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Question Paper Code: U4103

B.E. / B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Professional Elective

Electronics and Communication Engineering

21ECV103- VIDEO PROCESSING AND ANALYSIS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. A 5-minute video recorded at 30 fps contains how many frames? CO2-App
(a) 150 frames (b) 300 frames (c) 900 frames (d) 9,000 frames
2. The mathematical approach used in frequency-domain motion estimation for analyzing pixel intensity changes is: CO1-U
(a) Fourier transform (b) Optical flow equation
(c) Kalman filter (d) Principal component analysis
3. The tool is best suited for unstructured data? CO1-U
(a) MySQL (b) Oracle (c) Power BI (d) Hadoop
4. The feature is commonly used in content-based video categorization CO1-U
(a) Metadata (b) Motion Features
(c) File Names (d) Timestamps
5. Affective video content analysis is most beneficial for CO1-U
(a) Live event streaming. (b) Personalized video recommendations.
(c) Detecting damaged video frames. (d) Resolving video compression issues.

PART – B (5 x 3= 15 Marks)

6. Define Bit Depth and how does it impact video quality? CO1-U
7. Apply the mathematical model of the Lucas-Kanade algorithm to compute motion estimation for a given set of image gradients and temporal differences. CO3-App
8. Mention the tools used for data storage and retrieval. CO1-U

9. Differentiate between content-based and metadata-based video categorization. CO1-U
10. Outline the challenges faced in parsing videos into semantic segments. CO1-U

PART – C (5 x 16= 80 Marks)

11. (a) Explain the differences between Interlaced Scan and Progressive Scan video formats and their impact on visual quality and display technologies. CO1-U (16)

Or

 (b) Explain the importance of higher sampling rates in audio and video systems. How do higher sampling rates improve both video and audio quality. CO1-U (16)

12. (a) Apply the global optical flow algorithm to estimate the motion of vehicles in real-time traffic surveillance video, while handling challenges such as varying lighting conditions, occlusions and fast-moving objects. CO2-App (16)

Or

 (b) Given a video sequence of moving vehicles with conditions such as varying lighting, large motion, and occlusions, analyzes two optical flow estimation methods based on their performance in these scenarios. Consider the following factors: accuracy in tracking vehicle movement, computational efficiency, robustness to noise, and ability to handle occlusions. CO2-App (16)

13. (a) Implement analytic tools to extract trends from a web data repository. Explain how scalable systems can adapt to the following conditions: CO1-U (16)
 - i. Data originates from customer reviews in an E-commerce platform.
 - ii. Analysis focuses on sentiment classification.

Or

 (b) Express the limitations of conventional systems for managing high-velocity data streams CO1-U (16)

14. (a) Classify a dataset of educational videos based on visual content and descriptive attributes. Examine the impact of categorization on improving accessibility. CO4-App (16)

Or

- (b) Use categorization methods to organize a video database containing various genres. Explain how the techniques improve user engagement on a streaming service. CO4-App (16)

15. (a) Analyze the role of content repair algorithms in addressing imperfections in damaged video files. List their application in revitalizing vintage media and ensuring seamless live-stream playback. CO5-Ana (16)

Or

- (b) Analyze the techniques used in video inpainting to remove artifacts like watermarks or scratches and their implications for content restoration and media production. CO5-Ana (16)

