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D127771(022)

B. Tech. (Hon's) (Seventh Semester) Examination, Nov-Dec, 2024

(AICTE Scheme)

(Artificial Intelligence)

INTELLIGENT SYSTEM AND ROBOTICS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

***Note** : Each question contains four parts. part (a) is compulsory each 4 marks and attempt any two from (b), (c) and (d). Each are 8 marks. Include suitable header file in all your program.*

Unit-I

1. (a) List out any five applications of robotics?

   (b) Demonstrate the principles of robotics with suitable example.

(c) Explain the main phases in the software development life cycle. 8

(d) What are the principles and practices of agile software development model. 8

Unit-II

2. (a) What is modularity principle of software design? 4

(b) Define different levels of abstraction. Explain various types of attributes in entity-relationship diagram with example. 8

(c) What is unified modeling language? Explain various types of structural diagrams in unified modeling language. 8

(d) Write short notes on : 8

(i) Client-Server architecture

(ii) Microservices architecture

Unit-III

3. (a) What do you understand by conventions in software engineering? What are the various coding conventions? 2+2=4

(b) Explain different programming paradigms in software development. Give two example of documentation tools. 6+2=8

(c) What is unit testing? Explain test driven development. 8

(d) What is "big bang" non-incremental integration? Explain the types of integration testing. 2+6=8

Unit-IV

4. (a) Explain version control systems. 4

(b) Draw the work flow of software configuration management. What approaches are used for modernizing the legacy systems? 2+6=8

(c) Define software maintenance. Explain the types of maintenance. 8

(d) Describe various code refactoring techniques. Give example of encapsulate-field refactoring technique. 6+2=8

Unit-V

5. (a) Explain work breakdown structure. 4

(b) What are the roles and events of scrum framework? Explain the components of Kanban framework. 4+4=8

(c) What are the steps involved in risk management? Discuss various mitigation strategies in software projects. 4+4=8

(d) (i) Describe two effort estimation models. 4+4=8

(ii) Suppose we have the following counts for different elements, with their respective weights :

Element type	Count	Weight
External inputs	15	4
External outputs	6	5
Internal logic	5	7

Calculate the following :

(a) Unadjusted function points

(b) Adjusted function points based on adjustment factor (CAF) = 1·2

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D127773(022)

B. Tech. (Hon's) (Seventh Semester) Examination, Nov.-Dec. 2024

(New Scheme)

(Specialization : Artificial Intelligence)

Subject : Software Engineering

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) of each question is compulsory, each of 4 marks. Attempt any two parts from (b), (c) and (d) each of 8 marks.*

Unit-I

1. (a) What are the uses of SRS document? 4

(b) Describe requirements engineering. 8

(c) Explain Image Acquisition and Pre-processing Techniques. 8

(d) Discuss the various Image Processing Steps. 8

Unit-II

2. (a) What is Brightness Adoption? 4

(b) Explain the different types of gray level transformation. 8

(c) Write short notes on : 8

(i) Image Denoising

(ii) Image deblurring

(d) Explain Frequency domain Enhancement Techniques. 8

Unit-III

3. (a) What is image segmentation. 4

(b) Explain various feature extraction techniques. 8

(c) Write short notes on : 8

(i) Thresholding

(ii) Region based segmentation.

(d) Describe Edge Detection Algorithms. 8

Unit-IV

4. (a) Define Mathematical Morphology. 4

(b) Explain various mathematical morphology operation. 8

(c) Explain application of morphological operation in image processing. 8

(d) Discuss Morphological image Processing for Noise removal and feature extraction. 8

Unit-V

5. (a) Define wavelet based compression. 4

(b) Discuss Image Compression Techniques. 8

(c) Write short notes on : 8

(i) Image Registration

(ii) Fusion Method.

