2022-23

Acropolis Institute of Technology and Research, Indore

Submitted To:
Prof. Mayank Bhatt

ACROPOLIS
Enlightening wisdom

Department of Information Technology

Open Elective Lab

(Data Compression)

(CD 506)

Submitted By:– Sumit Mandloi

Enrollment No.: 0827CD201055

Class/Year/Sem: CSE(DS)/3rd / V Sem

[LAB ASSIGNMENT DCL (CD-506)]

The Objective of this laboratory work is to enlighten the student with knowledge base in Data Compression and its techniques. Also demonstrate a working understanding of Data Compression.

ACROPOLIS INSTITUTE OF TECHNOLOGY & RESEARCH, INDORE

Department of Information Technology/CSE(DS)/CSE(IoT)

CERTIFICATE

This is to certify that the experimental work entered in this journal as per the B. Tech.____year syllabus prescribed by the RGPV was done by Mr./ Ms. ……B. TECH……. year …… semester in the……Laboratory of this institute during the academic year 20_- 20__

Signature of Head Signature of the Faculty

Vision and Mission of the Institute

Vision

To be an academic leader for the development of human potential so as to meet the global challenges.

Mission of the Institute

a. To create an intellectually stimulating learning environment.
b. To impart value based, innovative, and research-oriented education.
c. To develop positive attitude with communication skills.
d. To increase employability and entrepreneurship through collaboration with industries and professionalorganizations.

Vision and Mission of Information Technology Department

Vision

Dedicated technical Information Technology education, research, and practices towards excellent to produce competent and skilled intellectual Information Technology professionals.

Mission

e. To provide need-based training to the students on latest IT tools to become productive global citizens.
f. To provide IT based solutions for real life problems of the society.
g. To provide an environment for continuous learning and research to investigate, apply and transfer knowledge.

❖ GENERAL INSTRUCTIONS FOR LABORATORY CLASSES

➢ DO'S

- ✓ Without Prior permission do not enter the Laboratory.
- ✓ While entering the LAB students should wear their ID cards.
- ✓ The students should come with proper uniform.
- ✓ Students should sign in the LOGIN REGISTER before entering the laboratory.
- ✓ Students should come with observation and record notebook to the laboratory.
- ✓ Students should maintain silence inside the laboratory.
- ✓ After completing the laboratory exercise, make sure to shut down the system properly.

➢ DONT'S

- ✓ Students bringing the bags inside the laboratory.
- ✓ Students using the computers in an improper way.
- ✓ Students scribbling on the desk and mishandling the chairs.
- ✓ Students using mobile phones inside the laboratory.
- ✓ Students making noise inside the laboratory.

SYLLABUS

Course: CD-506 [CD- 504(B) (Data Compression)]

Branch/Year/Sem: CSE - Data Science /III Year/V Sem

Unit I: Compression Techniques

Lossless compression, Lossy compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

Unit II: The Huffman coding algorithm

Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Huffman coding: Lossless image compression, Text compression, Audio Compression.

Unit III: Coding

Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression- The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, ImageCompression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move to-front coding, CALIC, JPEGLS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression.

Unit IV: Scalar Quantization

Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

Unit V: Vector Quantization

Advantages of Vector Quantization over Scalar Quantization, TheLinde-Buzo-Gray Algorithm.

TEXT BOOKS

1. The Data Compression Book – Mark Nelson.

2. Data Compression: The Complete Reference – David Salomon.

REFERENCE BOOKS

1. Introduction to Data Compression – Khalid Sayood, MorganKaufmann Publishers.

HARDWARE AND SOFTWARE REQUIREMENTS:

S. No	Software Requirement	Hardware Requirement
1	MATLAB 7.0	**Processor:** 360 & Above
2	C++	**RAM:** 16 MB
3	Python 3	**HDD Space:** 200 MB

MATLAB Tool:

The purpose of this subject is to cover the data compression techniques. This syllabus provides all the concepts of data compression. For execution, MATLAB is the best tool for Data Compression.

PREREQUISITE:-

The students should have knowledge of MATLAB, and how to write Programs in MATLAB Tools.

Name of Department---------- Name of Laboratory---------

Index

Exp. No.	Date of Exp.	Name of the Experiment	Page No.	Date of Submission	Grade & Sign of the Faculty
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

COURSE OBJECTIVES AND OUTCOMES

- **Course Objectives**

1. To have knowledge of MATLAB tool.
2. To identify compressing techniques.
3. To Understand Process of arithmetic coding.
4. To Understand JPEG encoder and decoder.
5. To Understand LZW coding.

- **Course Outcomes**

At the end of the course student will be able to:

1. Must be able to write MATLAB Commands.
2. Must be able to perform Encoding and decoding of Huffman code.
3. Must be able to process the arithmetic coding.
4. Must be able to implement JPEG encoder and decoder.
5. Must be able to perform LZW coding.

Program Outcome (PO)

The engineering graduate of this institute will demonstrate:

a) **Apply** knowledge of mathematics, science, computing, and engineering fundamentals to computer science engineering problems.

b) Able to **identify, formulate,** and demonstrate with excellent programming, and problem-solving skills.

c) **Design solutions** for engineering problems including design of experiment and processes to meet desired needs **within reasonable constraints** of manufacturability, sustainability, ecological, intellectual and health and safety considerations.

d) Propose and develop effective **investigational** solution of complex problems using research methodology; including design of experiment, analysis and interpretation of data, and combination of information to provide suitable conclusion. synthesis

e) Ability to create, select and use the **modern techniques** and various **tools** to solve engineering problems and to evaluate solutions with an understanding of the limitations.

f) Ability to acquire knowledge of **contemporary issues** to assess societal, health and safety, legal and cultural issues.

g) Ability to evaluate the **impact** of engineering solutions on individual as well as organization in a societal and environmental context, and recognize sustainable development, and will be aware of emerging technologies and current professional issues.

h) Capability to possess leadership and managerial skills and understand and commit to professional **ethics** and responsibilities.

i) Ability to demonstrate the teamwork and **function** effectively as an individual, with an ability to design, develop, test, and debug the project, and will be able to work with a multi-disciplinary team.

j) Ability to **communicate effectively** on engineering problems with the community, such as being able to write effective reports and design documentation.

k) Flexibility to feel the recognition of the need for and can engage in independent and **life-long learning by** professional development and quality enhancement programs in context of technological change.

l) A **practice** of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and entrepreneurship.

❖ COMMON PROCEDURE FOR DCL:

Step 1: Make one folder in either E or F drive using your Id Number or Name Followed by Roll No.

Step 2: Start the MATLAB from windows start button or by using desktop ICON

Step 3: Click on File Menu --> New. New file will be created. Again Click on File -> Save a dialog box is going open write the path to your directory e.g. E:\ADD_20\FileName and Press OK. Now your program is going to save at your directory.

Acropolis Institute of Technology and Research, Indore 453771 Department of Information Technology/CSE(DS)/CSE(IoT)			
Lab: Data Compression Lab (CD-506)		Group / Title:	
EVALUATION RECORD		Type/ Lab Session:	
Name	Sumit Mandloi	Enrollment No.	0827CD201055
Performing on		First submission	Second submission
Extra	Regular		

Grade and Remarks by the Tutor		
1. Clarity about the objective of experiment		
2. Clarity about the Outcome		
3. Submitted the work in desired format		
4. Shown capability to solve the problem		
5. Contribution to the teamwork		

Additional remarks

Grade: Cross the grade.

A	B	C	D	F

Tutor

---

1. **Title:**