

Welcome to...

DTI 516 Multimedia Processing

Chapter: 0

Hello World!

Dr. Paween Khoenkaw

Digital Technology Innovation : Maejo University

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ชื่อ: อ.ดร. ปวีณ เชื้อนกแก้ว

Email: paween_k@gmaejo.mju.ac.th

website: <http://www.drpaween.com>



สาขาวิชาวิทยาการคอมพิวเตอร์ คณะวิทยาศาสตร์ มหาวิทยาลัยแม่โจ้

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2543-2546	วศ.บ. วิศวกรรมคอมพิวเตอร์ สถาบันเทคโนโลยีราชมงคล
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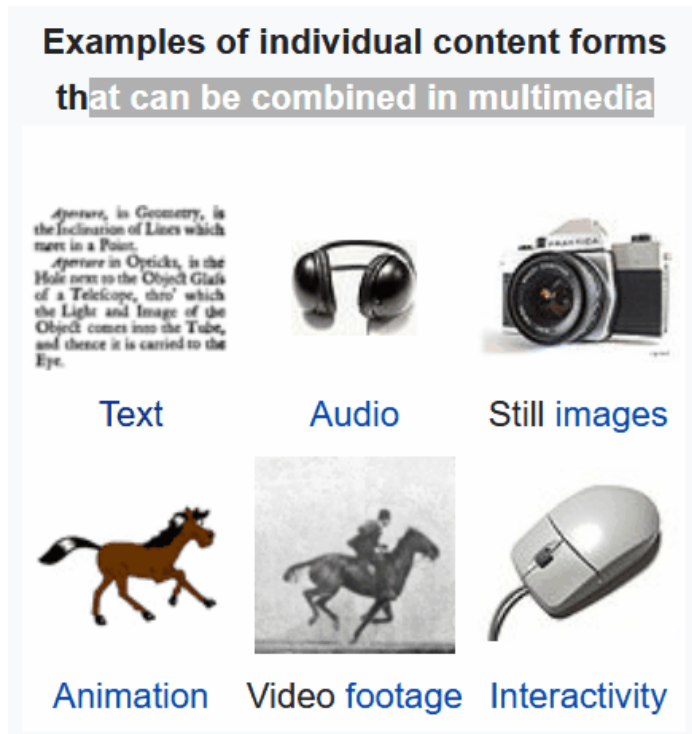
ความถนัด

- Multimedia processing
- Multimedia retrieval
- Smart devices and Mobile technology
- Embedded system

Contact information

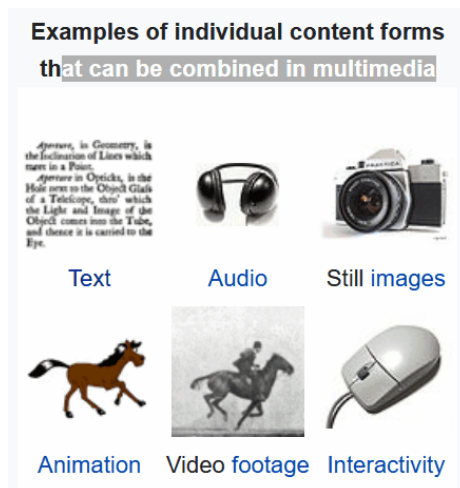
What is multimedia ?

Multimedia is content that uses a combination of different content forms such as **text**, **audio**, **images**, **animations**, **video** and **interactive** content.



What is multimedia Processing ?

The multimedia processing is a **process** that concerns the **analysis, synthesis, and modification** of **multimedia signal**.



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Multimedia Processing

3 (2-2-5)

Prerequisite : None

Concepts of processing multimedia data; audio; image; video; digital multimedia; interactive multimedia; **sampling** and signal **representation**; standards for multimedia **coding**; **compression**; **filtering**; **transformation**; **content analysis**; multimedia **retrieval**; related **tools** and applications

What is multimedia Processing ?

Examples of individual content forms that can be combined in multimedia

Aperture, in Geometry, is the Inclination of Lines which meet in a Point. In Opticks, it is the Hole new in the Object Glass of a Telescope, by which the Light and Image of the Object comes into the Tube, and thence it is carried to the Eye.

Text



Audio



Still images



Animation

Video footage



Interactivity

- Sampling
- Representation
- Coding
- Compression
- Filtering
- Transformation
- Content analysis
- Retrieval
- Tools

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Examples of individual content forms
that can be combined in multimedia


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Text



Audio



Still images



Animation

Video footage



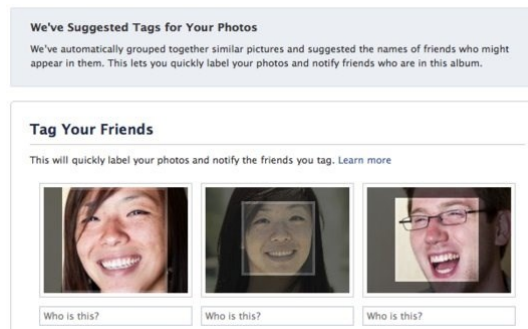
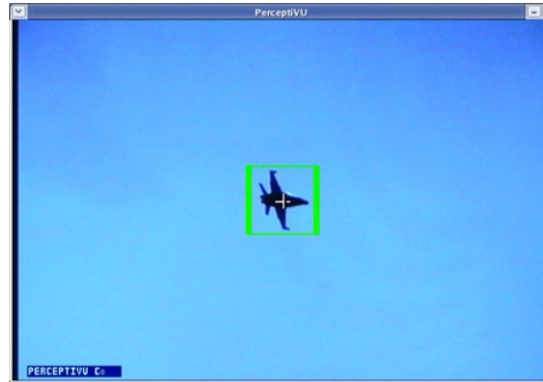
Interactivity

- Audio Processing
- Image Processing
- Video Processing

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Image Processing
Video Processing

What is image processing ?



Input = ?
Output = ?

The universe of digital imagery

Parameter



Computer Graphics

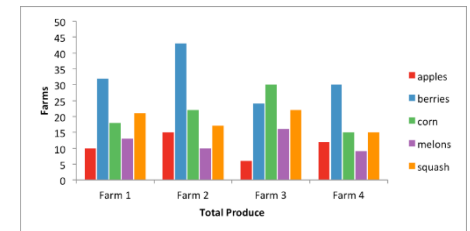


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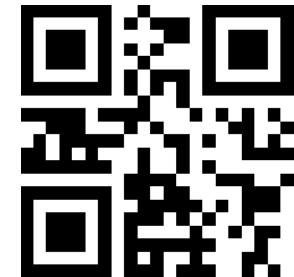


