CAIA (1TD396) re-exam June 2021

Det här är en förhandsvisning av den publicerade versionen av quizet

Startad: 2 dec kl 12.01

Instruktioner för Quiz

The re-exam in is in the form of a (ONE) quiz and it is an open book exam meaning that you can use books, notes etc. The quiz will contain different types of questions: T/F, multiple choice, numerical, motivations and explanatory. For the T/F and multiple choice questions wrong answers will result in negative points. No answer gives 0 points. You will NOT need to download images and do any real image analysis.

You have the full time (8:00-13:15) to spend on the quiz and can go back and forth between questions, **but you can only submit the quiz once!** -Similar to handing in a physical exam. The extra 15 minutes are added for submission. The system will close the submission at 13:15 sharp!

If you would like to uncheck or "un-answer" a T/F or multiple choice question- write that as a comment to one of the motivation questions.

Do not hesitate to contact me during the exam if something is unclear or if something is not working. Either through studium or directly to **ida.sintorn@it.uu.se (mailto:ida.sintorn@it.uu.se) .**

Please check announcements once in a while during the exam.

Good luck!

Ida-Maria

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Fråga 1 0 poäng

Code of honor start

- [ ] I confirm that I will not use unauthorized resources to answer the exam questions
- [ ] I confirm that I will not seek assistance from anyone else to answer the exam questions.

