Paper1:Research Advances in Computer Science& Engineering and Research Methodology
(Common to Computer Science and Engineering Streams)

UNIT I

Introduction: Definition and objectives of Research – Types of research, Various Steps in Research process, Mathematical tools for analysis, Developing a research question-Choice of a problem Literature review, Surveying, synthesizing, critical analysis, reading materials, reviewing, rethinking, critical evaluation, interpretation, Research Purposes, Ethics in research – APA Ethics code. Structure and Components of Research Report, Types of Report, Layout of Research Report, Mechanism of writing a research report, referencing in academic writing,Plagiarism.

UNIT II

Quantitative Methods for problem solving: Statistical Modeling and Analysis, Probability Distributions, Inequalities, Fundamentals of Statistical Analysis and Inference, Multivariate methods, Hypothesis Testing. Concepts of Correlation and Regression, Fundamentals of Time Series Analysis and Spectral Analysis, Error Analysis, Applications of Spectral Analysis.Linear Equations, Order of Operations, Absolute Value Functions, Polynomials and Quadratic Equations.

UNIT III

Tabular and graphical description of data: Tables and graphs of frequency data of one variable, Tables and graphs that show the relationship between two variables, Relation between frequency distributions and other graphs, preparing data for analysis, Use of statistical software R in research.

UNIT IV

Computer Science Concepts :
Boolean algebra, Number Systems, Instruction Formats, Addressing Modes, Computer Arithmetic, I-O Interface, Memory Organization: Cache, Main Memory and Secondary Storage. Process Scheduling Concepts and Algorithms, Critical Section Problem and Semsphores, Virtual Memory Management. Network-Introduction to OSI and TCP/IP Reference Model, Network Security-Public-key cryptography and Message Authenticati, SHA-1, Secure Hash Function.

UNIT V

Algorithms and Programming Concepts:
Searching, Sorting, Hashing, Asymptotic Worst Case Time and Space Complexity. Algorithm Design Techniques: Greedy, Dynamic Programming and Divide-and-Conquer, Graph Search, Minimum Spanning Trees, Shortest Paths.
Introduction to Functions and Pointers in C-Programming Language, Features of object oriented programming in Java Programming Language, Data Base-Normalization for Relational Database

Text Books

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan,2006

2. Donald H.McBurney, Research Methods, 5thEdition, Thomson Learning,ISBN:81-315-0047-0,2006.

3. Dr Bharti Motwani, Data Analytics with R , Wiley Publicatios

4. Computer System Architecture. Morris Mano. Prentice Hall of India.

5. Operating System Principles by Abraham Silberschatz, Peter Galvin, Greg Gagne. Seventh Edition, Wiley Publication

6. Computer Networks, Andrews S Tanenbaum, Edition 5, PHI, ISBN: -81-203-1165-5

7. Cryptography and Network security, Atul Kahate, Tata McGraw-Hill Pub company Ltd., New Delhi

8. Introduction to Design & Analysis of Algorithms by Anany Levitin, Pearson Education, New Delhi, 2003

9. C The Complete Reference, Fourth Edition. Herbert Schildt. Mc Graw Hill.

10. Java: The Complete Reference, Herbert Schildt, Ninth Edition, Oracle Press

11. Fundamentals of Database System , Elmasri, Navathe, Pearson Educaiton.

Prof.-P.S. Varma

Model Question Paper

Adikavi Nannaya University:Rajamahendravaram

Department of Computer Science&Engineering

Pre-Ph.D Examination::2020

Paper I:Research Advances in Computer Science&Engineering and Research Methodology

Time: 3 hrs   Max.Marks:100

Answer all the questions

Each question carried 20 Marks

1.a)Discuss various steps in research process.

b)Define research and Discuss objectives of research in detail.

Or

2.a)Discuss the need of ethics in research.

b)What is the purpose of research. Write about critical evaluation.

