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6E7101

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E7101

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SCIENCE & ENGG.

6CS3-01/Digital Image Processing

CS, IT, AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (As mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Discuss about contrast stretching and intensity slicing.

Q.2. How are color images represented digitally?

Q.3. What is unsharp masking?

Q.4. What are intensity transform.functions?

Q.5. What are the performance metrics for evaluating image compression?

Q.6. What is directional derivate? Where it is used?

Q.7. Differentiate between lossy and lossless compression techniques.

Q.8. State the conditions for Region Splitting and Merging Processes.

Q.9. What is spatial filtering?

Q.10. How do frequency domain filters work.?

PART-B

[5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Explain what you would expect the result of Sampling and Quantization operations on image.

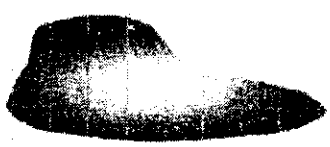

Fig.1

Q.2. Consider a 1-D image f(x) =[10 10 10 10 40 40 40 20 20]. Calculate the first and second order derivatives. Locate the respective edge positions.

Q.3. Explain HIS color model with an appropriate figure. Explain the conversion procedure from RGB color space to HSI color space.

Q.4. Explain the image restoration technique to remove the blur caused by uniform linear motion.

Q.5 What are the derivative operators useful in image segmentation? Explain their role in segmentation.

Q.6. Explain any two boundary representation schemes and illustrate with example.

Q.7. How do you link edge pixels through global processing? Also explain Hough Transforms.

PART-C

[3x10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1. Consider the image shown in Fig. 2. Explain what you would expect the result to be in each of the following four filtering operations :

(a) Horizontal gradient operation

(b) Vertical gradient operation

(c) Horizontal Sobel operator

(d) Vertical Sobel operator

Fig.2

Q.2. Decode the arithmetic coded message, 0.23355 for the coding model .

Symbol	Probability
A	0.2
E	0.3
I	0.1
O	0.2
u	0.1
!	0.1

And also explain LZW coding with an example and Explain Redundancies and their removal methods.

Q.3. Consider the Image 'I' below and the filters 'F' and 'L'.

'I'			'F'			'L'		
1	1	1	1/8			1		
1	8	1	1/8	1/2	1/8	1	−4	1
1	1	1	1/8			1		

(a) Correlate the image 'I' with the filter 'F' and compute the output image.

(b) Apply filter 'L' to the same image 'I' to produce a 3 by 3 output image.

Q.4. (a) Differentiate Correlation and Convolution with example.

(b) What are the derivative operators useful in image segmentation?

Q.5. With a neat block diagram, explain transform based image compression scheme. Also give two valid reasons for the choice of "Discrete Cosine Transform" in JPEG image compression standard.

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6E7102

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E7102

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SCIENCE AND ENGINEERING (Artificial Intelligence)

6CAI4-02 / Machine Learning

CS, IT, AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. Nil 2. Nil

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1. What do you mean by Maximum Marginal Hyperplane (MMH in SVM)?

Q. 2. Differentiate between 2-layer neural network and 3-layer neural network.

Q. 3. Give advantages of content based filtering.

Q. 4. Differentiate between feature extraction and selection.

Q. 5. What do you understand by false negative in confusion metrix?

Q. 6. Define attribute selection measure in classification.

Q. 7. Write any four requirement of Clustering Algorithm.

Q. 8. How you compute support for a transactional database? Give example.

Q. 9. What is Markov Property? Express it mathematically.

Q. 10. Give your intuition about following :

(a) Markov Reward Process (MRP)

(b) Bellman Equation

PART-B **[5×4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q. 1. List the important steps of policy evaluation using Monte Carlo.

Q. 2. Differentiate between following for reinforcement learning :

(a) Value iteration and policy iteration

(b) On-policy and off-policy

Q. 3. What do you mean by optimal policy in an MDP environment? How we find an optimal policy? Give example.

Q. 4. How distance be computed for attributes that are not numeric, but are categorical in k-nearest neighbor classifier? Give example.