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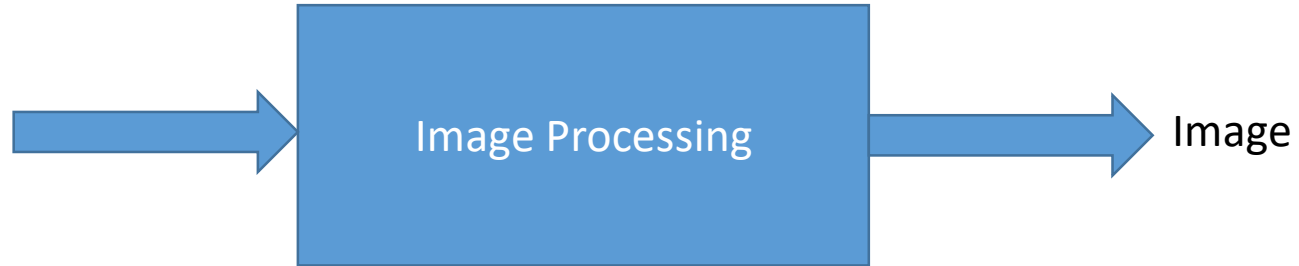


computer graphics

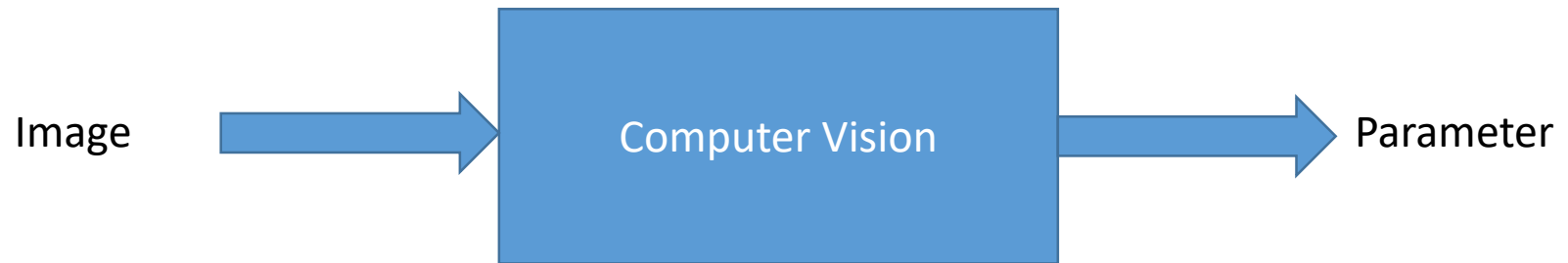


The universe of digital imagery

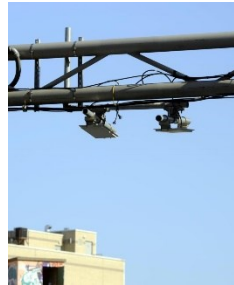
Image



The universe of digital imagery



computer graphics

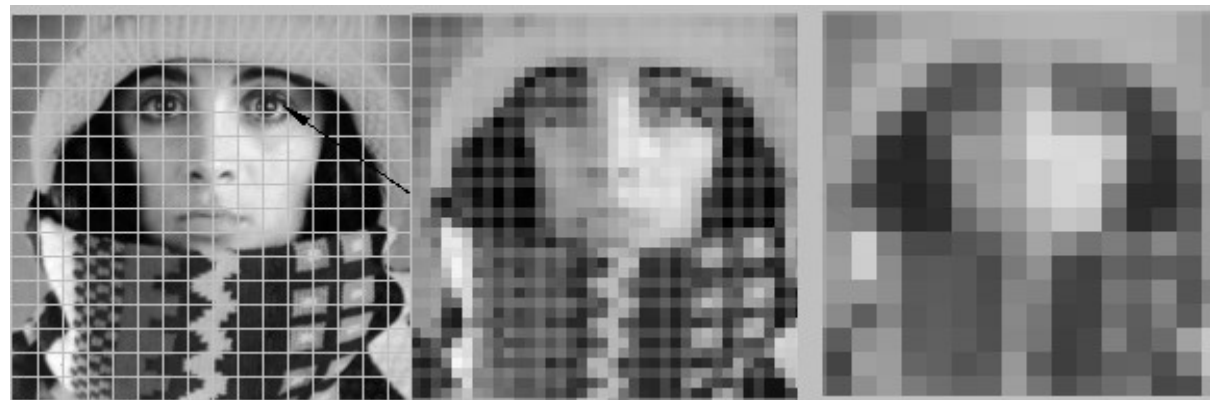
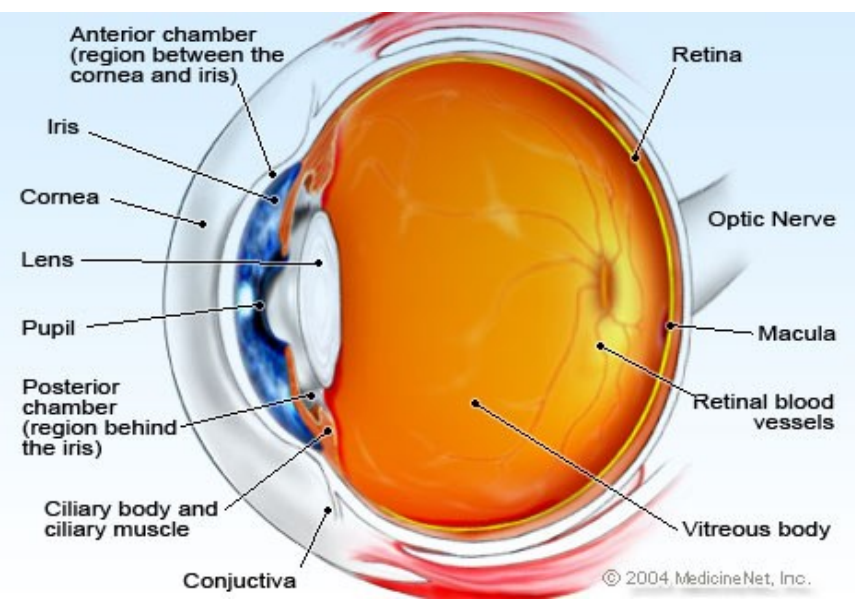


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The universe of digital imagery



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Introduction

- Image processing and related science
- Human visual perception

Image Acquisition

- Spatial Cartesian coordinate
- Camera model
- Sampling and Quantization
- Bitmap Image representation
- Color representation

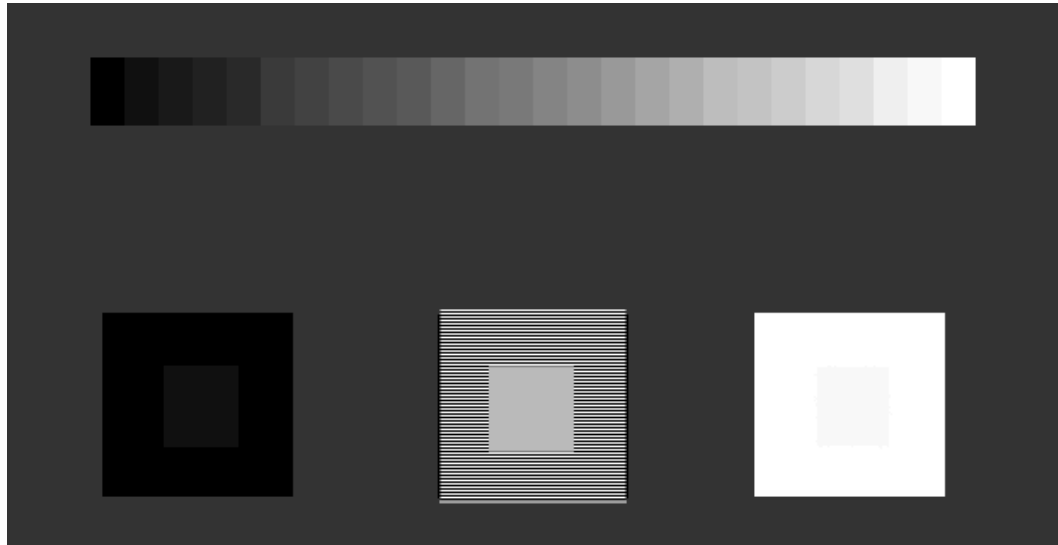


Image Characteristic

- Luminance
- Brightness, Contrast
- Distance measurement
- Histogram
- Normalization and Equalization