3.a)Explain the probability distribution with an example.

b)Discuss multivariate methods.

or

4.a)Write about concepts of correlation and regression.

b)Discuss Applications of spectral analysis.

5.Describe the relation between frequencies distributions and other graphs

Or

6.Discuss about the uses of statistical software R in research

7.a)Explain the importance of cache memory in computer system

b)Discuss OSI reference model

or

8.a)Explain critical section problem and semaphores.
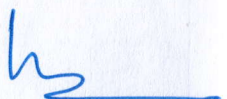
b) Explain in detail about SHA-1

9.a)Write about Asymptotic notations

b) Discuss minimum spanning trees

or

10.a)Explain features of object oriented programming in java

b) Discuss in detail about Normalization for relational data base.

(Prof.P. Suresh Varma)

ADIKAVI NANNAYA UNIVERSITY : RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Pre-PhD Coursework Syllabus
Paper-II: NETWORK SECURITY AND CRYPTOGRAPHY

UNIT-I

Introduction: The need for security -Security approaches- Principles of security- Plain Text and Cipher Text- Substitution and Transposition Techniques-Encryption and Decryption- Symmetric and Asymmetric Cryptography-Stenography-key range and key size- Types of attacks.

Number Theory: Introduction- Prime and relatively prime numbers- Modular Arithmetic- Euclidean algorithm- Euler theorem- Fermat Theorem- Totient Function- Multiplicative and Additive Inverse.

UNIT-II

Symmetric Key Cryptographic Algorithms: Algorithm types and modes- Overview of symmetric key cryptography – DES – IDEA –RC5- Blowfish – AES-Differential and Linear Cryptanalysis.

Asymmetric Key Cryptographic Algorithms: Overview of asymmetric key cryptography- RSA algorithm- Symmetric and asymmetric key cryptography together -Digital signatures.

UNIT-III

User Authentication and Message Authentication: Introduction-Authentication basics- Passwords-Authentication tokens -Certificate based authentication -Biometrics Authentication- Kerberos– Message authentication requirements -Message authentication functions- MAC.

Public key infrastructure: Introduction- Digital certificates- Private key management- The PKIX model-Public key cryptography standards(PKCS).

UNIT-IV

Hash functions Introduction to hash functions-SHA512- - Digital Signatures- RSA digital signature-DSS digital signature.

System Security: Intruders- Intrusion detection techniques- Viruses- Types of viruses- Virus counter measures- Related Threats, Trusted Systems.

UNIT-V

Internet Security Protocols: Basic concepts-SSL-TLS-SHTTP-TSP-SET-SSL versus SET- 3D Secure Protocol-Electronic Money-Email security (PGP & S/MIME)-WAP security-security in GSM.

Network Security, Firewalls and Virtual private network: Brief Introduction to TCP/IP -Firewalls -IP Security-Virtual Private Networks(VPN).

Text Books:
1. Cryptography and Network security, AtulKahate, Tata McGraw-Hill Pub company Ltd., New Delhi
2. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi

Reference Books:
1. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., NewDelhi
2. Network   Security: The Complete Reference by Roberta Bragg, Mark Phodes - Ousley, Keith Strass berg TataMcGraw-Hill.

Scholar: N. Aditya Sundar

MODEL QUESTION PAPER
ADIKAVI NANNAYA UNIVERSITY : RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Pre-PhD Examinations
Paper-II: NETWORK SECURITY AND CRYPTOGRAPHY

Time:3 Hrs

Max. Marks:

Answer all the questions
Each question carries 20 marks

1. a). Explain Principles of Security?
   b). Discuss substitution and transportation techniques?

   OR

   c). What is modular arithmetic and write short notes on operations and properties?
   d). Discuss Euler theorem and Fermat Theorem?

2. a). Briefly explain different algorithm types and modes?
   b). Explain AES algorithm?

   OR

   c). Explain RSA algorithm and perform encryption and decryption using the RSA algorit
      for p=5, q=11, e=3 and m=9?