Q. 5. How to define inter-cluster similarity in Hierarchical clustering? Give example of each approach.

Q. 6. What are advantages of 'Navie' Bayesian classifier? Briefly outline major steps of the algorithm.

Q. 7. What is the use of PCA in Machine Learning? Give the steps of PCA algorithm.

PART-C [3×10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q. 1. Consider following eight points (with (x,y) represents location) $A_1(2,10)$, $A_2(2,5)$, $A_3(8,4)$, $B_1(5,8)$, $B_2(7,5)$, $B_3(6,4)$, $C_1(1,2)$, $C_2(4,9)$. The distance function is Euclidean distance cluster these eight points into three clusters using k-means algorithm with showing all necessary steps.

Q. 2. What is multilayer neural network? Explain Back propagation Learning Algorithm.

Q. 3. Explain the following with example :

(a) Decision-Tree Algorithm

(b) Linear Regression

Q. 4. Write short notes on the following :

(a) Collaborative filtering

(b) Evaluating machine learning algorithms and model selection

Q. 5. Consider following transactional database with min-sup = 60% and min–conf = 80%.

TID	Item Bought
T_1	{M,O,N,K,E,Y}
T_2	{D,O,N,K,E,Y}
T_3	{M,A,K,E}
T_4	{M,U,C,K,Y}
T_5	{C,O,O,K,I,E}

and construct the following using FP Growth algorithm :

(a) FP - Tree

(b) Conditional Pattern base

(c) Conditional FP-tree

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6E7103

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E7103

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SC. AND ENGG. (ARTIFICIAL INTELLIGENCE)

6CAI4-03 Information Security Systems

CS,IT, AID,CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Differentiate between active and passive attacks.

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Q.2. Differentiate between stream and block ciphers.

Q.3. What is avalanche effect ?

Q.4. Write advantages of multiple encryption and triple DES.

Q.5. Differentiate between private key and public key cryptography.

Q.6. Write disadvantages of public key cryptography.

Q.7. What is cryptographic hash function ?

Q.8. What is message authentication code ?

Q.9. Write four general means of authenticating an user's identity.

Q.10. What is HTTPS ?

PART-B

[5x4=20]

(Analytical/Problem Solving questions)

Attempt any five questions

Q.1. Construct a Play fair matrix with the key "occurrence" and encrypt the message "Jaipur".

Q.2. Explain AES key expansion algorithm with suitable diagram.

Q.3. Explain the design principles of block cipher.

Q.4. Perform encryption and decryption using the EIG amal algorithm, for the following :

$q = 71$; $\alpha = 7$; $X_A = 3$; $M = 30$; $k = 2$

Q.5. Explain the security requirements for cryptographic hash functions.

Q.6. Explain Cipher-based Message Authentication Code (CMAC).

Q.7. Explain the public-key certificate technique for the distribution of public keys.

PART-C **[3x10=30]**

(Descriptive/Analytical/Problem Solving Design/Questions)

Attempt any three questions

Q.1. Explain the Data Encryption Standard (DES) algorithm with suitable diagrams.

Q.2. Explain the Electronic Code Book (ECB) and Cipher Block Chaining (CBC) modes of block cipher operations.

Q.3. Explain the SHA-512 algorithm using suitable diagrams.

Q.4. Explain the digital signature algorithm.

Q.5. Explain the SSL architecture and protocols with suitable diagrams.

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6E7104

Total No. of Questions : 22 Total No. of Pages : 04

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6E7104

B.Tech. VI-Sem. (Main/Back) Exam.- 2024

Computer Science and Engineering (Artificial Intelligence)

6CAI4-04 Computer Architecture and Organization

CS, IT, AID, CAI

Time : 3 Hours Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in Form No. 205)

1. Nil 2. Nil

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1 What is meant by RISC?

