EE 569 Discussion

Zohreh Azizi

04/09/2021

Announcements

- Midterm 2

  Monday 04/12/2021 8:00-10:15AM

- HW5

  due: 04/14/2021 11:59PM

Announcements

Preview of Discussion Sessions:

- …
- Week 13 (Apr. 9): Midterm2 Review
- Week 14 (Apr. 16): HW6 - part 1
- Week 15 (Apr. 23): HW6 - part 2
- Week 16 (Apr. 30): Wellness day (No Discussion)

Announcements

Exam procedure:

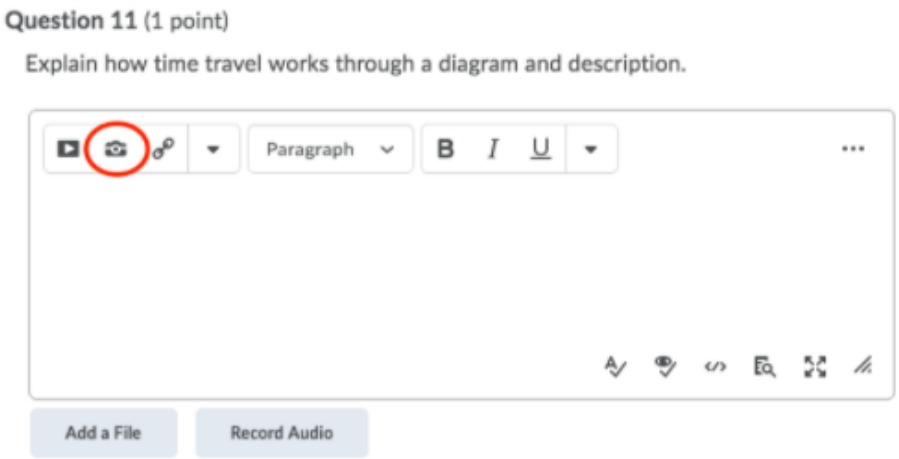
- Respondus LockDown will no longer be used for your upcoming exam.
- To access this exam, you will log in to D2L (https://courses.uscden.net) >> (course page) >> My Tools >> Quizzes >> Midterm 2
- You will not need to join the WebEx meeting for Midterm 2, as it won't be running.
- The quiz start time is 8:00am, the due time is 10:15am and the quiz shuts off at 10:15am PT. You have 135 minutes before D2L flags the submission as late.
- The quiz auto-saves whenever you click outside of a question box.
- The quiz only allows for **one** submission, so please make sure you have answered every question before clicking the "submit" button at the end.

Announcements

Exam procedure:

- Your quiz will include Written Response questions that require handwritten answers. You will need to take a picture of any handwritten answers and then insert them into their respective answer fields. To insert a picture into a question's answer, follow these steps:

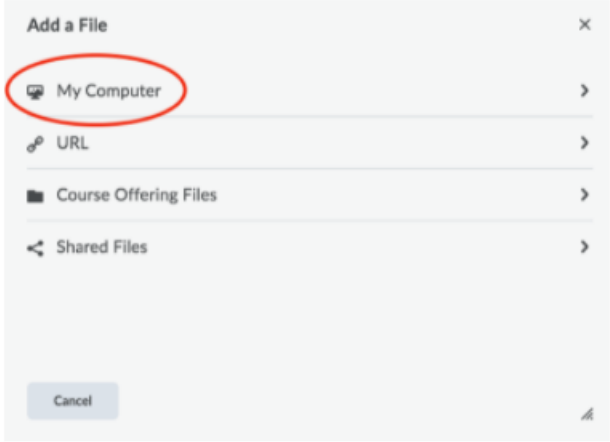
1. Click the Camera icon in the answer field's toolbar.



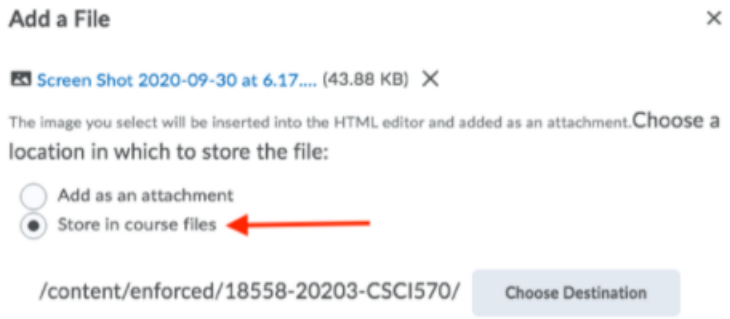
Announcements

Exam procedure:

2. In the “Add a File” prompt, select “My Computer”.



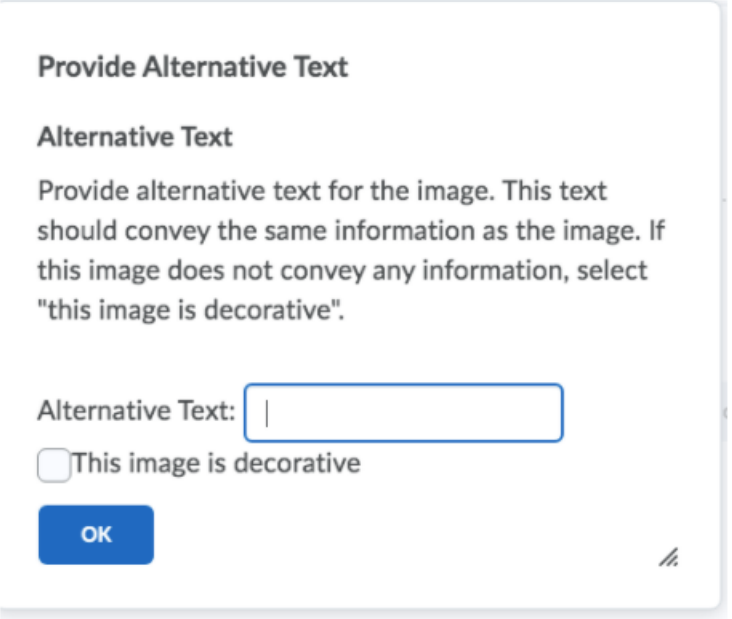
3. After adding your file, leave the “Store in course files” option selected. Click the blue “Add” button at the bottom.



Announcements

Exam procedure:

4. Type in any word inside the “Alternative Text” field.



5. Your picture is now added within the answer field. If you would like to display the answer field in full screen, click the icon with four arrows pointing outwards located at the bottom right.

Announcements

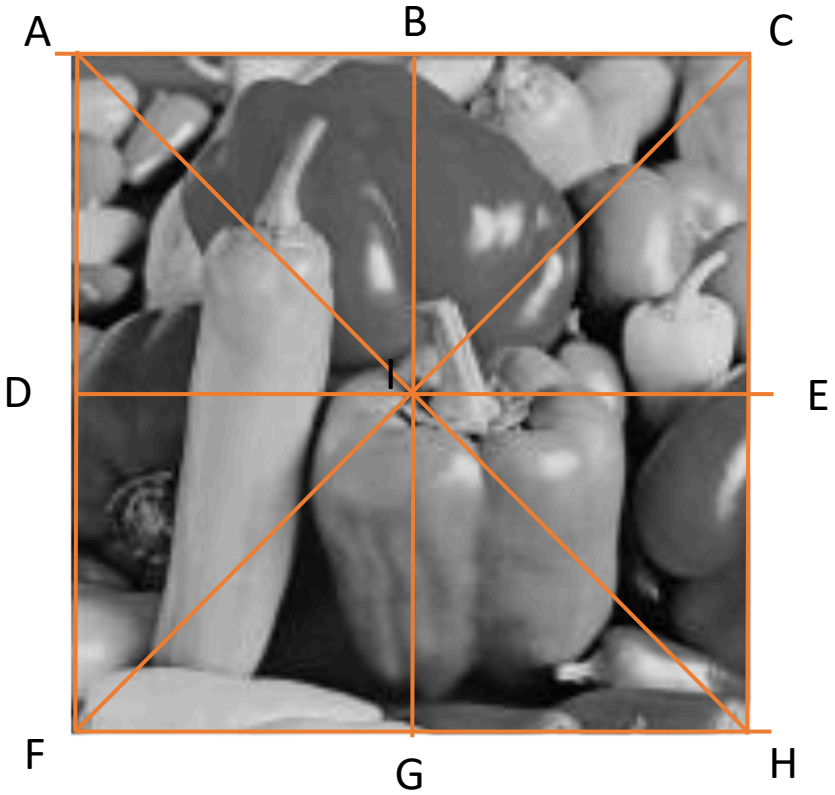
Exam procedure:

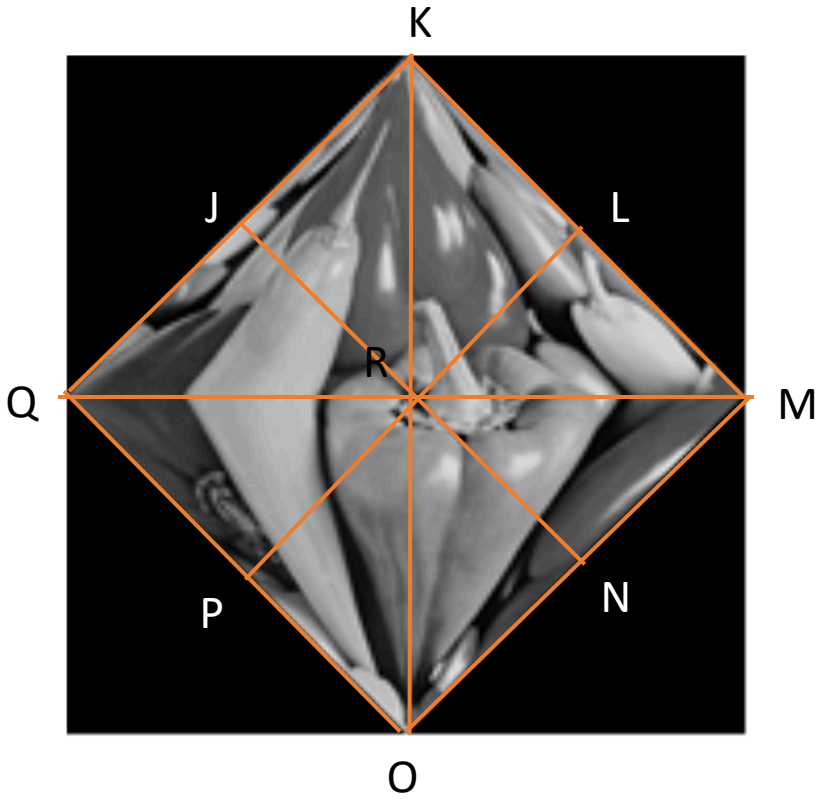
- Please note that the questions are shuffled in this exam.
- As the difficulty of all the questions may not be the same, please take a look at all the questions.
- If one question is difficult for you, do not stop on that question. Because that question may be difficult for everyone.
- There are four questions in the exam.

Overview

- **Geometric Modification**
- Morphological Processing
- Texture Analysis
- SIFT and Bag of visual words

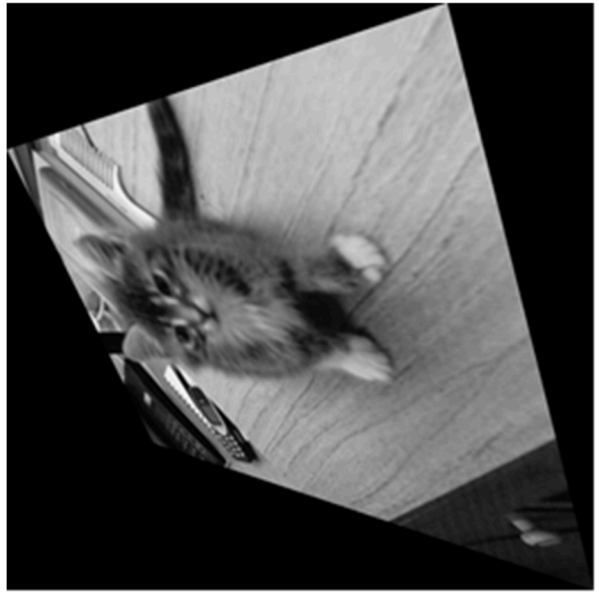
Geometric modification





ABI → JKR
BCI → KLR
…

Geometric modification



Overview

- Geometric Modification
- **Morphological Processing**
- Texture Analysis
- SIFT and Bag of visual words

Morphological Processing

- Shrinking:

Objects without holes shrink to a point, and objects with holes shrink to a connected ring halfway between each hole and the outer boundary.

- Thinning:

Object without holes shrinks to a minimally connected stroke, and an object with holes shrinks to a connected ring halfway between each hole and the outer boundary.

- Skeletonizing:

removes pixels on the boundaries of objects but does not allow objects to break apart. The pixels remaining make up the image skeleton.

Overview

- Geometric Modification
- Morphological Processing
- **Texture Analysis**
- SIFT and Bag of visual words

Problem 1 – Law's Filters

Table.1 1D Kernel for 5x5 Laws Filters

Name	Kernel
L5 (Level)	[1 4 6 4 1]
E5 (Edge)	[-1 -2 0 2 1]
S5 (Spot)	[-1 0 2 0 -1]
W5 (Wave)	[-1 2 0 -2 1]
R5 (Ripple)	[1 -4 6 -4 1]