(d) Write case study on Medical imaging. 8

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D127733(022)

B. Tech. (Hon's) (Seventh Semester) Examination, Nov.-Dec. 2024

(AICTE Scheme)

(Data Science/Artificial Intelligence)

IMAGE PROCESSING

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

***Note** : All questions are compulsory. Part (a) of each unit is compulsory and carries 4 marks. Attempt any two parts from (b), (c) and (d) and carries 8 marks each.*

Unit-I

1. (a) Write specialized image processing hardware? 4

(b) Explain the concept of image processing? 8

(b) In online grocery store, *FreshMart*, wants to boost sales by identifying which products are frequently bought together so it can provide personalized product recommendations to customers in real time. Select an appropriate model for prediction. 8

(c) Discuss the use of clustering techniques in customer segmentation and profiling. Explain how clustering algorithms like K-means and hierarchical clustering can help businesses tailor marketing strategies for different customer segments. 8

(d) Explain the process of performing sentiment analysis using machine learning. Discuss the difference between rule-based, machine learning-based, and hybrid approaches for analyzing customer sentiment from textual data. 8

Unit-V

5. (a) What is Prescriptive Analytics, and how does it differ from descriptive and predictive analytics in business intelligence? 4

(b) Explain the role of big data analytics platforms like Hadoop and Spark in processing and analyzing massive datasets. Compare their functionalities, advantages, and challenges, and describe how they are used in modern business analytics scenarios? 8

(c) Discuss the importance of real-time analytics and stream processing in business intelligence. Explain how tools like Apache Flink and Apache Kafka are used to handle real-time data streams. Provide examples of real-world applications where real-time analytics is crucial. 8

(d) Examine three emerging trends in business intelligence : artificial intelligence (AI), machine learning (ML), and augmented analytics. Discuss how each trend enhances data-driven decision-making processes and enables businesses to uncover deeper insights from data. 8

(c) How does a data warehouse differ from a traditional database, and why is it essential for large-scale data analytics? 8

(d) How do data privacy laws, such as GDPR, impact the way organizations handle and analyse customer data? 8

Unit-II

2. (a) Discuss any patterns or anomalies in the summary statistics (e.g., skewness or central tendencies) Assume a dataset. 4

(b) Explain density based techniques for outlier detection in sales data. Give the visualisation of the data. 8

(c) Explain distance based techniques for outlier detection in social media marketing data. Give the visualisation of the data. 8

(d) What are the best practices for designing effective data visualizations? Explain with examples how poorly designed visualizations can lead to misinterpretation of insights. 8

Unit-III

3. (a) Define clustering in machine learning. Explain how it differs from supervised learning algorithms like regression and classification? 4

(b) Explain the importance of algorithm selection in predictive modeling. Describe factors such as data type, problem context, and interpretability that influence the choice between regression, classification, and clustering techniques. 8

(c) Explain the applications of machine learning in business contexts. Illustrate how algorithms can be applied in churn prediction. 8

(d) Explain customer lifetime value (CLV) estimation, and fraud detection, including the types of data needed and the impact of these applications on business decisions. 8

Unit-IV

4. (a) Briefly explain the concept of time series forecasting. What makes it suitable for demand prediction? 4

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D127772(022)

B. Tech. (Hon's) (Seventh Semester) Examination, Nov.-Dec. 2024

(Artificial Intelligence Branch)

BUSINESS INTELLIGENCE and ANALYTICS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) of each question is compulsory and carries 4 marks. Solve any* ***two*** *parts from part (b), (c) & (d) and carries 8 marks each.*

Unit-I

1. (a) Explain the levels of data models. 4

   (b) What is the role of data-driven decision-making in modern organizations, and how does it improve business outcomes? 8

(c) Discuss the Societal impacts of intelligent robotics.

(d) Discuss the history of Intelligent System and Robotics.

Unit-II

2. (a) What is Sensor fusion techniques?

(b) Illustrate the sensory modalities in robotics.

(c) Explain object Recognition in robotics vision.

(d) Explain localization and mapping algorithms for robot navigation.

Unit-III

3. (a) What do you mean by robot navigation?

(b) Explain control architecture of autonomous robot.

(c) Explain Human robot interaction and collaborative robots.

(d) Demonstrate path planning and motion control Techniques for Robot navigation.

Unit-IV

4. (a) What do you mean by speech processing?

(b) Explain the techniques of robotics manipulation.

(c) Discuss human robot interaction.

(d) Illustrate the applications in healthcare.

Unit-V

5. (a) What do you mean by Robot learning?

(b) Discuss Swarm robotics and collective intelligence.

(c) Explain Imitation learning and transfer learning.

(d) Explain autonomous exploration and mapping in unknown environment.