Image Matching

Image Retrieval

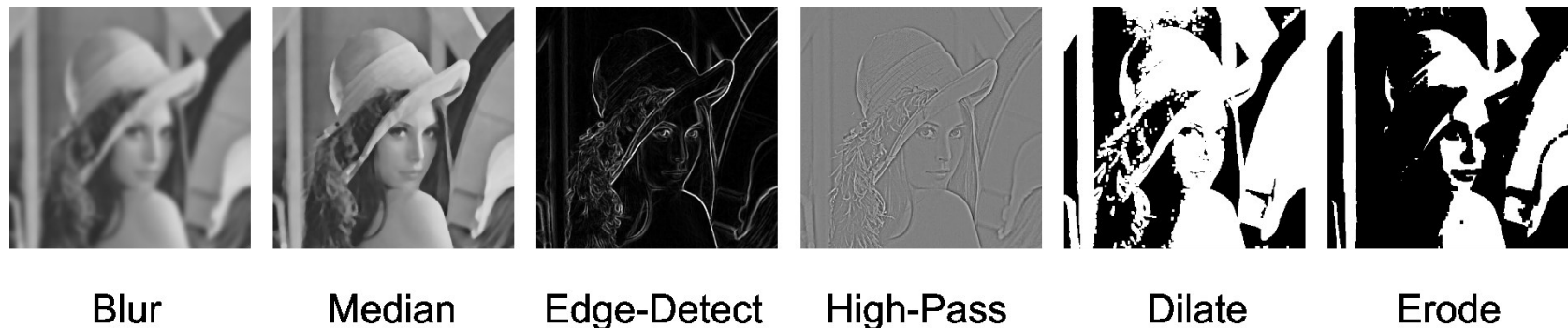
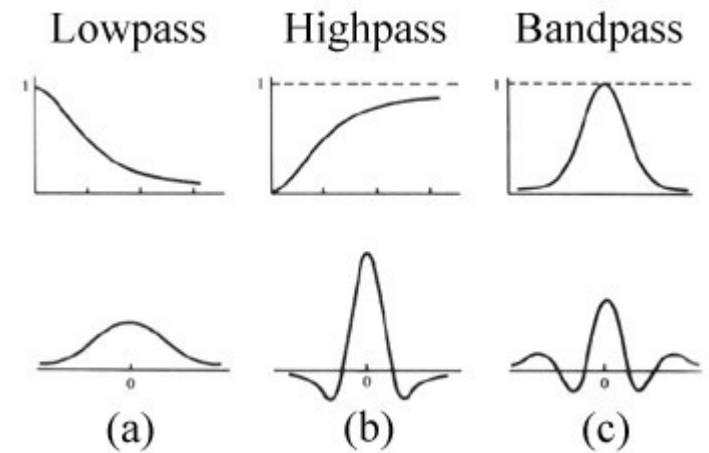
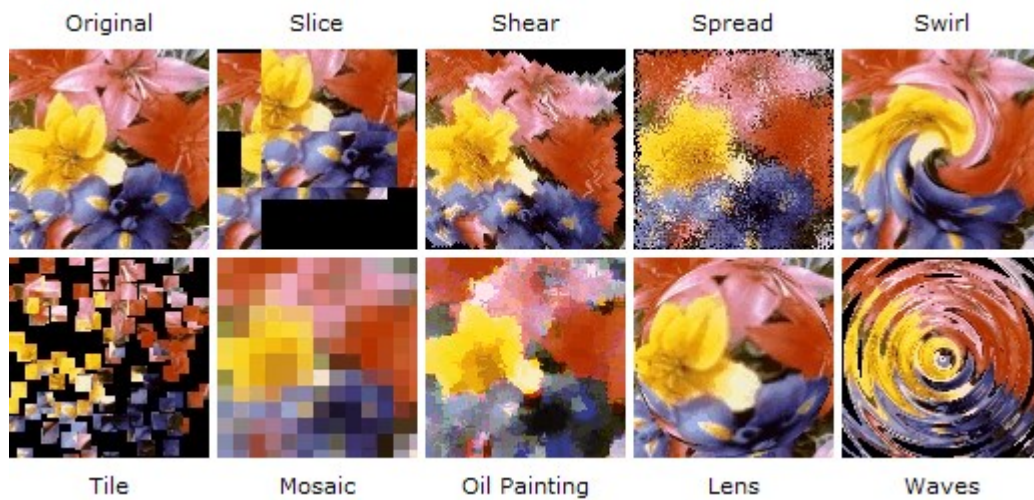
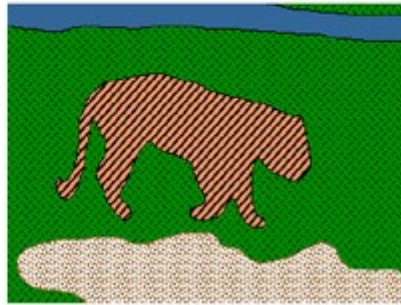


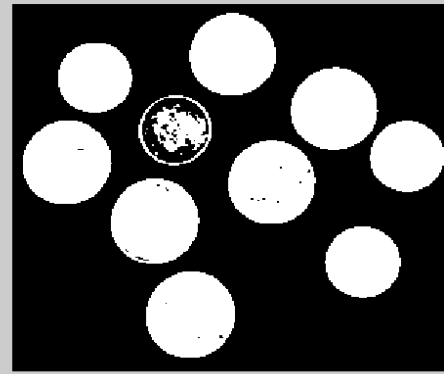
Image Filter

- Threshold
- Convolution
- Smooth image
- Sharpen image
- Edge detection algorithm