Q.2 What do you mean by ALU?

Q.3 What is a control memory?

Q.4 What is an instruction cycle?

Q.5 Define a bus.

Q.6 What is a micro-operation?

Q.7 What do you mean by multicomputer ?

Q.8 What is parallel processing?

Q.9 What is a register?

Q.10 What is auxiliary memory?

PART-B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1 Design a 4×3 RAM.

Q.2 Explain set-associative mapping with a suitable example.

Q.3 Design a 4×3 ROM for a table of contents of your choice.

Q.4. Write 4 logic micro-operations.

Q.5 Explain memory hierarchy.

Q.6 Explain serial communication with an example.

Q.7 Explain arithmetic pipeline with an example.

PART-C [3×10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q. 1 Explain DMA with suitable example.

Q.2 Show the steps of Booth's algorithm for 8*(-8).

Q.3 Describe Flynn's taxonomy.

Q.4 Explain the design of a vector processor.

Q.5 Explain cache coherence with a suitable example.

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6E7105

Total No. of Questions : 22 Total No. of Pages : 04

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6E7105

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SCIENCE AND ENGINEERING
ARTIFICIAL INTELLIGENCE

6CAI4-05 Principles of Artificial Intelligence

CS,IT,AID,CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10×2=20]**

Answer should be given up to 25 words only

All questions are compulsory

Q. 1. Define atomic sentence and complex sentence.

Q. 2. Define the terms 'syntax' and semantics'.

Q. 3. What are the different types of machine learning?

Q. 4. What is an expert system?

Q. 5. What is the need for probability theory in uncertainty?

Q. 6. Define Modus Ponens rule in propositional logic.

Q. 7. What is heuristic function?

Q. 8. Define supervised and unsupervised learning.

Q. 9. What is the main condition required for alpha-beta pruning?

Q. 10. Define Neural Networks.

PART-B **[5×4=20]**

Analytical/Problem solving questions

Attempt any five questions

Q. 1. What are Quantifiers? Discuss about different types of quantifiers.

Q. 2. Differentiate propositional logic from first-order logic.

Q. 3. What reasoning direction is a more suitable heuristic in the game of chess : forward or backward? Justify your answer by referring to the properties of the search space.

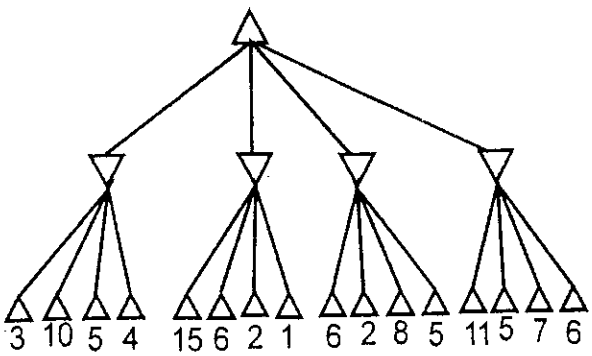
Q. 4. Explain Bayesian networks with examples.

Q. 5. Write short note on artificial neural networks.

Q. 6. Explain Bayesian network and conditional independence with example.

Q. 7. Consider the following game tree :

(a) Write down the minimax value of every non-terminal node next to that node :



(b) Cross out the branches that do not need to be examined by alpha-beta search in order to find the minimax value of the top node.

PART-C **[3×10=30]**

Descriptive/Analytical/Problem Solving/Design questions

Attempt any three questions

Q. 1. Explain the A^* search algorithm and give the proof of optimality of A*.

Q. 2. Define the constraint satisfaction problem. Describe the elements in the definition of CSP. Use an example to define the map coloring problem as constraint satisfaction problem.

Q. 3. Enumerate classical water Jug problem. Describe the state space for this problem. Solve this problem by giving its operation sequence.

Q. 4. What is Natural Language Processing? Explain the various steps followed in NLP. Also discuss the different issues in NLP.

