

Assignment NO : 6 DL

Q1. Write a short note on computer vision?

- - Computer Vision is a field of artificial intelligence that enables machines to interpret and understand visual information from the world, much like humans.
- It involves the automatic extraction, analysis, and comprehension of useful information from images or videos.
- Computer vision systems use machine learning and deep learning techniques to perform tasks such as object detection, facial recognition, image classification, and image segmentation.

Application:-

- Healthcare: Medical imaging (e.g., detecting tumors, analyzing X-rays).
- Autonomous Vehicles: Object detection and navigation.
- Security: Facial recognition & surveillance.
- Retail: Product recognition and inventory management.
- Augmented Reality (AR): Overlaying digital content on the physical world.

Q2. Write a short note on speech recognition.

→ Speech recognition is a technology that enables computers to interpret and transcribe spoken language into text. It converts audio signals into words using natural language processing (NLP) and machine learning techniques. Speech recognition systems can process and understand different accents, language, and dialects, making it possible to interact with machines through voice commands.

Applications:

- Virtual assistants: (e.g., Siri, Alexa, Google assistant) that respond to voice commands.
- Transcription Services: Automatic conversion of speech to text for meetings, interviews or lectures.
- Accessibility Tools: Helping individuals with disabilities interact with technology.
- Customer Service Automation: IVR systems that understand customer queries over the phone.

Q3. Write a short note on NLP.

→ Natural Language Processing (NLP) is a branch of artificial intelligence that focuses on enabling computers to understand, interpret and generate human language. It combines linguistics and machine learning to analyze text and speech data, allowing machines to communicate with humans in natural language.

Applications:

- Sentiment analysis: Determining the emotional tone of text (e.g., positive or negative reviews).
- Machine Translation: Automatically translating text between languages (e.g., Google Translate).
- Chatbots and Virtual Assistants: Enabling conversational interactions with machines.
- Text Summarization: Condensing large volumes of text into shorter, meaningful summaries.
- Speech Recognition: Converting spoken language into text.

Q4. Write a short note on recommendation engines.

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- Recommendation Engines are systems designed to suggest relevant items to users based on their preferences, behaviors, or interactions.
 - These engines play a crucial role in improving user experience by filtering vast amounts of data and providing personalized recommendations.

Types of recommendation engines include:

- Content-Based Filtering: Recommends items similar to what a user has liked in the past, based on item features (e.g., recommending books similar to those previously read).
- Collaborative Filtering: Suggests items based on the preference of similar users (e.g., users who liked this movie also liked another).

- Hybrid Systems : Combine both content-based and collaborative filtering to improve recommendation accuracy.

Application

- E-commerce : Suggesting products on Amazon.
- Streaming services : Recommending movies or shows on Netflix.
- Social Media : Suggesting connections or content on platforms like LinkedIn or Facebook.

Q. Write a short note on social network analysis (SNA).

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- Social Network analysis (SNA) is a method used to study the relationships and interactions between individuals, groups or organizations within a network.
 - It involves analyzing the structure of social networks, identifying patterns of connections (called ties), and understanding how these connections influence behaviors and information flow within the network.

Components of SNA :-

- Nodes : Represent individuals or entities within the network.
- Edges (Links) : Represent relationships or interactions between nodes.
- Centrality : Measures the importance of a node within the network, such as how influential or well-connected it is.
- Clusters : Groups of nodes that are more densely connected to each other than to the rest of the network.

Applications include:

- Marketing: Identifying influencers and key nodes for target marketing.
- Epidemiology: Tracking the spread of diseases within a population.
- Organizational Studies: Analysing communication & collaboration patterns within companies.

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→ What are some of major application of SNA.

- ① Marketing: Identifying key influence for target campaigns (e.g., influencer marketing on social media).
- ② Epidemiology: Tracking disease spread by analyzing human interaction patterns (e.g., COVID-19 transmission).
- ③ Criminal Network: Mapping illegal networks to identify and disrupt key players (e.g., counterterrorism).
- ④ Organizational Behavior: Improving company communication by analyzing employee collaboration networks.
- ⑤ Politics: Studying influence in political network and public opinion (e.g., during elections).
- ⑥ Scientific Collaboration: Analysing research networks to understand knowledge sharing.

⑦ Education: Enhancing student collaboration in learning environment.

⑧ Supply Chain: Optimizing relationships between suppliers & distributors.

⑨ Customer Relationship Management: Understanding customer behavior and connections for better segmentation.