

Лекц 2: Дүрс мэдээнд тоон боловсруулалт хийх арга зүй – удиртгал (үргэлжлэл...)

Газарзүйн тэнхим,
Шинжлэх ухааны сургууль,
Монгол Улсын Их Сургууль

- Digital Image Processing
 - Digital image processing is the technique of processing images while they are in the form of discrete (тусдаа) digital brightness quantities.
 - It is also the manipulation (нарийн төвөгтэй арга) of images by computer which is a relatively recent development in terms of humans' ancient fascination (гайхалтай, бишрэм) with visual stimuli (өөрчлөлт).

Concepts

- Image enhancement, image geometric transformation, image restoration, image compression, image segmentation, etc. are the concepts of digital image processing.
- Digital image processing is based on image processing algorithms which are point operation, local operation, total operation, etc.
- Digital image processing requires knowledge from a varied background for its successful use.

Contents

- Topics of Image Processing
 - Image enhancement
 - Image geometric transformation
 - Image restoration
 - Image segmentation
 - Image compression
 - Image fusion

Algorithms

- Image Processing Algorithms
 - Point operation
 - Local operation
 - Total operation
 - Algebraic operation
 - Geometric operation

Relative subjects

- Digital Signal Processing
- Some basic mathematical knowledge (eg: Matrix, Probability Theory)

Relationship

- Digital signal processing
- Computer graphics
- Pattern recognition (төлвийг танин мэдэх)

Digital signal processing

- Digital signal processing
 - 1D digital signal
 - 1D digital filter
 - 1D orthogonal transform
- Digital image processing
 - 2D digital signal
 - 2D digital filter
 - 2D orthogonal transform

Computer Graphics

- Computer Graphics
 - Graphics
 - Source –mathematical expression of 3D shape of objects
 - Result –graphics of the objects
- Digital image processing
 - Images
 - Source –original image.
 - Result –extracted objects or image understanding

(Image) Pattern Recognition

- Digital image processing
 - Images
 - Source –original image.
 - Result –extracted objects or image understanding
- Pattern Recognition
 - Patterns
 - Source –objects extracted from images
 - Result –recognition or classification of the objects

Practical Image Processing

- Hardware

- Imaging

scanner, digital camera

- Display

monitor

- Hardcopy

ink-jet printer

- Software

- Operating

Photoshop ENVI

- Programming

MATLAB, Visual C++

Conclusion

- Vision is the most important way of information exchange. Images also play an important role.
- Advantages of digital image
 - Digital techniques and computer techniques
 - High resolution
 - Permanent (тогтвортой, байнгын) saving without data losses
 - LAN and WAN broadcast
- Now-days **digital image applications exist everywhere.**

Conclusion

- Trends

- From low resolution to high resolution.
- From 2D to 3D.
- From frigid to motion.
- From single modality to multiple modalities.