Q. 5. Explain in detail the differences between supervised and unsupervised learning with the help of examples.

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Total No. of Questions : 22 Total No. of Pages : 04

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6E7106

B.Tech. VI-Sem. (Main/Back) Exam. 2024

COMPUTER SCIENCE AND ENGINEERING

(Artificial Intelligence)

6CA14-06 Cloud Computing

CS, IT, AID, CAI

Time : 3 Hours Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is Cloud Computing? Mention the objectives as well.

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Q.2. Explain the different components of Cloud Computing.

Q.3. Explain the Parallel and Distributed Cloud Paradigm.

Q.4. Explain the Fractures of Cloud Computing.

Q.5. Explain CRM in Cloud.

Q.6. Explain the Hypervisor VMware.

Q.7. What are the fundamental principles of cloud security design?

Q.8. Describe the working of Hadoop.

Q.9. What is AWS? What types of services does it provide?

Q.10. Discuss the cloud federation stack.

PART-B **[5×4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Explain in depth about Ubiquitous Cloud and the Internet of Things.

Q.2. Explain the Storage Services of Cloud Platform.

Q.3. What is Business Continuity and Disaster Recovery in Cloud Computing?

Q.4. Explain the different layers and types of Clouds and Service Models.

Q.5. Describe the core components of Google App Engine.

Q.6. Explain the (SLA) with a neat diagram and also state its advantages and disadvantages.

Q.7 What is Data Intensive Computing? List eight open challenges of Data Intensive Computing.

PART-C [3×10=30]

(Descriptive/Analytical/Problem Solving/ questions)

Attempt any three questions

Q.1. With a neat diagram, explain the Cloud Computing Reference Model.

Q.2. Explain the following Deployment Mode Platform for the following Aneka Cloud:

(a) Private Cloud

(b) Public Cloud

(c) Hybrid Cloud

Q.3. What is Virtualization? Explain the implementation level along with the benefits.

Q.4. Design and implement an Application for Log Parsing, Mapper and Reducer with Aneka Map Reduce.

Q.5. Explain the Windows Azure platform architecture.

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6E7136

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E7136

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SCIENCE AND ENGINEERING

6CS5-11 / Distributed System (EI.-I)

CS, IT

Time : 3 Hours Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is a distributed system?

Q.2 Define distributed computing environment (DCE).

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Q.3. Define Inter-process Communication.

Q.4. What are RMI and RPC?

Q.5. Define distributed file system.

Q.6. What is threshold?

Q.7. What is the difference between shared memory and distributed memory?

Q.8. Which two instructions are required to perform hardware support for mutual exclusion?

Q.9. Define distributed deadlock.

Q.10. What are the disadvantages of Active Replication in distributed systems?

PART-B [5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Briefly explain the disadvantages of distributed system.

Q.2 Compare synchronous versus asynchronous execution.

Q.3. Distinguish between physical clock and logical clock.

Q.4. Explain different kinds of problems that are associated with the coordination and agreement in distributed system.

Q.5. Briefly explain the issues in concurrency control in a distributed system.

Q.6. Briefly explain fault, errors, and failure in distributed system.

Q.7. What do you understand by Byzantine Agreement? Explain.

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions

Q.1. Explain the need of Distributed system and also explain its characteristics with example.

Q.2 Explain client-server communication model on RPC and its message passing.

Q.3. What is distributed process implementation and also explain static process scheduling with communication?

Q.4. What are the design and implementation issues in distributed shared memory?

Q.5. Explain CORBA Interface Definitions Languages.

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6E7108

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E7108

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

6AID5-12 Natural Language Processing

AID, CAI

Time : 3 Hours Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Explain Natural Language Understanding.

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Q.2. What is Stemming?

Q.3. Define the significance of Word Vector.

Q.4. What is Word Cloud?

Q.5. What is Tokenization? Why is it required?

Q.6. Describe Word Segmentation.