identify groups of pixels that go together



original binary image



labeled image

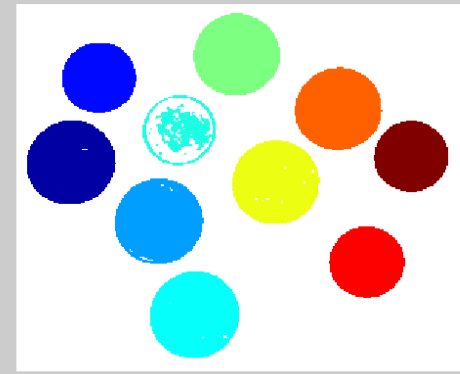
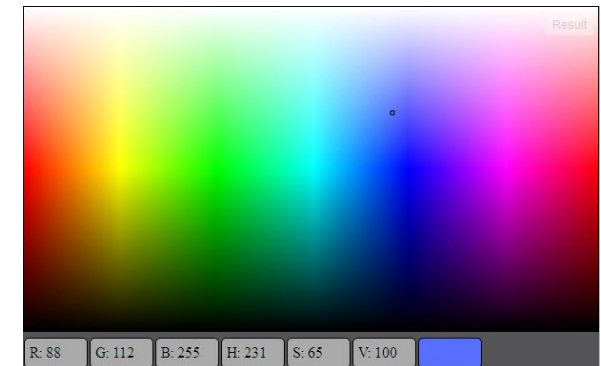
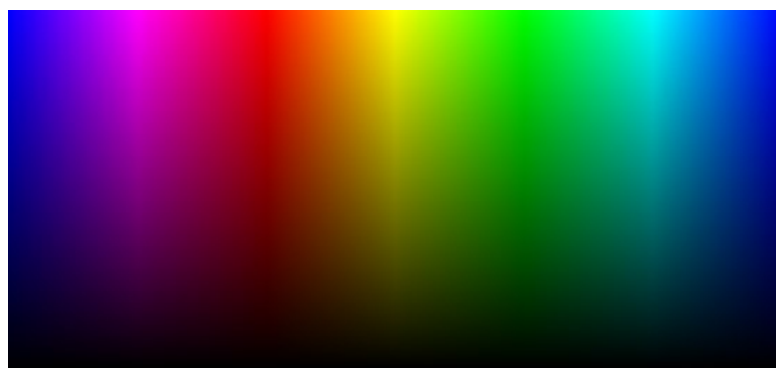


Image segmentation

- Neighborhood
- Erosion, Dilation
- False color and Pseudo color image



Color Processing

- Color spaces
- True color: RGB
- Indexed color (GIF)
- Component color (JPEG)

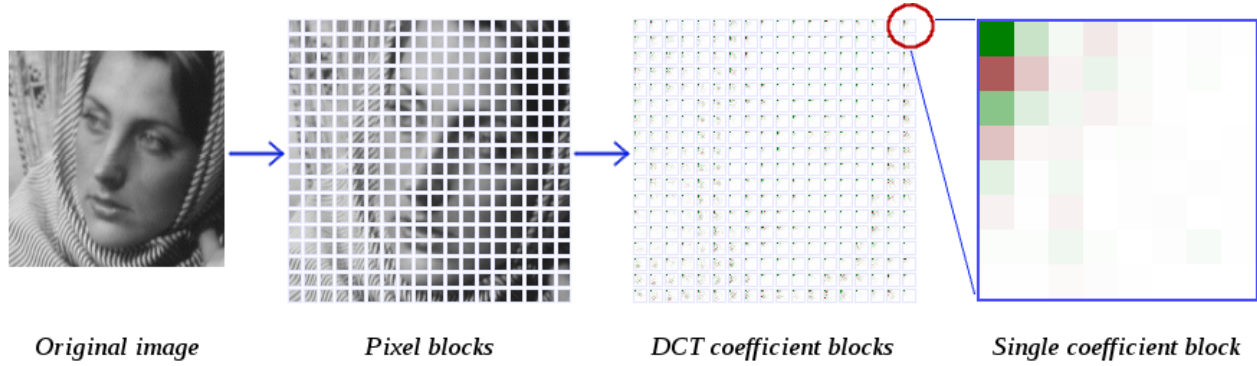
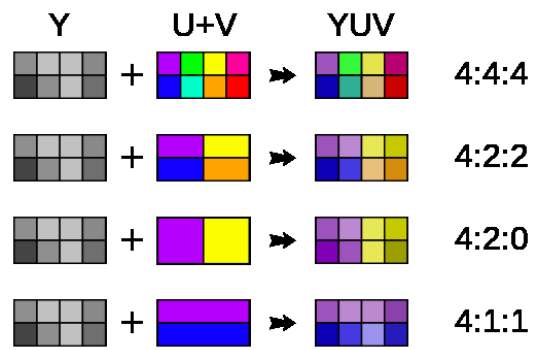


Image compression

- Channel Subsampling
- Run length encoding (GIF)
- Chain Code
- Discrete cosine transform
- JPEG Compression Algorithm

