LIBRARY MANAGEMENT SYSTEM

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OUTLINE.....

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- OBJECTIVE
- SYSTEM ARCHITECTURE
- KEY FEATURE AND IMPLEMENTATION
- FUTURE ENHANCEMENT
- CONCLUSION

INTRODUCTION

Overview:

Brief introduction to the project.

Importance of a Library Management System

OBJECTIVES

- IMAGE CAPTURING AND PROCESSING
- IMAGE RECOGNITION
- IMAGE COMPRESSION

IMAGE CAPTURE

- Image capture (or machine vision) is a growing area of specialized data acquisition for PCs, enabled by the speed and power of current PC hardware and operating systems. Machine vision is now commonly used for industrial automated inspection systems, with applications including reading bar codes on objects, verifying correct assembly of manufactured parts, and even checking the colour of pharmaceutical pills.
- There are many other image capture manufacturers who produce high-performance products with specialized image processing features built into the hardware.

IMAGE RECOGNITION

- It requires no physical interaction on behalf of the user.
- It is accurate and allows for high enrolment and verification rates.
- It can use your existing hardware infrastructure, existing cameras and image
- capture Devices will work withno problems.

IMPLEMENTATION

The implementation of face recognition technology includes the following four stages:

- Image acquisition
- Image processing
- Distinctive characteristic location
- Template creation
- Template matching

IMAGE ACQUISITION

- Facial-scan technology can acquire faces from almost any static camera or video system that generates images of sufficient quality and resolution.
- High-quality enrollment is essential to eventual verification and identification enrollment images define the facial characteristics to be used in all future authentication events.

Image Processing

- Images are cropped such that the avoid facial image remains, and color images are normally converted to black and white in order to facilitate initial comparisons based on grayscale characteristics.
- First the presence of faces or face in a scene must be detected. Once the face is detected, it must be localized and Normalization process may be required to bring the dimensions of the live facial sample in alignment with the one on the template.

What is imageCompression

- Reduction of the amount of data required to represent a digital image → data removal of redundant
- Transforming a 2-D pixel array into a statistically data set

Why is Compression Needed ?

- The main advantages of compression are reductions in storage hardware, data transmission time, and communication bandwidth.
- Examples:Progressive transmission of images (Internet)- Video coding.- Digital libraries and image databases- Remote sensing- Medical imaging

The reasons we can compress:

Three basic data redundancies:

– Coding redundancy

– Spatial/Temporal (Inter-Pixel) redundancy,

– Irrelevant/Psycho-Visual redundancy

a b c

FIGURE 8.1 Computer generated 256 × 256 × 8 bit images with (a) coding redundancy, (b) spatial redundancy, and (c) irrelevant information. (Each was designed to demonstrate one principal redundancy but may exhibit others as well.)

