UNIT – IV IMAGE SEMENTATION

SESSION – 1:

1. Introduction to Image Segmentation: Activity Quiz: Sample question

What is the need for segmentation?

Give the principle of segmentation?

How lines, edges and curves can be detected?

1. Types of Detection: PPT slides are presented to students to understand the different types of detection.

www.comp.dit.ie/.../ImageProcessing9-Segmentation(PointsLinesEdges)....‎

disp.ee.ntu.edu.tw/.../Image%20Segmentation,Representation%20and%2...‎

1. Edge Detection and basic formulation: PPT slides are presented to students to illustrate Edge Detection and basic formulation.

cnx.org/content/m24423/latest/Edge%20Detection.ppt‎

1. Definition:Segmentation subdivides an image into its constituent regions or interest objects. The level to whish the subdivision is carried depends on the problems being solved. When the objects ofinterest have been isolated,segmentation should stop.
2. Classification: discontinuity – based and similarity based methods, this two features are two most basic properties of intensity values. In the first category, the partition of an image is based on abrupt changes in intensity, such as point, line and edge. The second category partsan image region that is similar according to a set of predefined criteria. The thresholding region growing, and region splitting and merging are examples.
3. Conclusion: Learner led presentation: Assign group of learners and instruct them to list the features. One member from each group Narrates the need for segmentation give the principle of segmentation, how lines, edges and curves can be detected.

SESSION – 2

1. Recap: Activity: Brainstorming:

List the points contributed by the students on image segmentation, instruct them to list the Types of Detection. One member from each group narrates Image Segmentation. Types of Detection and Edge Detection and its basic formulation.

1. Edge linking & boundary detection: Chalk and Talk
2. Local processing: Activity: Presentation: PPT slides are presented to students to understand local processing.

www.csie.ntnu.edu.tw/~violet/IP93/Chapter03.ppt‎

een.iust.ac.ir/.../Image%20Processing/PowerPoints/Image%20Segmentati...‎

1. Global processing via Hough Transform: Presentation: PPT slides are presented to students to understand Global processing.

www.csie.ntnu.edu.tw/~violet/IP93/Chapter03.ppt‎

1. Conclusion: Question and Answers: Sample questions:

Differentiate local processing and Global processing?

List the steps to perform local processing

Give the advantage of Hough Transform

SESSION – 3

1. Recap: Rapid fire: Sample questions:

What is meant by local processing?

Give the steps to perform global processing.

Foundation & the role of illumination: Activity: Presentation

1. Basic of Global & Adaptive Thresholding: Presentation: PPT slides are presented to students to narrate the basic and role of illumination.

www.comp.dit.ie/.../ImageProcessing10-Segmentation(Thresholding).ppt‎

www.cs.tut.fi/~karen/Segmentation.pdf‎

www-ee.uta.edu/dip/Courses/EE5351/Image\_Segmentation.ppt‎

1. Optimal Global, Local thresholding& Adaptive Thresholding: Writing board.

The definition of Optimal Global, Local thresholding & Adaptive.Thesholding and the condition to achieve such thresolding are described to students.

1. Conclusion: Summarization:

The staff gives the summary of local thresholding global thresholding and adaptive thresholding.

SESSION – 3

1. Recap: Rapid fire: Sample questions:

What is meant by local processing?

Give the steps to perform global processing.

Foundation & the role of illumination:

Brainstorming: Questions on fundamentals of thresholding, role of illumination and need of thresholding can be asked to students and written on the board. Finally these topics are summarized by the faculty.

1. Basic of Global & Adaptive Thresholding: Presentation: PPT slides are presented to students to narrate the basic of global and adaptive thresholding.

www.comp.dit.ie/.../ImageProcessing10-Segmentation(Thresholding).ppt‎

www.cs.tut.fi/~karen/Segmentation.pdf‎

www-ee.uta.edu/dip/Courses/EE5351/Image\_Segmentation.ppt‎

1. Optimal Global, Local thresholding& Adaptive Thresholding: Writing board. The definition of Optimal Global, Local thresholding & Adaptive. Thesholding and the condition to achieve such thresolding are described to students.
2. Conclusion: Summarization: The staff gives the summary of local thresholding global thresholding and adaptive thresholding.

SESSION – 4

1. Recap: Recall by keywords

Global thresholding

Local thresholding

Adaptive thresholding

1. Introduction to region based segmentation: Presentation: With the help of PPT slides the concept of Region based segmentation is explained.

www-ee.uta.edu/dip/Courses/EE5351/Image\_Segmentation.ppt‎

cpsc.ualr.edu/milanova/image\_processing/.../Segmentation\_part1.ppt‎

1. Basic formulationsegmentation: Presentation:

With the help of PPT slides the concept of basic formulation segmentation is explained.

jdxy.cup.edu.cn/UpLoadFiles/双凯/Chapter10.pdf‎

1. Region Growing: Chalk and Talk

Region Growing is a procedure that groups pixel or sub regions into larger regions based on a predefined criteria from a set of “set” points.

