Task 3 in computer vision course on youtube : Image Processing Filters

Description: In this task, you will explore the concepts of blur filter, Gaussian filter, median filter, and bilateral filter in image processing. You will need to apply these filters to a set of images and compare the results to determine which filter is most effective for each image. You will also need to provide a brief theoretical explanation of each filter and its applications in real-world scenarios.

Instructions (revised):

1. Choose a set of images to work with. These can be images from your personal collection or images that you find online.

2. Apply each of the following filters to the images using Python or another programming language of your choice:
   a. Blur filter
   b. Gaussian filter
   c. Median filter
   d. Bilateral filter

3. Experiment with different filter parameters and compare the results to determine which filter is most effective for each image. You should consider factors such as noise reduction, edge preservation, and detail preservation.

4. Provide a brief theoretical explanation of each filter and its applications in real-world scenarios. Your explanation should include the basic principles of each filter, how it works, and its advantages and disadvantages. You may use online resources or textbooks to support your explanation.

5. Discuss the mathematical equation of each filter and how it relates to its practical application. You should include the formula for each filter and explain how the parameters of the equation affect the filter's performance. You may use online resources or textbooks to support your discussion.

Submission:
1. Submit a report that includes the following:

   a. A brief introduction to image processing filters and their importance in computer vision.
   b. A description of each filter and its theoretical principles, advantages, and disadvantages.
   c. A discussion of the mathematical equation of each filter and its practical application.
   d. An analysis of the results of your experiments with each filter.
   e. A conclusion that summarizes your findings and discusses the overall effectiveness of each filter.
2. Include the Python code you used to apply the filters to the images.
3. Submit the images you used in the experiment.
4. Submit any additional materials, such as diagrams or charts, that support your analysis.

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