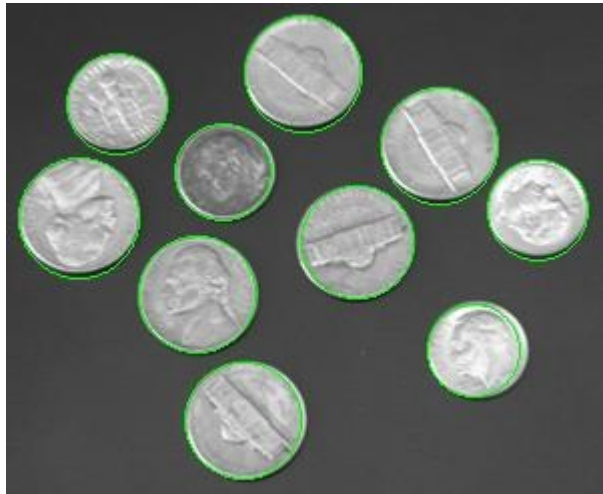
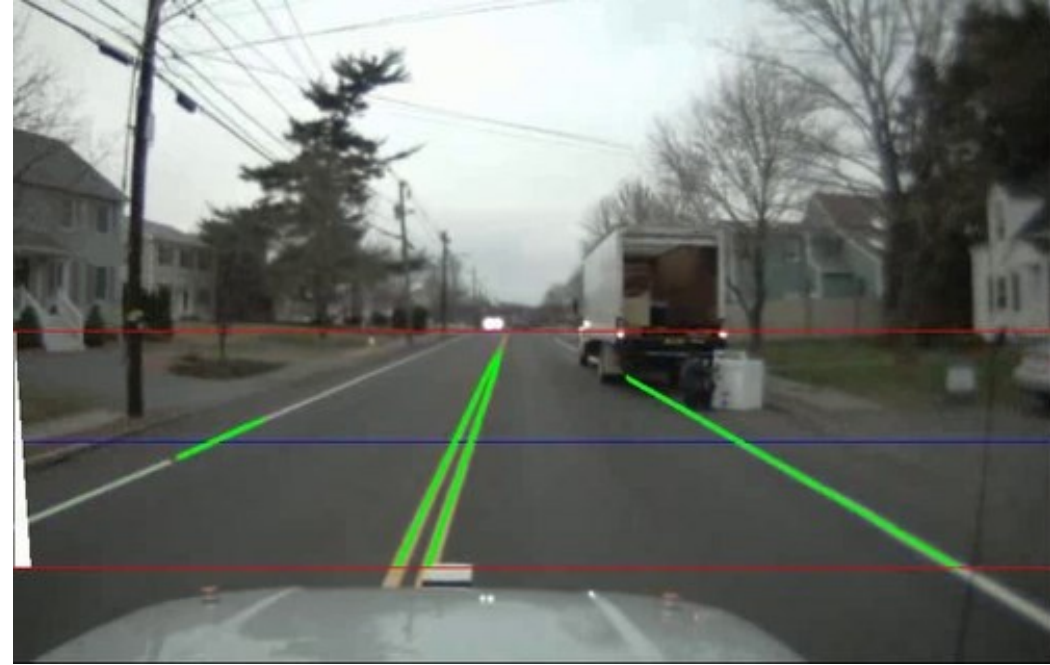
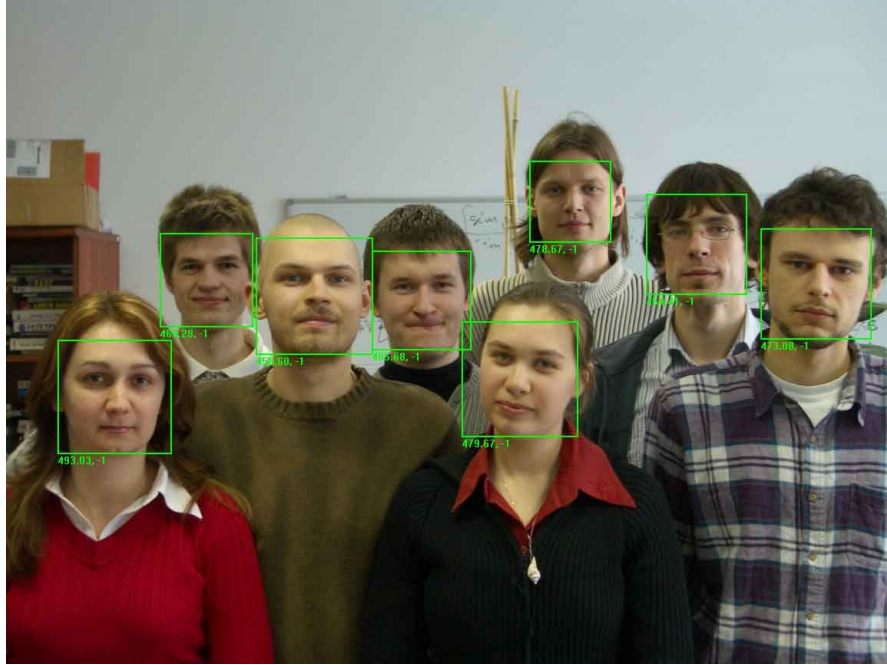
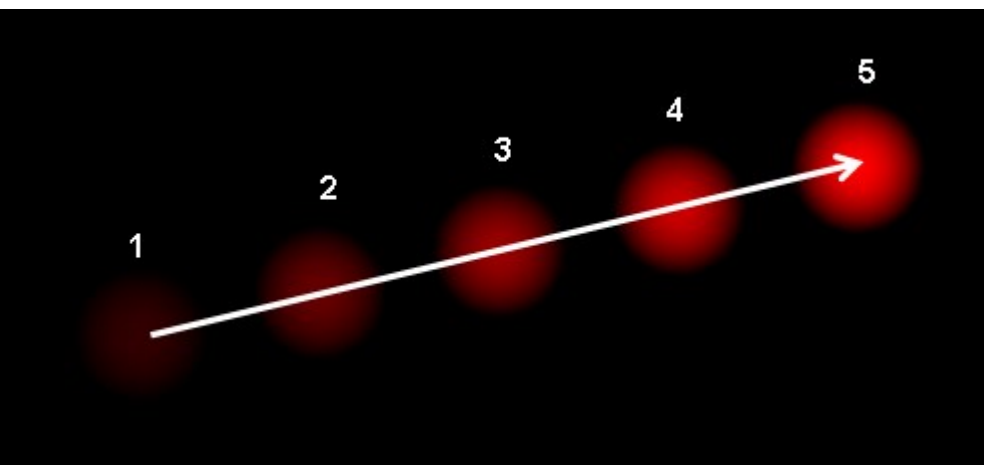
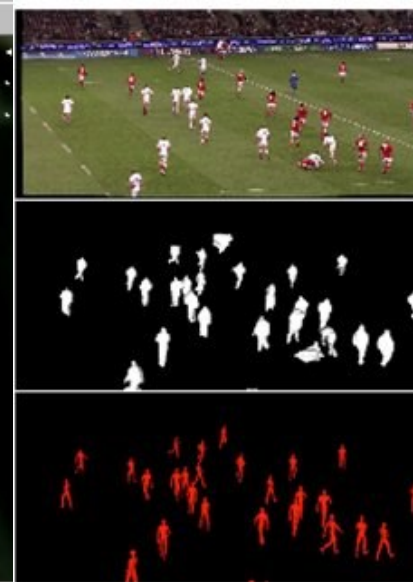


Image recognition technic



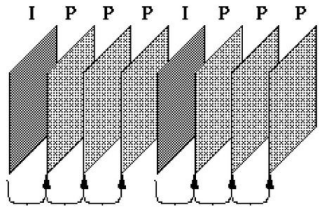
Motion

- Principle of Video
- Video camera
- Motion detection
- Motion Estimation
- Optical flow
- Object Tracking

MPEG-1 Video Compression

Motion Estimation Search

- Larger gaps between I and P frames allowed, so expand motion vector search range.



- To get better encoding, allow motion vectors to be specified to fraction of a pixel (1/2 pixels).