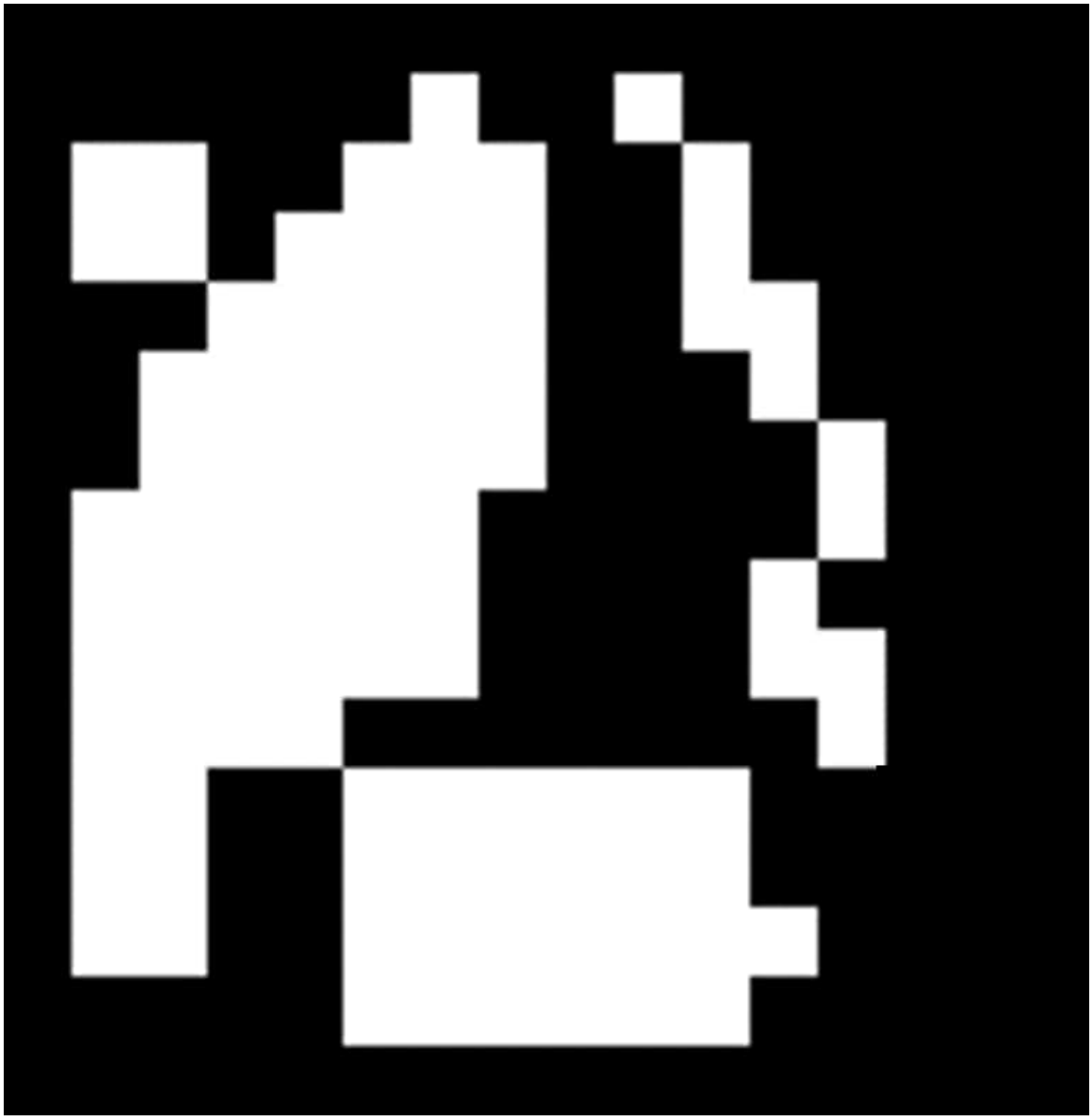
Fråga 2 — 1 poäng

The iso-data thresholding method is often a good choice for both bimodal and unimodal histograms.

- ◯ True
- ◯ False

Fråga 3 — 1 poäng

How many 4-connected objects are there in the image below?



- ◯ 3
- ◯ 6
- ◯ 2
- ◯ 4
- ◯ 7
- ◯ 8
- ◯ 5

Fråga 4 — 1 poäng

Signatures shall only be used to describe the border of convex objects.

- ◯ True
- ◯ False

Fråga 5 — 1 poäng

A sobel filter is orientation invariant.

- ◯ True
- ◯ False

Fråga 6 — 1 poäng

Intensity quantization means choosing the number of pixels per distance unit when digitizing and image.

