey, Amira Ashour and Suvojit Acharjee, Applied Video Processing in Surveillance and Monitoring Systems, IGI global



4. Zhihao Chen, Ye Yang, Jingyu Xue, Liping Ye, Feng Guo, The Next Generation of Video Surveillance and Video Analytics: The Unified Intelligent Video Analytics Suite, CreateSpace Independent Publishing Platform
5. Caifeng Shan, Fatih Porikli, Tao Xiang, Shaogang Gong, Video Analytics for Business Intelligence, Springer

Suggested List of Experiments:

Sr. No.	Title	Hours
1	Introduction to Multimedia (Image, Audio and Video)	02
2	Introduction to Multimedia Tools and Software	02
3	Introduction to Neural Network	02
4	Create the AND gate using the ANN	04
5	Introduction to CNN	04
6	Image Processing using CNN	04
7	Audio Processing	04
8	Video Processing	04
9	Multimedia Content Mining	02
10	Multimedia Analytics	02