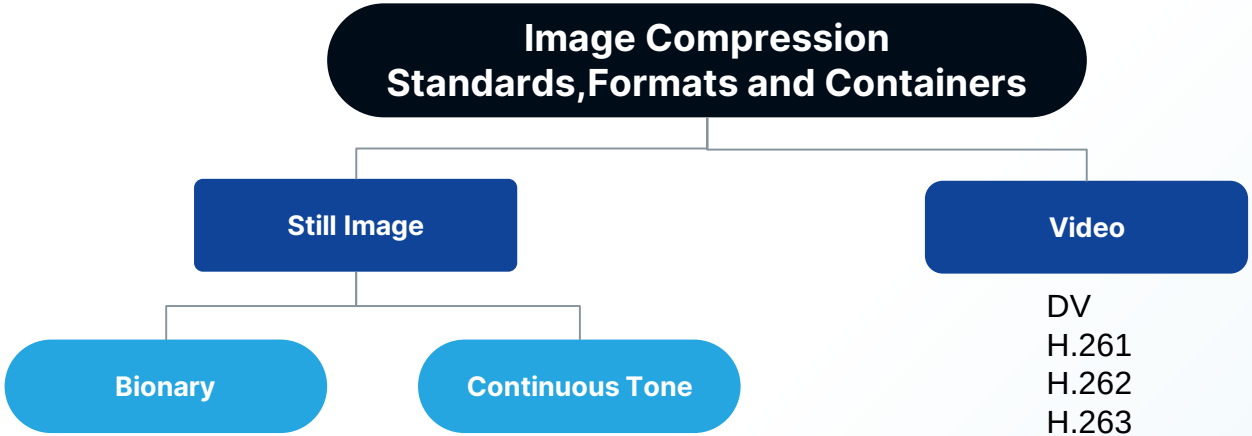
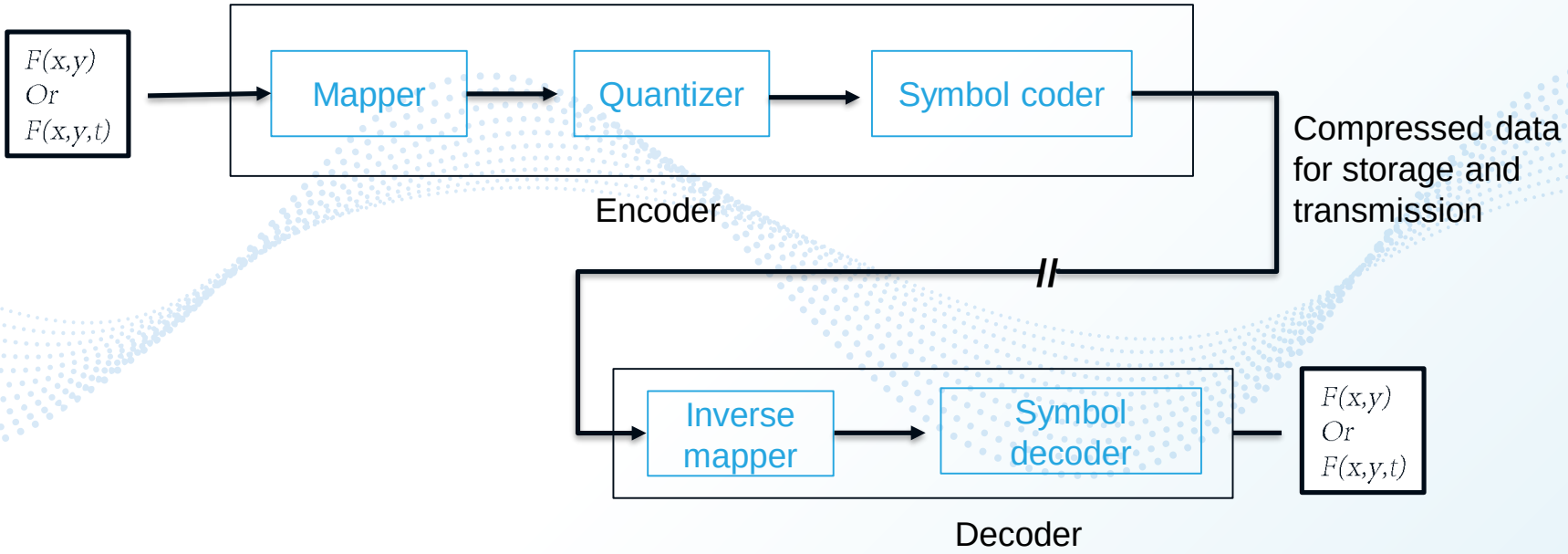
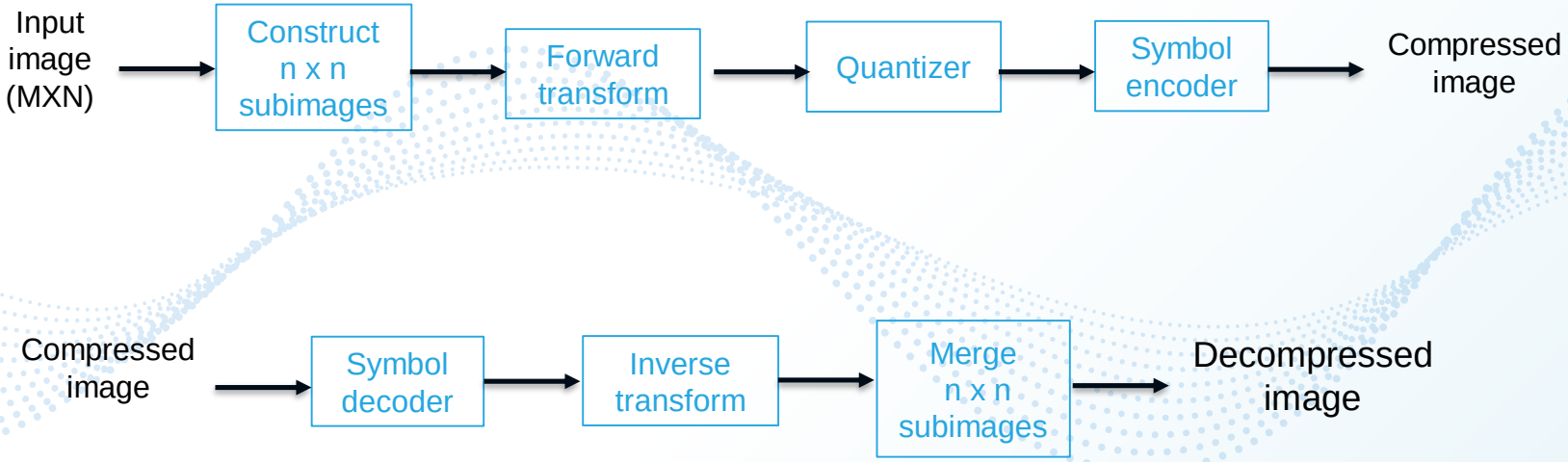