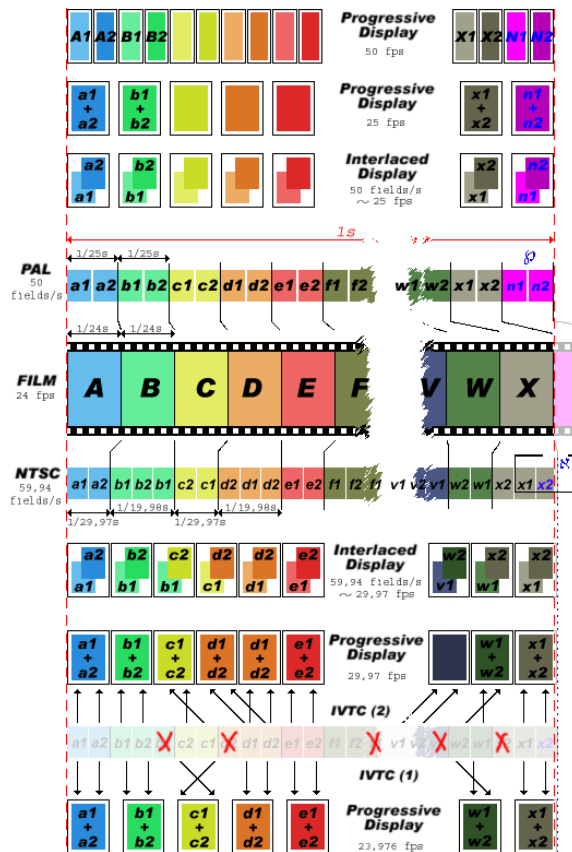
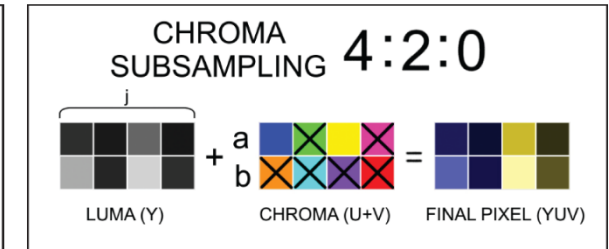
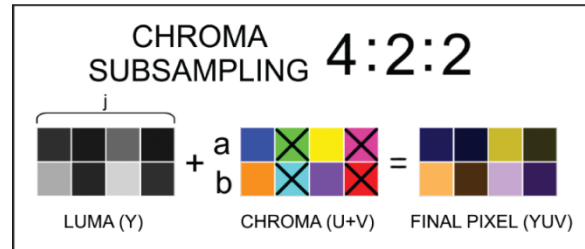
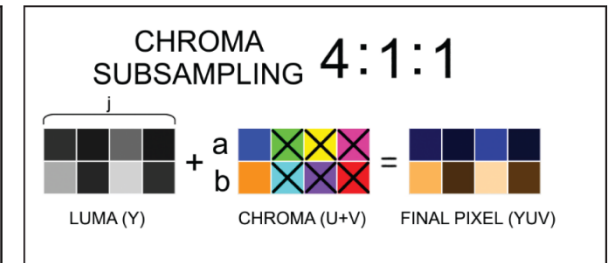
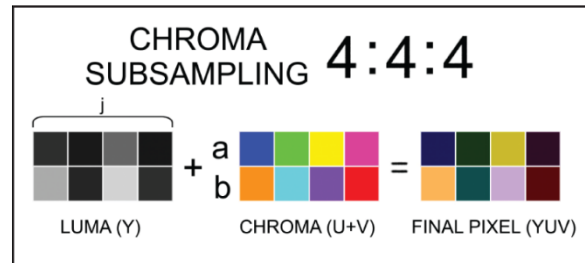
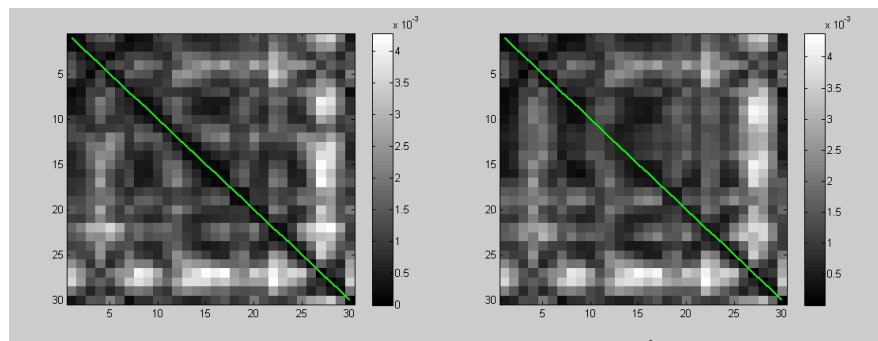


Figure 2

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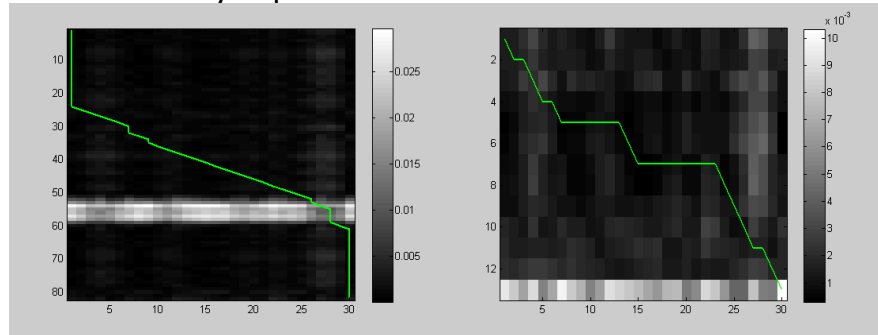


Video Coding



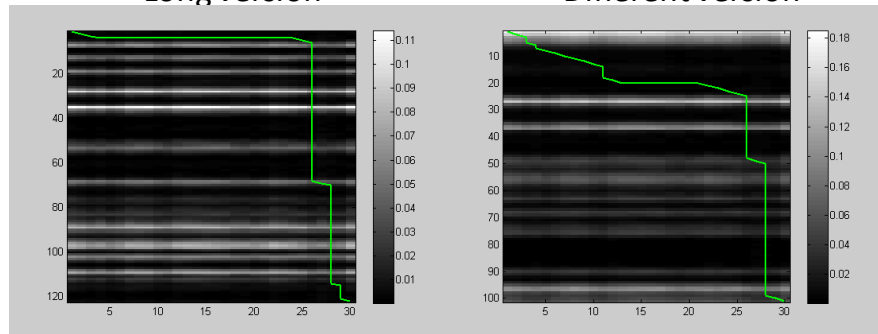
Exactly duplicate

Similar



Long version

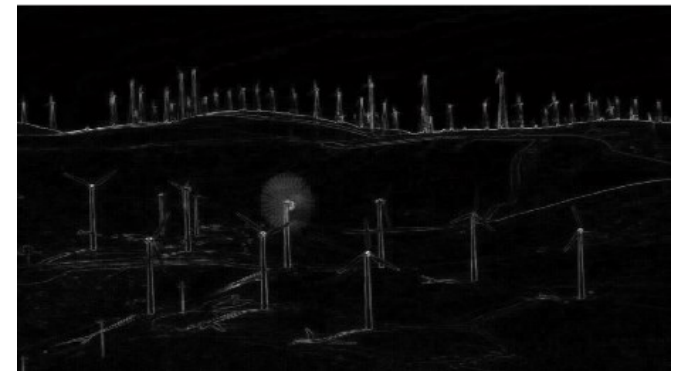
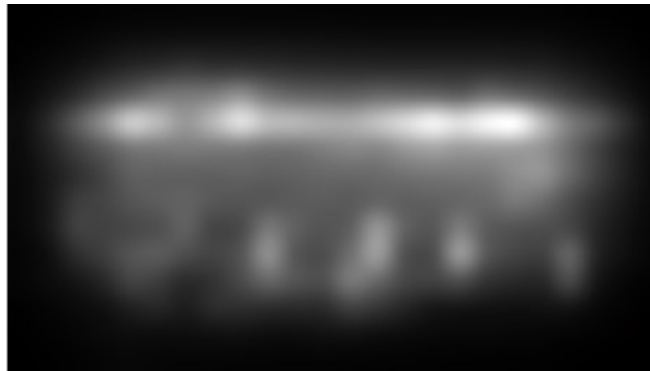
Different version