- ◯ True
- ◯ False

Fråga 7 — 1 poäng

To change the contrast is an example of spatial filtering

- ◯ True
- ◯ False

Fråga 8 — 1 poäng

Sampling density is equivalent to resolution

- ◯ True
- ◯ False

Fråga 9 — 2 poäng

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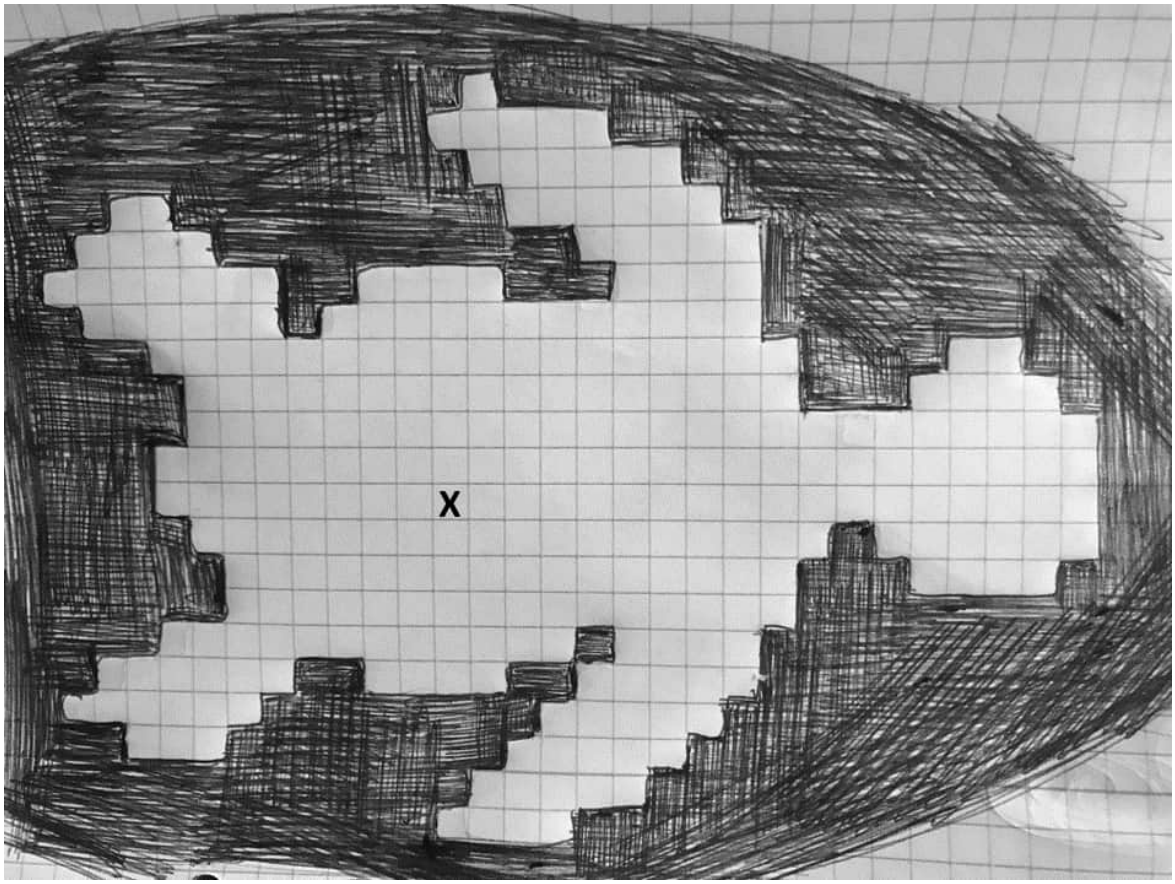
What value would the marked position get with the chess-board distance transform?



- ○ 7
- ○ 16
- ○ 5
- ○ 6
- ○ 4
- ○ 17

Fråga 10

2 poäng

In what order from left to right are the RGB color bands corresponding to the color image shown?

- ◯ G, B, R
- ◯ B, R, G
- ◯ B, G, R
- ◯ R, G, B
- ◯ G, R, B
- ◯ R, B, G

Fråga 11

5 poäng

Why is histogram equalization performed? In what situations will it not work/shall not be used/not be useful? Describe briefly how it is calculated (how does the algorithm work)?

Redigera Visa Infoga Format Verktyg Tabell

12pt Paragraph

p 0 words </>

Fråga 12

3 poäng

What is coding redundancy, interpixel redundancy and psycho-visual redundancy? How can these redundancies be utilized in image coding and compression?

Redigera Visa Infoga Format Verktyg Tabell

12pt Paragraph

p 0 words </>

Fråga 13

3 poäng

Explain how mathematical morphology can be used to extract edges in an gray-scale image? In a binary image?

