Deep Learning for Computer Vision

Jul-Oct 2024

NPTEL and IIT-Hyderabad

Quiz 1

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Deep Learning for Computer Vision
Max Marks: 6
Quiz 1

Instructions:

- Starter code for this assignment is provided in DL4CV-Assignment-1-Week-1-2024.ipynb.
- Use Python 3.x to run the notebook. As instructed in the notebook, write your code only in between the lines 'YOUR CODE STARTS HERE' and 'YOUR CODE ENDS HERE'.
- Do not change anything else in the code; if you do, the answers you are supposed to get at the end of this assignment might be wrong.
- Read documentation of each function carefully.
- All the best!

1. For this question, please see Question 1 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Which of the following options correctly provides the standard deviation of row-wise means and the row-wise means themselves?

   (a) $1.23, [3.875, 8.375, 13.575]$

   (b) $3.45, [3.375, 8.875, 13.375]$

   (c) $4.08, [3.375, 8.375, 13.375]$

   (d) $4.24, [3.875, 8.875, 13.875]$

2. For this question, please see Question 2 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Which of the following pairs represents the largest eigenvalue and its corresponding eigenvector?

   (a) Eigenvalue: 0.78568026, Eigenvector: $\begin{bmatrix} -0.75578934 \\ 0.52065737 \\ -0.39711255 \end{bmatrix}$

   (b) Eigenvalue: 3.53918887, Eigenvector: $\begin{bmatrix} 0.63178128 \\ 0.73923874 \\ -0.23319198 \end{bmatrix}$

   (c) Eigenvalue: 4.67513087, Eigenvector: $\begin{bmatrix} -0.17214786 \\ 0.42713229 \\ 0.88765034 \end{bmatrix}$

   (d) Eigenvalue: 4.67513087, Eigenvector: $\begin{bmatrix} -0.75578934 \\ 0.52065737 \\ -0.39711255 \end{bmatrix}$

3. For this question, please see Question 3 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Which of the following is the sum of the elements in the modfied list obtained after applying the function?

   (a) 1.03

   (b) 1.00

   (c) 1.50

   (d) 3.02

4. For this question, please see Question 4 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Now, which of the following is the **GBR** representation of the **RGB** image **'golden_retriever.jpg'** in programming question 1?

a)

c)

b)

d)

   (a) a
   (b) b
   (c) c
   (d) d

5. For this question, please see Question 5 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segments therein. The shape of the **'human_mitosis'** image after applying a 5×5 mean filter is:
   (a) (512,512)
   (b) (510,510)
   (c) (508,508)
   (d) (507,507)

6. For this question, please see Question 6 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segments therein. The median value of the **'human_mitosis'** image before and after applying the 5×5 mean filter is __ and _____ respectively.

Answer Key for Exam A

1. For this question, please see Question 1 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Which of the following options correctly provides the standard deviation of row-wise means and the row-wise means themselves?

   (a) $1.23, [3.875, 8.375, 13.575]$

   (b) $3.45, [3.375, 8.875, 13.375]$

   (c) $4.08, [3.375, 8.375, 13.375]$

   (d) $4.24, [3.875, 8.875, 13.875]$

2. For this question, please see Question 2 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Which of the following pairs represents the largest eigenvalue and its corresponding eigenvector?

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3. For this question, please see Question 3 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Which of the following is the sum of the elements in the modfied list obtained after applying the function?

   (a) 1.03

   (b) 1.00

   (c) 1.50

   (d) 3.02

4. For this question, please see Question 4 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segment therein. Now, which of the following is the **GBR** representation of the **RGB** image **'golden_retriever.jpg'** in programming question 1?

a)

c)

b)

d)

(a) a
(b) b
(c) c
(d) d

5. For this question, please see Question 5 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segments therein. The shape of the **'human_mitosis'** image after applying a 5×5 mean filter is:

(a) (512,512)
(b) (510,510)
(c) (508,508)
(d) (507,507)

6. For this question, please see Question 6 in the iPython notebook (`.ipynb` file) provided alongside. Complete your implementation under the "YOUR CODE STARTS HERE" segments therein. The median value of the **'human_mitosis'** image before and after applying the 5×5 mean filter is 10 and 10.28 respectively.