**Task 3.1P Answer sheet**

Fill in the “**Results**” column with relevant results

**Notes**:

* Examples are given for illustration purposes only and need to be replaced by your own results.
* Missing any required results will result in a re-submission.

**1. Harris corner detection**

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| --- | --- | --- |
|  | **Number of corners detected** | **Corner detection result** |
| **ratio = 0.1%** | 39280 |  |
| **ratio = 0.5%** | 18163 |  |
| **ratio = 1%** | 10896 |  |

**Discussion of the above results**

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| The results became packed at 0.1% due to the huge number of corners (39,280) that were discovered, including many weak or redundant features. By increasing the threshold to 0.5%, the count dropped to 18,163, indicating stronger structural elements like building edges. Only the strongest corners (10,896), mostly at high contrast areas, were left at 1%. Corner detection gets more reliable and selective as the threshold rises, but it loses finer details in the process. |
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**2. SIFT**

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|  | **Results** |
| **Keypoints (with radius and orientations) on empire\_45.jpg** |  |
| **Keypoints (with radius and orientations) on empire\_zoomedout.jpg** |  |
| **Keypoints (with radius and orientations) on fisherman.jpg** |  |

**3. Image matching using SIFT**

**Visualisation**

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| --- | --- |
|  | **Result** |
| **empire.jpg vs empire\_zoomedout.jpg with nBestMatches=10** |  |
| **empire.jpg vs fisherman.jpg with nBestMatches=10** |  |

**Dissimilarity scores**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **nBestMatches=10** | **nBestMatches=50** | **nBestMatches=100** |
| **empire.jpg vs empire\_45.jpg** | 126.06704616546631 | 920.1556854248047 | 2133.9572887420654 |
| **empire.jpg vs empire\_zoomedout.jpg** | 114.81388759613037 | 839.6173696517944 | 2003.75674533844 |
| **empire.jpg vs fisherman.jpg** | 861.1744499206543 | 6909.1140213012695 | 17156.097869873047 |

**Discussion of the dissimilarity scores of the image pairs (empire.jpg vs empire\_45.jpg), (empire.jpg vs empire\_zoomedout.jpg), (empire.jpg vs fisherman.jpg)**

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| How well SIFT manages rotation, scaling, and entirely distinct content is shown by the dissimilarity scores. The dissimilarity between empire.jpg and empire\_45.jpg is comparatively low for all match counts (126.07 for 10, 920.16 for 50, and 2133.96 for 100), showing that SIFT is adaptable to rotation and can still identify reliable feature matches. SIFT's high scale-invariance is also shown by the comparable and slightly lower scores (114.81, 839.62, and 2003.76) for empire.jpg versus empire\_zoomedout.jpg. However, there are very few significant matches between two semantically different photos, as shown by the much higher scores for empire.jpg compared to fisherman.jpg (861.17, 6909.11, and 17156.10). These findings demonstrate that SIFT performs badly when content similarity is minimal yet successfully manages geometric adjustments like rotation and scaling. |