Major change

Dissimilar

- Video Signature
- Video Retrieval
- Cinematic



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Audio Processing

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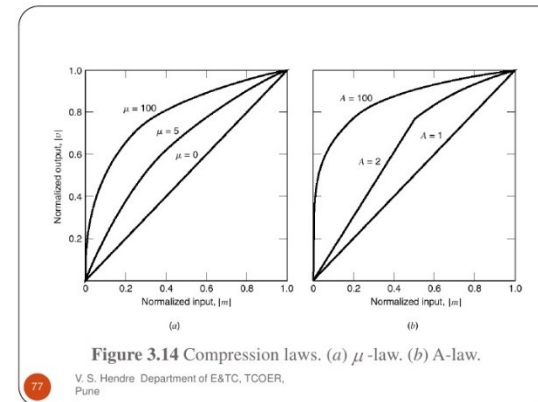
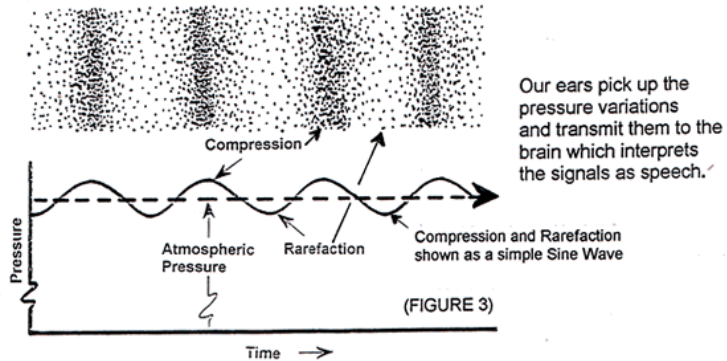
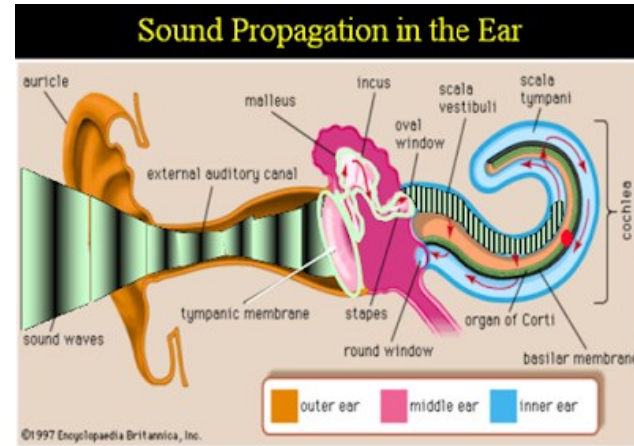
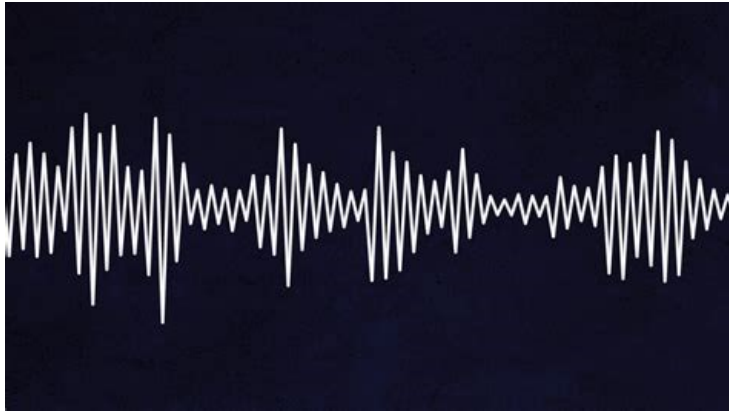
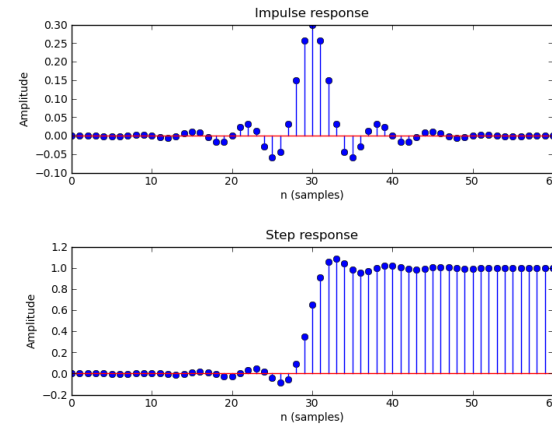
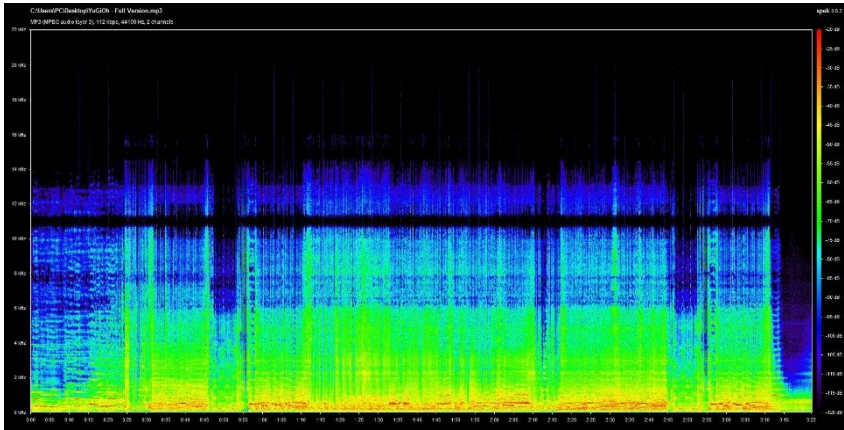


Figure 3.14 Compression laws. (a) μ -law. (b) A-law.

V. S. Hendre Department of E&TC, TGOER, Pune

- Sound
- Audio capture
- A2D in audio capture
- Companding

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- Sound model
- Time domain
- Frequency domain
- Audio Filter