3. a). Discuss different authentication mechanisms?
   b). Explain Kerberos authentication mechanism with diagram?

   OR

   c). Describe digital certificates?
   d). Explain private key management system?

4. a). Explain SHA512 algorithm?
   b). What is digital signature and explain RSA digital signature system?

   OR

   c). Discuss different intrusion detection techniques?
   d). What is virus and explain types of viruses?

5. a). Explain SSL protocol?
   b). Explain PGP protocol?

   OR

   c). What is firewall? Discuss different types of firewalls?
   d). Explain IP Security overview?

Scholars: N. Aditya Sundar

ADIKAVI NANNAYA UNIVERSITY : RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Pre-PhD Coursework Syllabus
Paper-II: NETWORK SECURITY AND CRYPTOGRAPHY

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2. Network Security: The Complete Reference by Roberta Bragg, Mark Phodes - Ousley, Keith Strass berg TataMcGraw-Hill.

Time:3 Hrs   Max. Mark
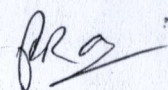
Answer all the questions
Each question carries 20 marks

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    c). What is firewall? Discuss different types of firewalls?
    d). Explain IP Security overview?

Scholar.

P. Salman Roju

ADIKAVI NANNAYA UNIVERSITY: RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Pre-Ph.D. Course Work Syllabus
Paper – II: MACHINE LEARNING WITH PYTHON

UNIT-I

Basics of Python Programming: Basics of Python Programming-Structure of Python Programme – data types – Literals- constants – operators – Input / Output statements.
Control Structures: Selection statements - Iteration statements.
Data Collection Structures: Lists, Tuples, Dictionaries.
OOPs Concepts: Class and objects – Constructors and destructors – Inheritance – Encapsulation and Polymorphism.
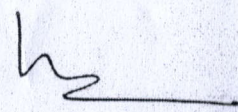
UNIT-II

Data Pre-Processing: Overview of data pre-processing - data pre-processing.
Data Cleaning Techniques: Filling missing values – cleaning and filling missing data – drop missing values – smoothing noisy data – Removing inconsistencies.
Data Integration and Data Reduction Techniques: Dimensionality reduction – Numerosity reduction – data compression – Histograms – clustering – sampling Data **Transformation and Data Discretization:** overview of Data Transformation strategies – Discretization by binning - Discretization by Histogram Analysis - Discretization by cluster, Decision tree and correlation analysis.
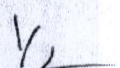
UNIT-III

Data Analysis: Data Analysis Tools- Business Intelligence, Statistical analysis, SQL Consoles, Data Visualization. **Data Grouping -** What is data grouping, frequency grouping, histogram, advantages of data grouping. Iterating through Graphs, Aggregations, Transformations, Filtration.
Data Visualization: Direct Plotting techniques: Line Plot, Bar Plot, Pie Chart, Box Plot, Histogram Plot, Scatter Plot, **Matplotlib Plot techniques:** Line Plot, Bar Chart, Histogram Plot, Scatter Plot, Stack Plot, Pie Chart.

UNIT-IV

Introduction to Machine Learning: Human Learning – Types of Human Learning: Learning under expert guidance-learning guided by knowledge gained from experts –learning by itself. Machine Learning – Types of Machine Learning: supervised learning –unsupervised learning-Reinforcement Learning. Applications of Machine Learning and Tools in Machine Learning.
Supervised Learning:
Classification and Regression: –Naïve Bayes Classification – Linear Regression, Logistic Regression, k-Nearest Neighbors (KNN) - Decision Tree – Random forest Model – Support Vector Machines.

