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MSBA 503 - Take Home Assignment

**Part I. Comparison Using YOLO and Faster R-CNN**

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| --- | --- | --- | --- | --- | --- | --- |
| **Image Name** | **Model** | **Objects Detected** | **Processing Time (s)** | **Average Confidence** | **Comments** | **Image** |
| imageOne.jpg | YOLO | 5 | 4.36 | 0.68 | YOLO Quickly detected five objects with moderate confidence compared to Faster R-CNN. |  |
| imageOne.jpg | Faster R-CNN | 3 | 12.68 | 0.92 | Detected fewer objects with higher confidence but took significantly longer. |  |
| imageTwo.jpg | YOLO | 3 | 5.4 | 0.74 | Detected three objects efficiently with high confidence. |  |
| imageTwo.jpg | Faster R-CNN | 8 | 14.58 | 0.78 | Detected more objects with slightly higher confidence and much longer processing time. |  |
| imageThree.jpg | YOLO | 5 | 4.5 | 0.47 | Detected fewer objects quickly but with lower confidence. |  |
| imageThree.jpg | Faster R-CNN | 13 | 14.07 | 0.72 | Detected many more objects with higher confidence but required much more time. |  |
| imageFour.jpg | YOLO | 2 | 3.54 | 0.95 | Detected the two objects with very high confidence in minimal time. |  |
| imageFour.jpg | Faster R-CNN | 2 | 12.38 | 1.0 | Achieved perfect confidence but required substantially longer processing. |  |
| imageFive.jpg | YOLO | 17 | 4.55 | 0.54 | Detected more objects quickly with varied confidence levels.. |  |
| imageFive.jpg | Faster R-CNN | 13 | 9.26 | 0.81 | Detected fewer objects with higher average confidence but took longer to process. |  |

**Conclusion:** From my analysis, YOLO seems better for tasks where speed is a priority, as it processed images quickly, even if it detected fewer objects with slightly lower confidence. In contrast, Faster R-CNN detected more objects with higher accuracy but took much longer to process, making it less practical for real-time tasks. Overall, the choice between the two depends on whether speed or detailed accuracy is more important for the application.

**Part II. Color Analysis**

I conducted a color analysis to examine the dominant colors in each image. This process involves resizing the images for computational efficiency and applying a K-means clustering algorithm to group pixels into clusters based on their RGB values. The dominant colors in each image are identified as the cluster centers with the highest proportions.

**Results:**

**ImageOne.jpg**: Neutral tones dominated, with light gray, beige, and dark gray as primary colors.

**ImageTwo.jpg**: Warm and earthy tones such as dark olive, warm brown, and light tan.

**ImageThree.jpg**: Natural colors like dark brown, golden orange, and light beige.

**ImageFour.jpg**: Classic shades like deep gray, muted brown, and soft beige.

**ImageFive.jpg**: Rich warm tones, including dark brown, warm orange, and pale gold.