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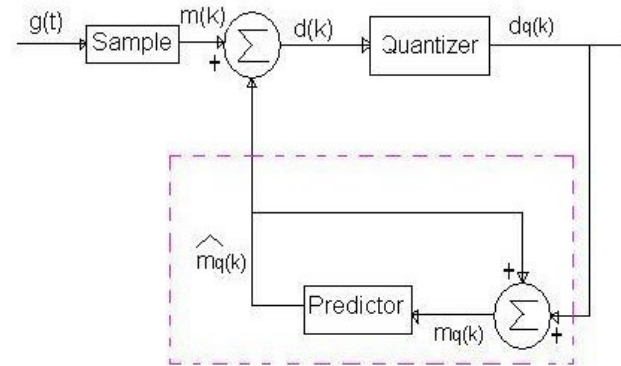
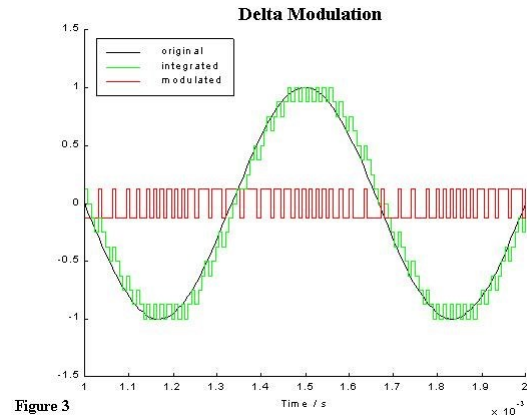
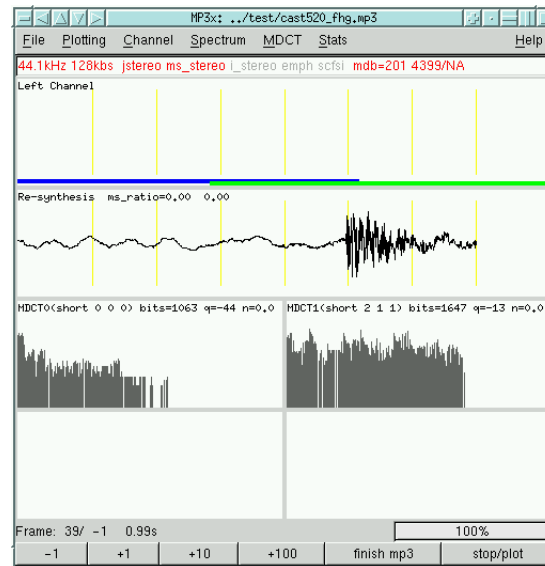
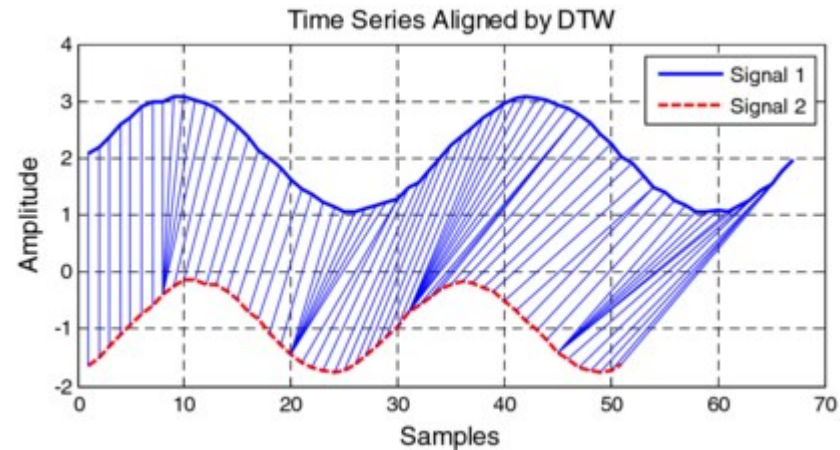
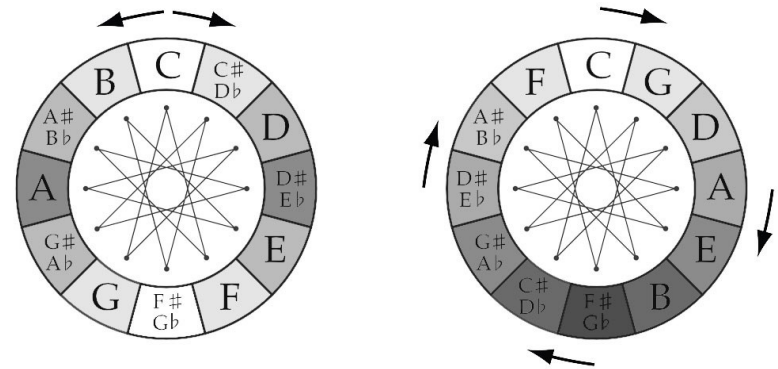
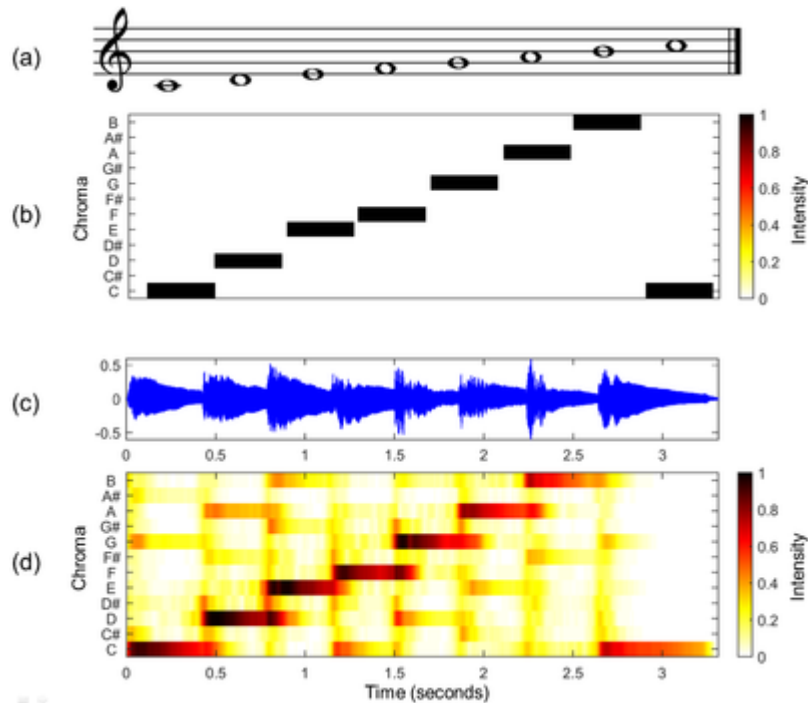


Fig:DPCM encoder



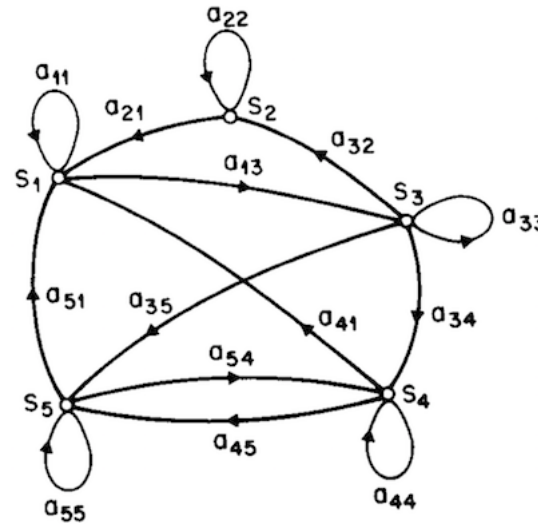
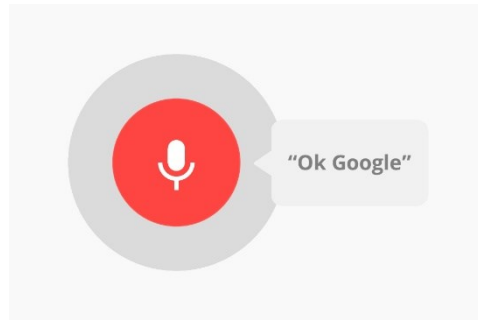
- Compression

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- Music Processing
- Similarity measurement
- Retrieval

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- Recognition