Scholor- k Trinadha Ravi kumar

MODEL QUESTION PAPER
ADIKAVI NANNAYA UNIVERSITY: RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Pre-Ph.D. EXAMINATION 2022
Paper – II: MACHINE LEARNING WITH PYTHON

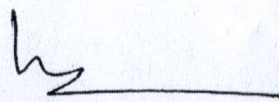Time: 3 Hours   Max.Marks: 100

Answer ALL Questions.
Each Question Carries 20 Marks

1. (a). Explain the structure of python program with an example?
    (b). Explain the basic data types available in Python with examples?
    (OR)
    (c). Explain about the list and tuple with examples?
    (d). Briefly discuss about constructors and destructors?

2. (a). What are the major tasks in Data Preprocessing?
    (b). Explain about data cleaning techniques?
    (OR)
    (c). Explain about the data reduction strategies?
    (d). Explain about the Discretization by cluster, decision tree and correlation analysis?

3. (a). Explain about data analysis tools?
    (b). Explain about the frequency grouping and histogram?
    (OR)
    (c). Explain the concept of aggregation, transformation and filtering?
    (d). Discuss about any 5 direct plotting techniques?

4. (a). What is machine learning? Explain the different types of machine learnings?
    (b). Write about the applications of Machine Learning?
    (OR)
    (c). Briefly discuss about naïve bayes classifier?
    (d). Write algorithm for kNN?

5. (a). Explain the concept of clustering?
    (b). Briefly discuss about the different types of clustering?
    (OR)
    (c). Briefly discuss about the k-means algorithm?
    (d). Explain the Principal Component Analysis method?

K. TRINADHA RAVI KUMAR
Research Scholar
Part Time Ph.D. (CSE)
Regd. No: 2002120106

Prof. P. SURESH VARMA
Research Supervisor

ADIKAVI NANNAYA UNIVERSITY: RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
PRE PH.D(2022) SYALLABUS

MACHINE LEARNING

UNIT I

Data Pre-Processing: Overview of data pre-processing - data pre-processing.
Data Cleaning Techniques: Filling missing values - cleaning and filling missing data - drop missing values - smoothing noisy data-Removing inconsistencies.
Data Integration and Data Reduction Techniques: Dimensionality reduction - Numerosity reduction - data compression - Histograms - clustering - sampling Data Transformation.

UNIT II

Machine Learning - Types of Machine Learning: supervised learning -unsupervised learning-Reinforcement Learning. Applications of Machine Learning and Tools in Machine Learning.
Supervised Learning:
Classification and Regression: Naive Bayes Classification - Linear Regression, Logistic Regression, k-Nearest Neighbors (KNN) - Decision Tree - Random forest Model - Support Vector Machines.

UNIT III

Unsupervised Learning: Supervised Vs Unsupervised learning - Introduction to clustering applications of clustering - types of clustering techniques.
Types of Unsupervised learning: Partitioning methods: k-means algorithm - k-medoids algorithm - Hierarchical Method: agglomerative clustering - Principal Component analysis

UNIT IV

Deep Learning for text and sequences: Working with text data, Understanding RNN, Advanced use of RNN, Sequence Processing with convents.(Deep Learning with Python-Francois Chollet)
Deep Learning applications: Image segmentation, Object detection, Attention model for computer vision tasks, Natural Language Processing, Speech Recognition, Video Analytics.

UNIT V

Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, problem and solution of under fitting and over fitting(Deep Learning, Good fellow- MIT Press, 2016)

PRESCRIBED TEXTBOOKS

1. Introduction to Machine Learning, Ethem Alpaydin, Second Edition, 2010, prentice Hall of India.
2. Deep Learning with Python-Francois Chollet - Manning publishers.

Y. Peja

MODEL QUESTION PAPER
ADIKAVI NANNAYA UNIVERSITY: RAJAMAHENDRAVARAM
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Pre-Ph.D. EXAMINATION 2022
Paper- II: MACHINE LEARNING

Time: 3 Hours　　　　　　　　　　　　　　　　　　　　**Max.Marks: 100**

Answer ALL questions.
Each Question Carries 20 Marks

1. (a). What are the major tasks in Data preprocessing?

   (b). Explain about data cleaning techniques?