Q.7. What is the significance of parsing in NLP?

Q.8. Why we require POS tagging in NLP?

Q.9. What are different approaches for Text Classification?

Q.10. Explain Lexical Analysis.

PART-B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Explain different phases in the development of a speech recognition system.

Q.2. What are the important tool available for the development of NLP applications? Write the feature of each of these tools.

Q.3. Explain the algorithm to edit one string X of length n to a string Y of length m. Show the steps of your algorithms for X = INTENSYION and Y = EXECUTION.

Q.4. Define Text Normalization. Why does text normalization important for Speech Synthesis?

Q.5. Discuss about the problem with maximum likelihood. How does the Laplace (add-1), smoothing solve the problem?

Q.6. Describe Word Net: Also explain the significance of Synset and Hypernyms.

Q.7 What is Morphological Parsing? Also explain the major problems associated with morphological parsing.

PART-C **[3×10=30]**

(Descriptive/Analytical/Problem Solving/ questions)

Attempt any three questions

Q.1. Explain Probabilistic Context Free Grammar (PCFG). Also explain the probability model, problems with PCFG.

Q.2. Describe the hard and soft clustering in context of Text Clustering. Also explain various clustering techniques used in NLP.

Q.3. Explain in detail about Graphical Models for Sequence Labeling in NLP.

Q.4. Describe Query Expansion Based on NLP and Word Embeddings.

Q.5. Explain the following terms with example in detail :

(a) Syntactic Collocations

(b) Term Weighting

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6E1551

Total No. of Questions : 14 Total No. of Pages : 04

Roll No. : .....

6E1551

B.Tech. VI-Sem. (Back) Exam. - 2024

Computer Science. & Engineering

6CS3-01/Digital Image Processing

CS, IT,

Time : 2 Hours **Maximum Marks : 80**

Instructions to Candidates :

Attempt all five questions from Part-A, four questions out of six questions from Part-B and two questions out of three questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (As mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[5×2=10]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Explain the effect of setting to zero the half of lower order bit planes have on the histogram of an image in general.

Q.2. What is the role of Fourier transform in the context of image processing?

Q.3. How is salt and pepper noise different from Gaussian noise?

Q.4. State the conditions for Region Splitting and Merging Processes.

Q.5. What are the performance metrics for evaluating image compression?

PART-B [4x10=40]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Explain what you would expect the result of Sampling and Quantization operations on image.

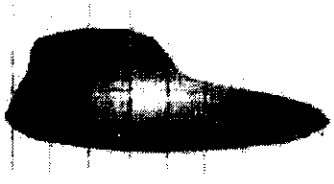

Fig.1

Q.2. Consider a 1-D image f(x) =[10 10 10 10 40 40 40 20 20]. Calculate the first and second order derivatives. Locate the respective edge positions.

Q.3. Explain HIS color model with an appropriate figure. Explain the conversion procedure from RGB color space to HSI color space.

Q.4. Explain the image restoration technique to remove the blur caused by uniform linear motion.

Q.5 What are the derivative operators useful in image segmentation? Explain their role in segmentation.

Q.6. Explain any two boundary representation schemes and illustrate with example.

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1. Consider the image shown in Fig. 2. Explain what you would expect the result to be in each of the following four filtering operations :

(a) Horizontal gradient operation

(b) Vertical gradient operation

(c) Horizontal Sobel operator

(d) Vertical Sobel operator

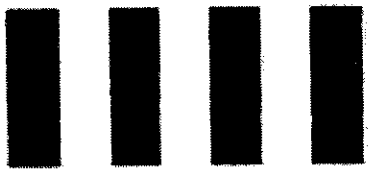

Fig.2

Q.2. Explain the following terms with examples :

(a) Lookup Table

(b) Additive Vs. Subtractive color system

(c) Hue and Saturation

(d) Hue-Max-Min-Diff (HMMD) color space

Q.3. A source emits three symbols A, B, C with a probability (0.50, 0.25, 0.25) respectively. Construct an Arithmetic code to encode the word 'CAB'.