Redigera Visa Infoga Format Verktyg Tabell

12pt Paragraph

p

0 words

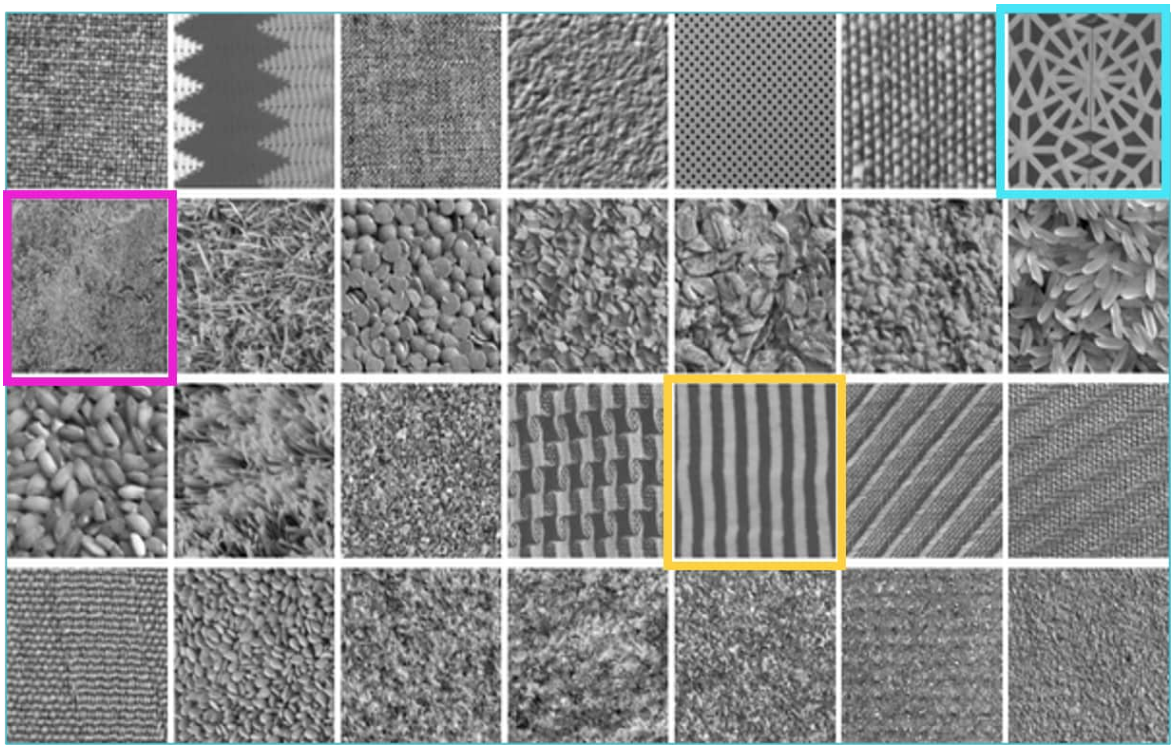
Fråga 14

5 poäng

Below, example images from a texture image dataset are shown. They are all intensity normalized to have the same mean and standard deviation.

Describe/discuss how/if histogram based measures can be used to distinguish between the the 3 marked texture classes.

Describe/discuss how co-occurrence matrix based measures can be used to distinguish between the 3 marked texture classes. Also describe how the co-occurrence should be constructed to solve the task (what parameter settings would you use when calculating the gray-level co-occurrence matrix.



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12pt Paragraph

p 0 words

Fråga 15

3 poäng

Describe/discuss different approaches of reducing noise in an image/when acquiring images