   (OR)

   (c). Explain about the data reduction strategies?

   (d). What are the different data integration techniques. Explain.

2. (a). What is machine learning? Explain the different types of machine learnings?

   (b). Write about the applications of Machine Learning?

   (OR)

   (c). Briefly discuss about naive bayes classifier?

   (d). Write algorithm for kNN?

3. (a). Explain the concept of clustering?

   (b). Briefly discuss about the different types of clustering?

   (OR)

   (c). Briefly discuss about the k-means algorithm?

   (d). Explain the Principal Component Analysis method?

4. (a). Explain Deep Learning for Text and Sequences. Explain Image segmentation.

   (b). Explain the concept of Recurrent Neural Networks.

   (OR)

   (c). Explain Deep Learning for Natural Language processing.

   (d). Explain various Deep Learning applications in brief.

5. (a). What are Convolution Neural Networks. Explain?

   (b). Explain Multiple Filters and Overfitting and Under fitting?

   (OR)

   (c). What are the different iterations in a deep CNN? Explain the relation between CNN and ANN.

SYLLABUS: CLOUD COMPUTING

UNIT-I: Introduction to Cloud Computing, Cloud issues and challenges, Properties, Characteristics, Deployment models. Cloud resources: Network and API, Virtual and Physical computational resources, Data-storage. Virtualization concepts, Types of Virtualization: Introduction to Various Hypervisors, High Availability (HA)/Disaster Recovery (DR) using Virtualization, Moving VMs.

UNIT-II: Service models, Infrastructure as a Service (IaaS), Resource Virtualization: Server, Storage, Network, Case studies. Platform as a Service (PaaS), Cloud platform & Management: Computation, Storage, Case studies. Software as a Service (SaaS).

UNIT-III: Cloud Resource Virtualization: Layering and Virtualization, Virtual Machines, Full Virtualization and Para virtualization, Hardware Support for Virtualization. Cloud Resource Management and Scheduling: Policies and Mechanisms for Resource Management.

UNIT- IV: Cloud Infrastructure: Cloud Computing (At Amazon, At Google, Microsoft Windows Azure), Private Clouds, Cloud Storage, Cloud Computing Interoperability (The Intercloud), Responsibility Sharing Between User and Cloud Service Provider.

UNIT- V: Storage System: SAN, NAS.

Text Books: 1. Cloud Computing: Theory and Practice, Dan C. Marinescu, Morgan Kaufmann, Elsevier.

Reference Books:

1.Distributed and Cloud Computing, Kai Hwang, Geoffrey C.Fox, Jack J.Dongarra, Morgan Kaufmann, 1st Edition, 2011.

2. Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGrawHill.

RESEARCH SCHOLAR : VENKATA CHANDRA VARMA B

RESEARCH GUIDE : DR.M.KAMALA KUMARI

DEPARTMENT : COMPUTER SCIENCE & ENGINEERING

ADIKAVI NANNAYA UNIVERSITY

Time: 3 Hours   Max.Marks: 100

Answer ALL questions.
Each Question Carries 20 Marks

1. (a). What are the major uses of Cloud Computing?

   (b). Explain about Deployment models?

                                (OR)

   (c). Explain High Availability?

   (d). Explain Disaster Recovery.

2. (a). List various service models in Cloud and explain them?

                                (OR)

   (b). Briefly discuss about case study of Cloud service model?

3. (a). Explain the concept of Virtualization?

   (b). Briefly discuss about the Full and Para Virtualization?

                                (OR)

   (c). Briefly discuss about the Resource Management?

   (d). Explain the Policies of Resource Management?

4. (a). Explain Cloud infrastructure
   (b). Explain any use case of the Aws/Azure.

                                (OR)

   (c). Explain Interoperability.

   (d). Explain any use case of Data Sharing across the cloud.

5. (a). What is SAN

   (b). Provisioning of SAN Storage

                                (OR)
   (c). What is NAS

   (d). Provisioning of NAS Storage.