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6E1552

Total No. of Questions : 22 Total No. of Pages : 04

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6E1552

B.Tech. VI-Sem. (Back) Exam. - 2024

COMPUTER SCIENCE AND ENGINEERING

6CS4-02 / Machine Learning

CS, IT

Time : 3 Hours **Maximum Marks : 120**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and four questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is mean square error (MSE) in Machine Learning?

Q.2. Differentiate between Random forest algorithm and Decision tree algorithm.

Q.3. Give the advantages of SVM model.

Q.4. Explain FP tree in FP Growth Association rule mining algorithm.

Q.5. Define Bellman equation.

Q.6. Give formula of accuracy in terms of FP, FN, TP and TN.

Q.7. What is meant by confidence in association rule mining?

Q.8. What is feature extraction? How does it differ from feature selection?

Q.9. Define collaborative filtering.

Q.10. Write in brief about policy iteration and value iteration.

PART-B

[5x8=40]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Write advantages and disadvantages of decision tree classifier.

Q.2. Explain the use of singular value decomposition.

Q.3. Compare filter and wrapper feature selection methods.

Q.4. Explain Markov decision process.

Q.5. For the given confusion matrix compute the recall. TP-true positive, TN-true negative and Predicted positive and Predicted negative are given.

	TP	TN
Predicated +ve	6	4
Predicated -ve	3	7

Q.6. How does bagging help in improving the classification performance?

Q.7. Explain steps of k-nearest neighbor algorithm.

PART-C **[4x15=60]**

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any four questions

Q.1. Consider the following one-dimensional dataset 12, 22, 2, 3, 33, 27, 5, 16, 6, 31, 20, 37, 8 and 18. Given k=3 and initial cluster centres to be 5, 6 and 31. Explain k-means algorithm for above example and find final cluster centers.

Q.2. Explain SARSA using example.

Q.3. Explain neural network Back propagation algorithm using example and diagram.

Q.4. Write short notes on the following :

(a) Probabilistic clustering

(b) Logistic Regression

Q.5. Explain support vector machine model with all necessary steps and diagrams.

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6E1553

Total No. of Questions : 14 Total No. of Pages : 04

Roll No. : .....

6E1553

B.Tech. VI-Sem. (Back) Exam. - 2024

COMPUTER SCIENCE AND ENGG.

6CS4-03 Information Security System

CS, IT

Time : 2 Hours **Maximum Marks : 80**

Note : Attempt all 5 questions from Part-A, 04 questions out of 06 questions from Part-B and 02 questions out of 03questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[5×2=10]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is Cryptography?

Q.2. Explain the three Security Principles.

Q.3. Define Security. What are the multiple layers of security?

Q.4. What are the function of Information Security?

Q.5. List down different Modes of operation.

PART-B [4×10=40]

(Analytical/Problem solving questions)

Answers should be given up to 100 words only

Attempt any four questions

Q.1. What are the basic difference between Passive and Active attacks?

Q.2. Explain the concept of MAC and its function.

Q.3. Explain Symmetric and Asymmetric authentication.

Q.4. Write short notes on the following:

(a) IP Security Architecture

(b) Authentication Header

Q.5. Why is SSL important?

Q.6. What is MD5?

PART-C [2×15=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any two questions

Q.1. What is Digital Signature? List the security provided by Digital Signature. Explain its uses with help of an example.

Q.2. Explain the principal of RSA Algorithms. In an RSA system it is given that

$p = 4, q = 12, e = 8, M = 5$. Find Cipher-text C and M from decryption.

Q.3. What is Cryptanalysis? Explain the Substitution and Transposition Cryptographic Techniques.

6E1554

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E1554

B.Tech. VI-Sem. (Back) Exam. June - 2024

COMPUTER SCIENCE AND ENGG.

