Task 2. Computer vision. Sentinel-2 image matching

Classical methods were used in the project for matching satellite images, and they show below results:

- ORB proved to be the better method for fast and efficient comparison of Sentinel-2 satellite images across different seasons. It produced more matches between images and worked significantly faster than SIFT.
- SIFT provides fewer matches and operates more slowly but can be useful in more complex conditions or for more precise matching.
- RANSAC effectively improves the quality of matches, especially for images with significant seasonal changes.

This difference in results may be due to substantial changes in the landscape's appearance caused by seasonal variations, which affect the effectiveness of keypoint matching, especially for images with differing lighting conditions, vegetation coverage, and snow conditions.

Potential improvements:

- Divide the satellite images into smaller blocks (e.g., 128x128 or 256x256 pixels) for local processing, which allows focusing on specific features and reduces computational costs.

- Apply U-Net for the segmentation of each block to detect changes in vegetation, snow, and other seasonal variations. This will help identify key areas for further processing.

- Integrate D2-Net for keypoint detection and description: Utilizing D2-Net can enhance the accuracy and robustness of keypoint matching across different seasons.