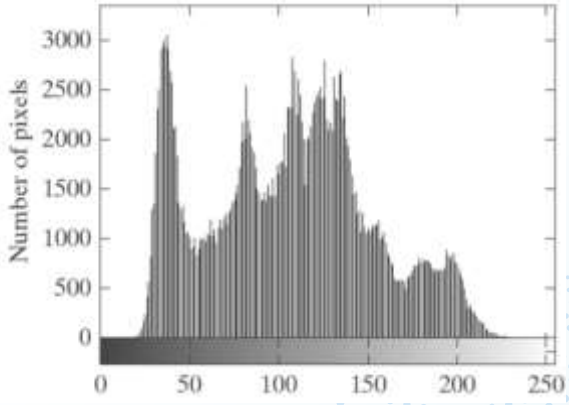
Image Compression
Standards,Formats and Containers
Still Image
Video
Bionary
Continuous Tone
CCITT Group 3
CCITT Group 4
JBIG (or JBIG1)
JBIG2
TIFF
JPEG
JPEG-LS
JPEG-2000
BMP
GIF
PDF
PNG
TIFF
DV
H.261
H.262
H.263
H.264
MPEG-1
MPEG-2
MPEG-4
MPEG-4 AVC
AVS
HDV
M-JPEG
Quick Time
VC-1 (or WMV9)


F(x,y)
Or
F(x,y,t)
Mapper
Quantizer
Symbol coder
Encoder
Compressed data
for storage and
transmission
Inverse
mapper
Symbol
decoder
F(x,y)
Or
F(x,y,t)
Decoder

JPEG


Input image (MXN)
Construct n x n subimages
Forward transform
Quantizer
Symbol encoder
Compressed image
Compressed image
Symbol decoder
Inverse transform
Merge n x n subimages
Decompressed image

Are all pixels equal ?



Are all Pixels/symbols equal ?

r_k	$p_r(r_k)$	code 1	$l_1(r_k)$	code 2	$l_2(r_k)$
$r_{87=87}$	0.25	01010111	8	01	2
$r_{128=128}$	0.47	10000000	8	1	1
$r_{186=186}$	0.25	11000100	8	000	3
$r_{225=225}$	0.03	11111111	8	001	3
r_k for $K \neq 87,128,186,255$	0	----	8	----	0

Huffman Coding

- Most popular coding redundancy technique
- Variable length code is a code which maps source symbols to a variable number of bits.
- A measure to reduce coding redundancy
- Min length code is assigned to one with highest probability

Huffman Coding

Image size:10x10(5bit image)

Frequency:

a_2 =40 a_6 =30 a_1 =10 a_4 =10 a_3 =6 a_5 =4

Original source		Source reduction			
Symbol	Probability	1	2	3	4
a_2	0.4	0.4	0.4	0.4	0.6
a_6	0.3	0.3	0.3	0.3	0.4
a_1	0.1	0.1	0.2	0.3	
a_4	0.1	0.1	0.1		
a_3	0.06	0.1			
a_5	0.04				

Original source			Source reduction								
Symbol	Probability	Code	1		2		3		4		
a_2	0.4	1	0.4		0.4		0.4		0.6	0	
a_6	0.3	00	0.3		0.3		0.3	00	0.4	1	
a_1	0.1	011	0.1		0.2	010	0.3	01			
a_4	0.1	0100	0.1	0100	0.1	011					
a_3	0.06	01010	0.1	0101							
a_5	0.04	01011									

Encoded string: 010100111100

Decoding: $a_3\ a_1\ a_2\ a_2\ a_6$

Parameters:

1.Average length of code

Lavg =0.4*1+0.3*2+0.1*3+0.1*4+0.1+0.06*5+0.04*5=2.2 bit/symbol

2.Total no. of bits to be transmited

10*10*2.2=220bit

3.How much you saved=$\frac{10*10*5-10*10*2.2}{10*10*5}$=0.56=56%

CONCLUSION

- Image recognition is a futuristic and relatively unexplored field, with wide areas of practical applications, including industrial, scientific and medical applications.
- This field has a lot of potential for development and implementation in new areas like space exploration, processing signal images, computer vision etc.
- For further enhance the performance of the image compression and decompression, can be done by other lossless methods of image compression because as it is concluded , that the result of the decompressed image is almost same as that of the input image, so it indicates that there is no loss of information during transmission.

Thank You!