6CS4-04 Computer Architecture and Organization

CS, IT

Time : 3 Hours **Maximum Marks : 120**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and four questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10×2=20]**

Answer should be given up to 25 words only

All questions are compulsory

1. Explain tri-state buffer. Describe its role in designing a data bus connecting memory and 4 different I/O interfaces.

2. Design a 4-bit combinational circuit decrementer using four full-adder.

3. Categories instruction cycle into phases and show flowchart by showing working in each timing signal.

4. How does parallel processing benefit modern computer systems and what are the key classifications according to Flynn's Taxonomy?

5. Computer RISC and CISC architectures.

6. Design 64 register stacks and write code for PUSH and POP operations.

7. Explain memory hierarchy in computer system.

8. Explain CPU IOP communications.

9. Explain working of shared memory multiprocessor.

10. Describe address sequencing in control unit.

PART-B **[5×8=40]**

Analytical/Problem solving questions

Attempt any five questions

1. Represent $(-185.125)_{10}$ to single precision.

2. Compare first and second pass of an assembler through suitable flowcharts.

3. Consider a pipeline having 4 phases with duration 70, 40, 80 and 100ns. Given latch delay is 10ns calculate-

   (a) Pipeline cycle time

   (b) Non-pipelined execution time

   (c) Speed up-ratio

   (d) Pipeline time for 1000 tasks.

4. Apply Booths algorithms to multiply (-37) and (+21), show the steps involved.

5. Compare the different mapping procedures used in cache memory organization. Give suitable example for each.

6. What are the advantages of using interrupt initiated data transfer over the transfer under program contrast without an interrupt.

7 Illustrate the conditional branch logic to provide decision-making capabilities in the control unit, using suitable diagram.

PART-C **[4×15=60]**

Descriptive/Analytical/Problem Solving/ questions

Attempt any four questions

1. Explain memory reference instructions, register reference instructions and Input-Output instruction with a suitable example and instruction cycle.

2. Explain associate memory with its hardware organization. Discuss the procedure for reading and writing data in associative memory.

3. What is priority interrupt? Explain Daisy chain interrupt^{-1}s polling logic using its block diagram.

4. Describe an algorithm for the restoring method of fixed point binary division. Show the contents of registers during the process of division of 10100011 by 1011.

5. Explain various types of hazards in pipeline structure? Explain these types with the help of suitable example.

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Total No. of Questions : 14 Total No. of Pages : 04

Roll No. : .....

6E1555

B.Tech. VI-Sem. (Back) Exam. - 2024

COMPUTER SC. & ENGG.

6CS4-05 Artificial Intelligence

CS, IT

Time : 2 Hours **Maximum Marks : 80**

Instructions to Candidates :

Attempt all five questions from Part-A, four questions out of six questions from Part-B and two questions out of three questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[5x2=10]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Define the Bayesian Networks.

Q.2. What do you mean by Agent?

Q.3. What is an expert system?

Q.4. What are the features of NLP?

Q.5. Explain Alpha, beta pruning in brief.

PART-B [4x10=40]

(Analytical/Problem solving questions)

Attempt any four questions

Q.1. What do you mean by AI? Explain the contribution of AI in various fields. Also explain the importance of AI.

Q.2. Explain supervised and unsupervised learning. Also differentiate between supervised and unsupervised learning.

Q.3. Explain the process of inductive learning using decision trees in detail.

Q.4. Differentiate between Depth first search and Breadth first search with the help of example.

Q.5. Explain the model of artificial neural network.

Q.6. Explain constraint satisfaction problem in detail.

PART-C [2x15=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any two questions

Q.1. (a) Write AO* search algorithm and explain with suitable example. [8]

(b) Define the heuristic search. Discuss benefits and shortcomings. [7]

Q.2. Explain best first search with suitable example. Also explain how it is based on hill climbing. [15]

Q.3. Enumerate classical "water jug problem". Describe the space for this problem and also give the solution. [15]

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