Project Report: Image Matching with SIFT

Introduction

This project implements image matching using the SIFT algorithm. The goal is to find similarities between satellite images taken in different seasons.

Methodology

We used the Scale-Invariant Feature Transform (SIFT) algorithm for feature detection and matching. The key steps include:

- Detecting keypoints in both images.

- Matching the descriptors using a BFMatcher.

- Visualizing the matches with lines drawn between the matched keypoints.

Results

The image matching between the August and November images showed a good level of correspondence, especially in areas with consistent features.

Potential Improvements

1. **Use of More Advanced Algorithms**:

  - Consider using LoFTR (Local Feature Transformer) or deep learning-based models, which might outperform SIFT for certain types of images.

2. **Better Keypoint Matching**:

  - Improve the matching strategy by tuning the BFMatcher's parameters or by using cross-checking methods.

3. **Preprocessing**:

  - Apply image preprocessing steps like histogram equalization or contrast adjustment to improve keypoint detection under varying lighting conditions.

Conclusion

While SIFT performs well, exploring deep learning approaches might improve the robustness of feature matching across seasons.