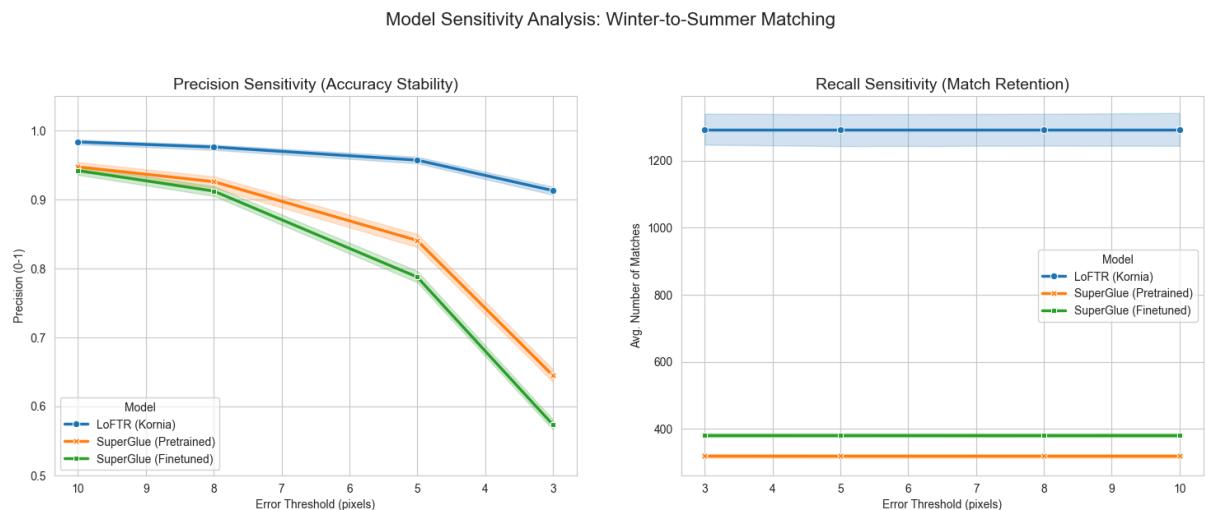


# Performance

## Task 1: Mountain NER

Context	precision	recall	f1-score
Overall	0.92	0.91	0.91
Ukrainian	0.88	0.88	0.88
English	0.95	0.92	0.93

## Task 2: Sentinel-2 image matching



## Future improvements

*Note: general reviews of the tasks are written in their README files. Here we outline just future improvements.*

## General (applies to both tasks)

## 1. Hyperparameter tuning

- Why: Current results are promising but sub-optimal.
- How: run searches (grid / random) over key parameters.

## 2. Expand dataset

- Why: More data reduces overfitting and teaches models edge-case behaviors.
- How:
  - For NER: add negative samples where tokens look like mountains (brand names, clubs, bottles) and contrasting contexts;
  - For satellites: add more tiles, seasons, atmospheric conditions, and imaging years.

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# Task 1 - Mountain NER

## 1. Inject context-contradictory samples

- Why: NER fails in such samples:

Футбольний клуб "[Карпати]" зіграв унічию сьогодні.

- Solution: Expand dataset with counter example samples.
- How: add an LLM prompt to specifically generate *confusing negatives* and integrate them into training; include token-level alignment checks.

## 2. Active sampling & human-in-the-loop

- Why: The model will make consistent errors when using the generated dataset.
- How: Collect high-confidence false positives & high-confidence false negatives with human dataset labeling

## 3. Fix a typo

- There is a typo. Ukrainian language is labeled as "UA" instead of "UK" in both dataset generation, training and testing pipelines.

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# Task 2 - Sentinel-2 image matching

## 1. Solve variable-size keypoint batching

- Why: Per-sample forward pass (no parallelism) is a major bottleneck.

- Solutions (potential):
  - o **Padding + Masking**
  - o **Bucketing**

## 2. Address fine-tuned model jitter

- Possible causes:
  - o Overfitting to seasonal textural features.
  - o Learning dynamics (too high lr or unstable gradients).
- Approaches (possible):
  - o **Temperature / confidence regularization**
  - o **Smoothing / sub-pixel refinement**

## 3. Data & augmentation

Add more season pairs, atmospheric/cloud variations, sensor noise simulation

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