



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

M. Tech CSE (Artificial Intelligence) / Artificial Intelligence

SEMESTER- III (2025-27)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTCSDS301	DCC	Social Media Analytics	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Equip students with fundamental knowledge of social media analytics.
2. Enable learners to interpret, analyze, and utilize social media data effectively.
3. Familiarize students with key tools and techniques for analyzing social media performance.
4. Develop practical skills for tracking online consumer behavior and digital campaign success.
5. Encourage strategic decision-making through data-driven insights from social platforms

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Understand the importance and application of social media analytics in modern business contexts.
2. Gain hands-on experience with analytics tools and metrics.
3. Develop strategies for optimizing social media campaigns based on data analysis.
4. Interpret consumer behavior and engagement trends using analytical techniques.
5. Create actionable reports to enhance brand presence and ROI

SYLLABUS

UNIT I

9 HOURS

Introduction to Social Media Analytics: Basics of social media platforms and their significance. Overview of social media analytics: scope and importance. Types of data: structured, unstructured, and semi-structured. Ethical considerations and privacy concerns social media analytics.

UNIT II

9 HOURS

Data Collection and Visualization: Data scraping and APIs for social media platforms. Tools for data collection: Google Analytics, Hootsuite, etc. Visualizing data: Dashboards, charts, and graphs. Understanding key performance indicators (KPIs) for social platforms.

UNIT III

9 HOURS

Analytical Techniques and Tools: Sentiment analysis and natural language processing. Social network analysis (SNA), Predictive analytics for social trends, Tools: Tableau, Power BI, Netlytic

UNIT IV

9 HOURS

Campaign Monitoring and Optimization: Measuring campaign effectiveness: reach, engagement, impressions.

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A/B testing and experimentation in social media campaigns. Competitive analysis on social media platforms. Case studies of successful and failed campaigns.

UNIT V

9 HOURS

Advanced Topics and Future Trends: Social media listening and brand reputation management, Impact of artificial intelligence and machine learning, Predictive models for viral content, Future of analytics: AR/VR, Metaverse, and beyond.

TEXTBOOKS:

- "Social Media Analytics: Techniques and Insights for Extracting Business Value Out of Social Media" by Matthew Ganis & Avinash Kohirkar.

REFERENCE:

- "Advanced Analytics and AI" by Tony Boobier.
- "Analyzing Social Media Networks with NodeXL" by Derek Hansen, Ben Shneiderman, and Marc A. Smith.
- "Big Data and Social Science: Data Science Methods and Tools" by Ian Foster et al.

LIST OF PRACTICALS

- Perform sentiment analysis on Twitter data using Python or R.
- Track and analyze engagement metrics for a brand's Instagram campaign.
- Examine audience demographics (age, location, etc.) for a specific brand page on Facebook or Instagram Insights.
- Study how engagement metrics change based on the time posts are published.
- Identify trending keywords in a domain using tools like Google Trends or basic Excel functions.

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MTCSAI302	DCC	Computer Vision	60	20	20	30	20	3	0	2	4

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COURSE OBJECTIVES:

The student will have the ability:

1. To understand the fundamentals of image formation, image processing techniques, and feature extraction methods used in computer vision.
2. To apply computer vision algorithms for image segmentation, object detection, depth estimation, and motion analysis.
3. To evaluate advanced computer vision models for scene understanding, 3D reconstruction, and shape analysis.

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Explain the principles of image formation, image enhancement, transformations, filtering techniques, and feature extraction methods used in computer vision systems.
2. Apply computer vision algorithms for feature detection, image segmentation, depth estimation, object detection, and motion analysis in real-world applications.
3. Apply concepts of camera geometry, stereopsis, and multi-view vision to estimate depth and reconstruct 3D scenes using techniques like homography, DLT, and RANSAC.

SYLLABUS

UNIT I

9 HOURS

Digital Image Formation and low-level processing: Overview and State-of-the-art, Fundamentals of Image Formation, Transformation: Orthogonal, Euclidean, Affine, Projective, etc; Fourier Transform, Convolution and Filtering, Image Enhancement, Restoration, Histogram Processing, introduction to computer vision.

UNIT II

9 HOURS

Feature Extraction: Shape, histogram, color, spectral, texture, Feature analysis, feature vectors, distance /similarity measures, data preprocessing, Edges - Canny, LOG, DOG; Scale-Space Analysis-Image Pyramids and Gaussian derivative filters, Gabor Filters and DWT; Line detectors (Hough Transform), Orientation Histogram, SIFT, SURF, GLOH, Corners - Harris and Hessian Affine.

UNIT III

8 HOURS

Depth estimation and Multi-camera views: Perspective, Homography, Rectification, DLT, RANSAC, 3-D reconstruction framework; Binocular Stereopsis: Camera and Epipolar Geometry; Auto-calibration. Image

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Segmentation: Region Growing, Edge Based approaches to segmentation, Graph-Cut, Mean-Shift, MRFs, Texture Segmentation; Object detection

UNIT IV

9 HOURS

Motion Analysis: Optical Flow, KLT, Spatio-Temporal Analysis, Background Subtraction and Modelling, Dynamic Stereo; Motion parameter estimation.

UNIT V

9 HOURS

Shape from X: Light at Surfaces; Use of Surface Smoothness Constraint; Shape from Texture, color, motion and edges Albedo estimation; Photometric Stereo; Phong Model; Reflectance Map.

TEXTBOOKS:

1. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer-Verlag London Limited 2011.
2. Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, 2003.

REFERENCE:

1. Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press, March 2004.
2. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Addison- Wesley, 1992.

LIST OF PRACTICALS

1. Study of image formation and image representation (grayscale & color).
2. Load an image and improve contrast using histogram equalization.
3. Apply Gaussian, Median, and Laplacian filters for smoothing and sharpening.
4. Perform DFT/FFT and apply low-pass & high-pass filters in frequency domain.
5. Extract keypoints and descriptors using SIFT or SURF.
6. Implement Canny, LoG, and DoG edge detection and compare results.
7. Detect straight lines in an image using Hough Transform.
8. Perform segmentation using Region Growing / Thresholding / Mean-Shift.
9. Compute disparity map from stereo images for depth estimation.
10. Implement Lucas-Kanade (KLT) optical flow for motion tracking.

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