Redigera Visa Infoga Format Verktyg Tabell

12pt Paragraph

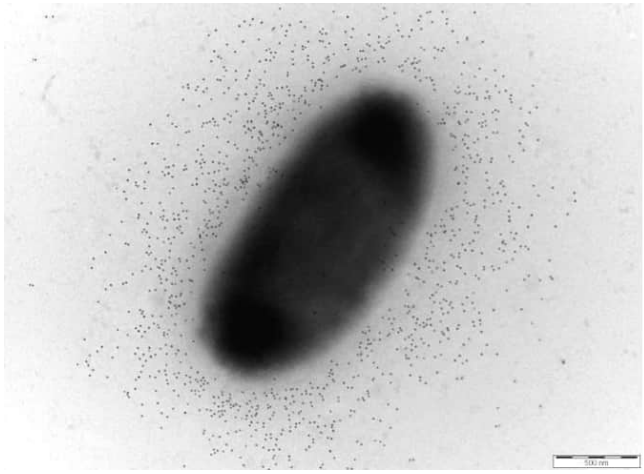
p 0 words

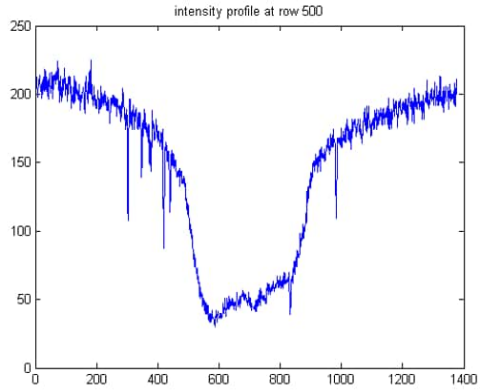
Fråga 16

3 poäng

The amount and length of fimbriae – protruding hairlike structures correlate with a bacterium's infectivity. The electron microscopy image below depicts an ECOLI bacterium whose fimbriae (invisible in this image) have been marked with gold nanoparticles (visible as black dots).The image is 1032x1376 pixels in size. The scalebar represents 500nm. An intensity profile of the image at row 500 is shown to the left. The image is acquired in order to detect and count the number and distance from the nanoparticles to the bacterium.

Describe how you would **preprocess** the image to correct/flatten the uneven background. What sizes/parameters would you use? Will the bacterium be affected and require special handling? If so, how will it be affected and how will you solve that?





Fråga 17

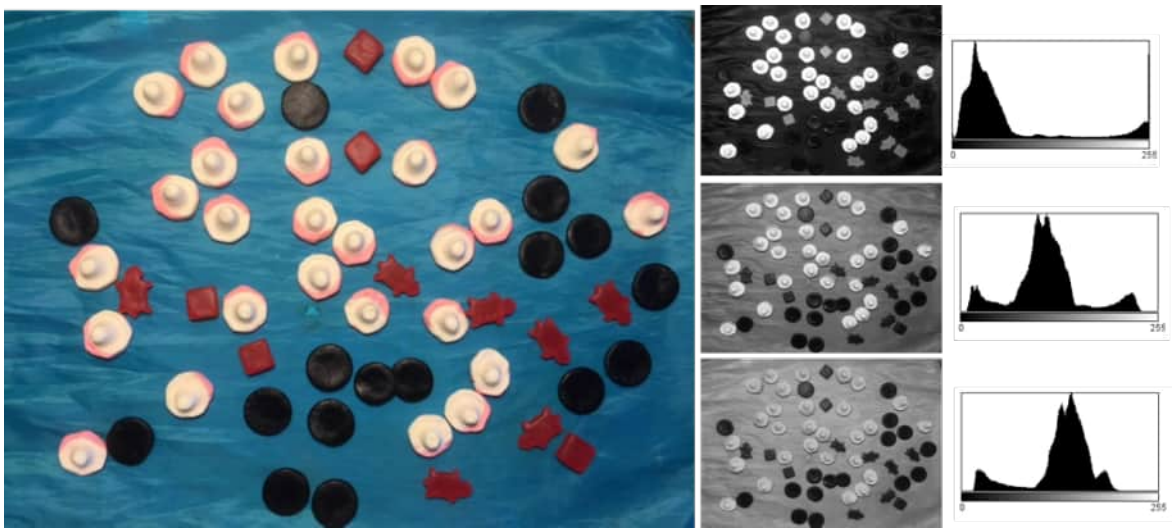
2 poäng

Assume that you have identified the center positions of all gold nanoparticles in the image. Assume also that you have a separate binary image mask with only the bacterium. Describe how would you measure the closest distance from each gold nanoparticle center to the border of the bacterium?

Fråga 18

5 poäng

How you would detect and count the number of each type of candy in the image below? Describe and motive the methods used, the order of methods and also how you would set/choose the parameters for the methods. The image is 640x480 pixels and the three colour bands (R,G;B) are also shown together with their corresponding grey-level histograms.



Fråga 19

0 poäng

Code of honor end

- [ ] I confirm I have not received help from anyone else to answer the exam questions.
- [ ] I confirm I have not used unauthorized resources to answer the exam questions.

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Lämna in quiz

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