Problem 1 – Law's Filters

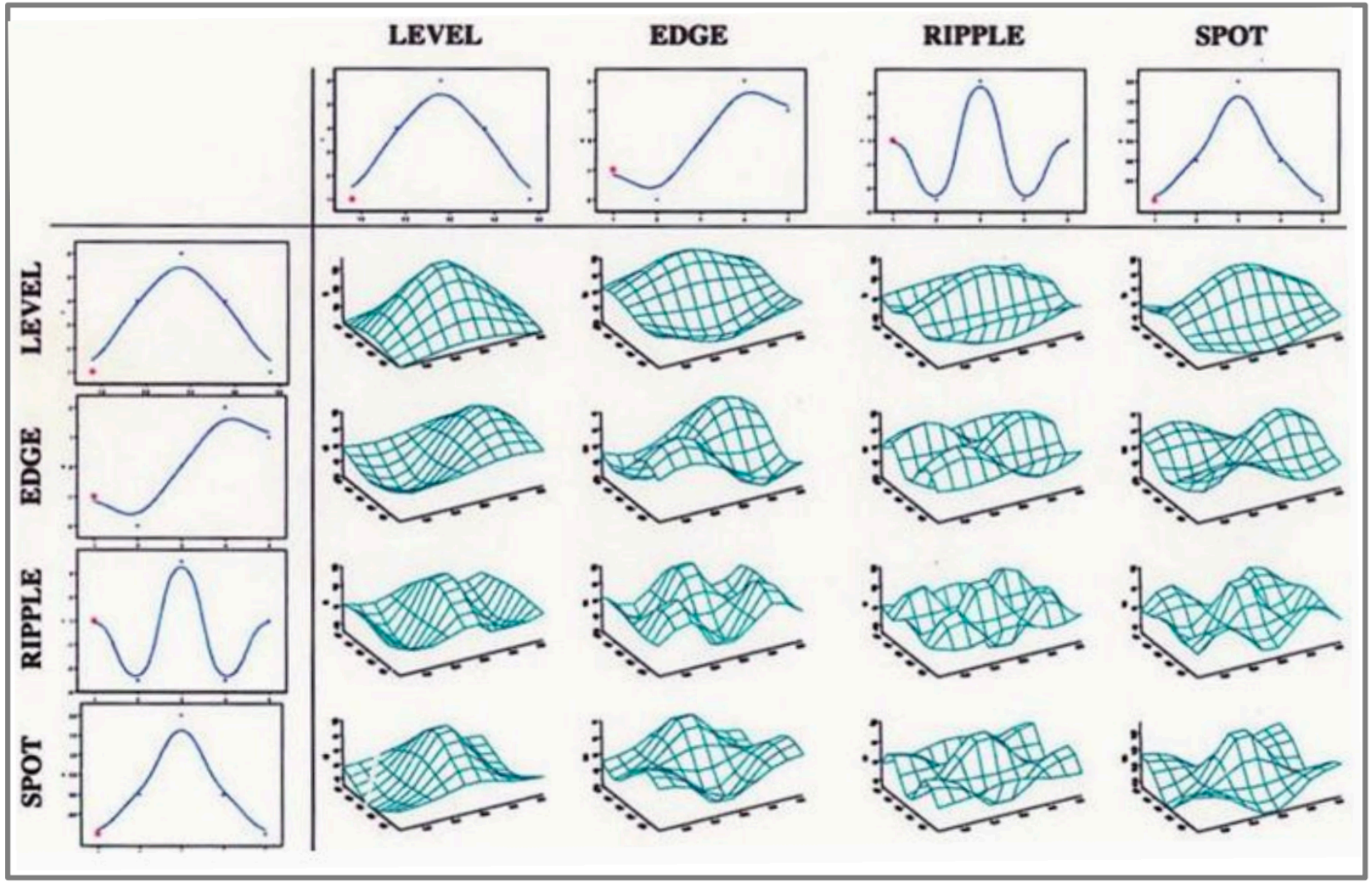
25 2D filters

- $L5L5^T$
- $L5E5^T$
- $L5S5^T$
- …

$$\begin{bmatrix}1\\4\\6\\4\\1\end{bmatrix} \times \begin{bmatrix}-1 & -2 & 0 & 2 & 1\end{bmatrix} = \begin{bmatrix}-1 & -2 & 0 & 2 & 1\\-4 & -8 & 0 & 8 & 4\\-6 & 12 & 0 & 12 & 6\\-4 & -8 & 0 & 8 & 4\\-1 & -2 & 0 & 2 & 1\end{bmatrix}$$

An example of $L5E5^T$

Problem 1 – Law's Filters



Overview

- Geometric Modification
- Morphological Processing
- Texture Analysis
- **SIFT and Bag of visual words**

SIFT and Bag of visual words

- Remember:

$$Similarity\ Index = \frac{\sum_{j=1}^{k} \min(I_j, M_j)}{\sum_{j=1}^{k} \max(I_j, M_j)}$$

References

- Prof. Kuo, EE569 Spring 2021 Lecture 7
- Zohreh Azizi, EE569 Spring 2021 Discussion WK 6,10,11

Q
A