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Assignment 4 ITAI 1378

In this assignment we learned about image processing, the techniques for enhancing images, when to use which applications to process those images, and how to utilize their capilities for the project you are working on. OpenCv and Pillow are two libraries that are used to process images and that are both utilized similarly, but with different application uses. We were also instructed to make a storybook that detailed the day in the life of a developer, and detail the applications used in their day to day work.

Image processing involves image enhancement which is used to adjust color contrast, brightness, and noise reduction. Restoration is when the user removes the blurs and corrects the distortions in the image. Segmentation involves dividing an image into meaningful regions. Compression involves reducing the size of an image file. Images can then be enhaced using various techniques such as histogram equilization, smoothing, and sharpening. Histogram equilization allows the user to improve the contrast of the image. Smoothing reduces the image noise using filters such as Gaussian or Median. Sharpening uses an application called Lapacian, which enhances the edges of images. Computers see using a matrix of pixel values. Those represented values then intensify across the color spectrum. Computers receive this information with no context just a pile of data.

Image segmentation is when an image is divided into meaningful regions. There are several techniques to segment images such as thresholding, edge detection, and clustering. Thresholding converts grayscale images to binary by setting thresholds. Canny and Sonal are the applications that are used to detect edges. Grouping pixels based on color and intensity is called clustering.

In this storybook, we depicted a typical day of work for a developer who is well versed in using OpenCV and Pillow to process images daily. In this project we were able to see how and when to use which application to ensure the best result in regards to processing images. The developer starts his day processing images for a client using the tools provided in OpenCV. The images are then loaded using OpenCV and then converted into grayscale. OpenCV is best used for this because of the tools geared more toward advaced image filtering and transformation. Once the images are converted to grayscale, the histogram equalization is then applied to improve its contrast.

Next, the developer resizes an image for a web application; so they switch to the Pillow to resize the function. First the images are loaded, and then resized to their required dimensions for the application; then saved. There are definte benefits in not only utilizing both applications, but also knowing when to deploy each. After a quick review of his work, the developer uses OpenCV to process the image in real time. Each frame is then processed for key point detection.

In this project, we created the storybook using Canva and collaborated as a team. I was able to learn not only how computers processed images, but also how a developer would approach image processing on a day to day basis. We used the powerpoint and various sites for research on OpenCV and Pillow which aided in being able to decipher when would be the best times to use which application. I learned that when it comes to image manipulation, cropping, and rotating images. OpenCV is better to use when it comes to more complex image transformations, filtering, and enhancements. My team and I collaborated on Canvas and added parts of the day to the storybook to illustrate an accurate depiction of the developer’s workday. After collaborating with the team, we finalized the project by adding our reflective journals at the end to depict the journey. We did not run into any issues with collaborating on Canva nor was it difficult to have team meetings to discuss the direction of the project.

Works Cited

"Image Processing – OpenCV vs. PIL." GeeksforGeeks, 3 Nov. 2021, https://www.geeksforgeeks.org/image-processing-opencv-vs-pil/. Accessed 15 Sept. 2024.