Several key factors: the selection of “seed” points, similarly criteria, descriptor (based on intensity levels, such as moments or texture, and spatial properties), stop rule, adjacency definition.

Notation: Descriptors alone can yield misleading results if connectivity or adjacency information is not used in the region – growing process.

1. Conclusion: Learner led presentation:

Any one of the learner is asked to summarize region based segmentation.

SESSION – 5 input:

1. Recap: Recall by keywords

Seed point

Region growing

Rules for segmentation

1. Fundamentals of Region splitting: Writing Board: The Fundamentals of Region splitting is explained with the help of the diagram.

R

R1R1

R2

R3

R4

Ra1

Ra2

Ra3

Ra4

R1

R2

R3

Ra1 Ra2

Ra3 Ra4

1. Steps to perform region splitting: Writing Board:
2. Conclusion: Fill the table

|  |  |  |
| --- | --- | --- |
| Region growing | Region splitting | Region merging |
| Condition: | Condition: | Condition: |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| Region growing | Region splitting | Region merging |
| Condition: | Condition: | Condition: |
| Fix seed points based on identity level | P(Ri) = FALSE; | P(Ri∪Rj) = TRUE |

SESSION – 6 input:

1. Recap: tit for tat:

Learners are divided into two groups they are asked to prepare questions one group asks question to another and the other group answers the question and vice versa.

1. Fundamentals of Region Merging: Presentation: PPT slides are presented to students to narrate the fundamentals of Region Merging.

www-ee.uta.edu/dip/Courses/EE5351/Image\_Segmentation.ppt‎

www-ee.uta.edu/Online/Devarajan/ee6358/regseg.ppt‎

1. Steps to perform Region Merging: Chalk and Talk.

The various steps involved in region merging and the rules and conditions for region merging are discussed.

1. Conclusion: Rapid fire: Sample questions

Define region growing

What is meant by region segmentation?

SESSION – 7 input:

1. Recap: Quiz: Sample questions:

Give the condition for segmentation

Rules for region merging

Rules for region splitting

1. Segmentation by morphological watersheds: Presentation:

With the help of PPT slides the concept of segmentation by morphological watersheds is explained.

elearning.najah.edu/.../Chapter9\_Morphological\_Image\_Processing.ppt‎

een.iust.ac.ir/profs/Rezairad/.../PowerPoints/Image%20Segmentation.pdf‎

1. Basic concepts:

Three types of points

1. Point belonging to regional minimum.
2. Catchment basin or watershed: Points at which a drop of water, if placed at the location of any these points, would fall with certainty to a single minimum; divide lines or watershed lines;
3. Points at which would be equally likely to fall to more than one such minimum; the main objective of this type of segmentation algorithms is to find the watershed lines.
4. Basic conceptsmorphological watersheds: Presentation:

With the help of PPT slides the concept of morphological watersheds is explained with the help of the diagram.

www.csie.ntnu.edu.tw/~violet/IP93/Chapter10.ppt‎

www.ece.uvic.ca/~aalbu/computer\_vision.../L20-21.Morphology.pdf‎

1. Conclusion: Questions & Answers;

What is dilation?

Define catchment basin

What is meant by watershed lines?

SESSION – 8 input:

1. Recap: Brainstorming

List the points contributed by the students on Dam construction. Instruct them to specify the need for dam construction. One member from each group narrates Watershed line and about region minimum.

1. Dam construction: Basic concept:Presentation:

proteomics.bioengr.uic.edu/imaging/.../bioe594-image\_lecture13.pdf‎

een.iust.ac.ir/profs/Rezairad/.../PowerPoints/Image%20Segmentation.pdf‎

1. Dam construction: derivation: Writing Board
2. Conclusion: Learner led Presentation:

Any one of the learner is asked to summarize Dam construction- Basic concept

SESSION – 9input:

1. Recap: Quiz: Sample questions:

What is meant by morphological dilation?

Write the steps to perform dam construction.

1. Fundamentals of watershed segmentation: Presentation: PPT slides are presented to learners to narrate Watershed Transform.

een.iust.ac.ir/profs/Rezairad/.../PowerPoints/Image%20Segmentation.pdf‎

www.csie.ntnu.edu.tw/~violet/IP93/Chapter10.ppt‎

Watershed Transform

1. Steps to perform Watershed Segmentation algorithm: Chalk and Talk

The steps to perform Watershed Segmentation algorithm is describe.

1. Conclusion: Summarization:

The facilitator summarizes the fundamentals of Watershed segmentation to the learners.