Final Exam
Final Exam

Question 14

1.0/1.0 point (graded)

10	10	10	9
10	13	12	11
10	9	247	246
248	248	248	248

What value would **max pooling** return for the following grid?
Choose the closest answer

- (•) 248 ✔
- ( ) 247
- ( ) 9
- ( ) 99
- ( ) 10

Explanation

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Question 2

1.0/1.0 point (graded)

If you had a noisy image that you wished to threshold, which step would normally be worthwhile to prepare the image for thresholding

- corner detection
- blurring or denoising ✔
- super-pixellation
- edge amplification

Explanation

Denoising is very important for thresholding. Edge amplification would be the opposite. It would make the image noisier and thus harder to threshold. Corner detection is a completely different set of algorithms. Super-pixelation would not normally be done in conjunction with thresholding. If the image is complex enough that super-pixelation is worthwhile, arguably its too complex for simple thresholding.

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Question 13

1.0/1.0 point (graded)

Which of the following statements are correct?
Choose all that apply

- [ ] Overfitting refers to a model that fits the new data too well.
- [x] Overfitting refers to a model that fits the training data well, but will not generalize to new data. ✔
- [x] Overfitting is the same as high variance ✔
- [ ] Overfitting is also called high bias
- [ ] Using a more complex model can help with overfitting
- [x] Variance is increased as model complexity increases. ✔
- [x] Using more training data can help with overfitting ✔

✔

Explanation

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Question 21

1.0/1.0 point (graded)

Which of the following are **true** statements about Conditional Random Fields (CRFs)?
Choose all that apply

- [x] CRFs capture spatial contextual dependencies of features. ✔
- [x] Before Deep Learning, semantic segmentation relied heavily on CRFs. ✔
- [ ] All Deep Networks require the use of external CRFs.
- [x] Some Deep Segmentation Networks can have their performance improved by CRFs. ✔
- [x] CRFs that can jointly infer objects and pixels have improved overall segmentation. ✔
- [ ] CRFs cannot be modelled as Deep Networks

✔

Explanation

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Question 23

1.0/1.0 point (graded)

Which of the following tasks does UberNet attempt to resolve?
Choose all that apply

- [x] Boundary Detection ✔
- [ ] Creating histograms of oriented gradients

- [x] Semantic Segmentation ✔
- [x] Region Proposal Generation ✔
- [x] Object Detection ✔
- [ ] Conditional Random Fields

✔

Explanation

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Question 3

1.0/1.0 point (graded)

Which of the following is a known limitation of K-means?

- (•) It is highly dependent on the initial random starting points of its clusters ✔
- ( ) It needs days of training to run effectively
- ( ) It needs thousands of images to train on
- ( ) Its name does not reflect its behavior

Explanation

Training is needed by more advanced Machine Learning algorithms but not really for K-means. K-means doesn't need thousands of images to work. Again, that's for more advanced algorithms like CNN based approaches. The algorithm's name is not a limitation of K-means.

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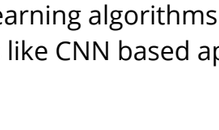
Question 10

1.0/1.0 point (graded)

In the following table of grayscale pixel intensities, calculate the missing integral image cell, knowing that
`s(x, y) = s(x, y-1) + i(x, y)`
and
`ii(x, y) = ii(x - 1, y) + s(x, y)`
where `s(x, y)` is the cumulative column sum and `s(x, -1) = 0` and `ii(-1, y) = 0`

0	6	7	4
4	9	3	5
1	8	12	7
11	6	2	4



0	6	13	17
4	19	29	38
5	28	50	
11	45	69	89

- 17
- 38
- 50
- 66 ✔

- 89

Explanation
The value is equal to 66 (0 + 4 + 1 + 6 + 9 + 8 + 7 + 3 + 12 + 4 + 5 + 7).

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Question 9

1.0/1.0 point (graded)

Which of the following describes what Supervised Machine Learning means?

- It refers to letting a machine learn to progressively improve its prediction ability by showing it labelled training examples. ✔
- It involves supervising a machine by formulating rules to address a particular type of problem.
- It involves checking that the training is converging and and is not overfitting.
- It refers to the manual creation of feature descriptors, which are then fed to a machine learning algorithm.
- It refers only to performing prediction in new previously unseen data.

Explanation
Supervised machine learning involves training a machine to progressively improve its prediction ability by showing it labelled training examples, with a view to having it accurately make predictions on previously unseen data.

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Question 15

1.0/1.0 point (graded)

10	10	10	9
10	13	12	11
10	9	247	246
248	248	248	248

What value would **average pooling** return for the following grid?
Choose the closest answer

- 248
- 247
- 9
- 99 ✔
- 10

Explanation

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Answers are displayed within the problem

Question 5

1.0/1.0 point (graded)

Superpixelation is commonly associated with which of the following?

- under-segmentation
- under-pixelation
- over-segmentation ✔
- over-pixelation

Explanation

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Answers are displayed within the problem

Question 8

1.0/1.0 point (graded)

What are corner detection algorithms typically looking for?

- gradual changes in intensity across an image
- gradual changes in color across an image
- sudden sharp changes in intensity in a small region

- absence of self-similarity if a small piece of the image is moved slightly ✔

Explanation

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Question 24

1.0/1.0 point (graded)

Which type of layer should you use to increase the Field of View (FOV) without changing dimensions of the output?
Choose one answer.

- Convolutional Layer
- Average Pooling Layer
- Fully Connected Layer
- Dilated Convolutional, also known as Atruous Convolutional, Layer ✔
- Max Pooling Layer

Explanation
Dilated convolutions, also known as Atrous Convolutions, allow increasing the field of view without a corresponding dimensional change.

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Question 16

1.0/1.0 point (graded)

Given the following set of inputs to a Softmax, what value would Softmax return for value 13.6? The inputs are 0.2, 0.1, 11.2, 12.8, 13.6.
If you recall, Softmax is defined as $\frac{e^{z_j}}{\sum_{k=1}^{K} e^{z_k}} for j = 1, \ldots, K.$

Choose the closest answer

- 0.65 ✔
- 0.29
- 0.84
- 0.05
- 1.0

Explanation

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Question 18

0.0/1.0 point (graded)

For the Edge Boxes Object Proposal method, which of the following are true?
Choose all that apply

- [x] The number of contours wholly contained in a bounding box is used as an indication of whether the box contains an object or not ✔
- [x] A separate function is used to find an initial seed edge map ✔
- [x] Clustered groups are separated into Neighboring similar edge pixels.
- [x] Edge Boxes uses sliding windows. ✔
- [x] Promising candidates are further analysed. ✔

✖

Explanation

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Question 22

0/1 point (graded)

If you are implementing a semantic segmentation model, and your results are blocky, one thing you could do is add smoothness constraints to your solution. Which of the following techniques allow you to do this with end-to-end training?
Choose all that apply

- [x] Add a CRF-RNN. ✔
- [x] Add an external separate CRF function.

- [x] Use a model like DeepLab v3, which has Atrous Spatial Pyramid Pooling augmented with image-level features to encode global context. ✔
- [ ] Add extra convolutional and re-scaling layers.
- [ ] Remove all pooling layers, as they lose spatial information.

✖

Explanation
Adding a CRF-RNN to the end of your architecture, which models a CRF as a Recurrent Neural Network, or using a more accurate network such a DeepLab v3, allows end-to-end training with better smoothness constraints built-in.

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