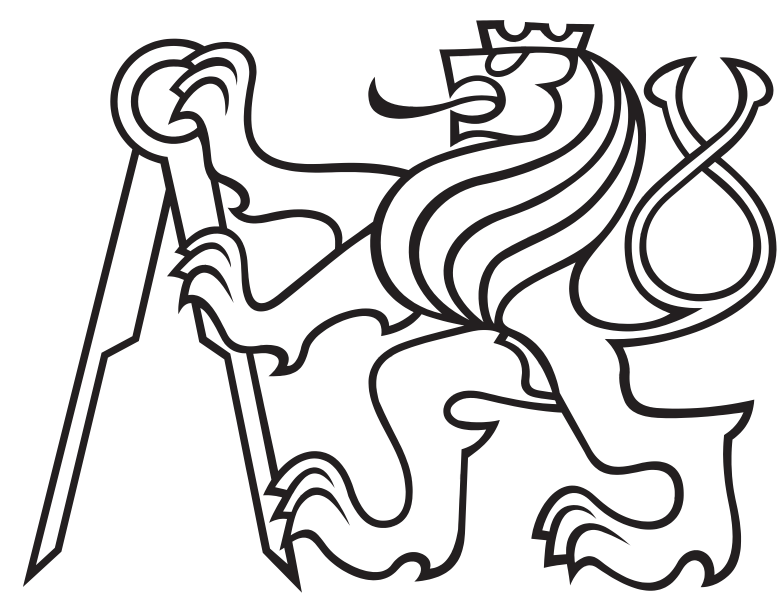


Automatic Landmark Detection for Cervical Image Registration Validation



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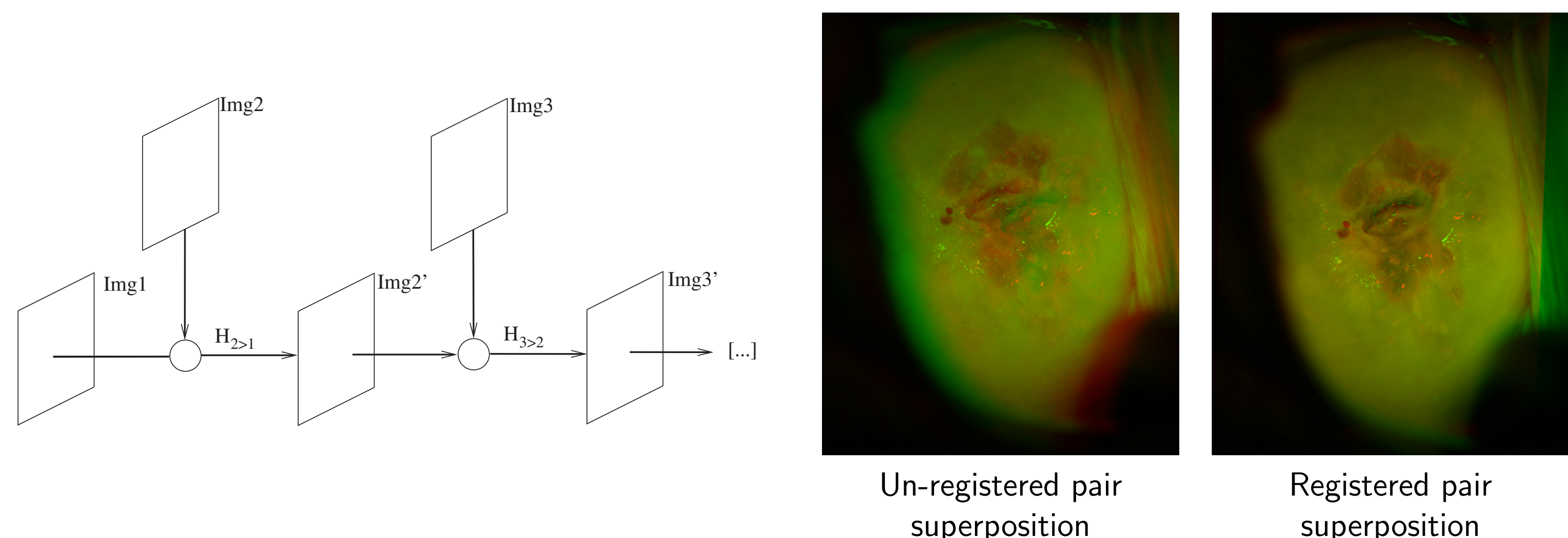


Overview

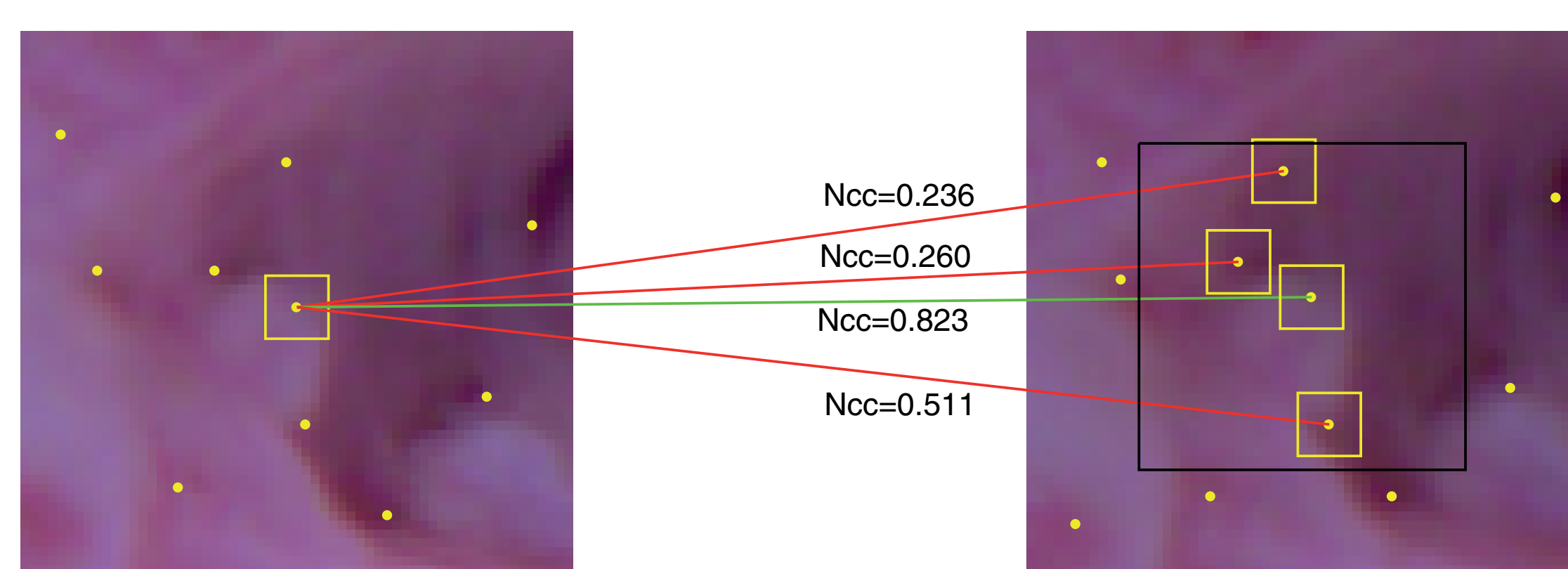
- Colposcopic images for multi image CAD (e.g. progressive texture or color change) must be previously registered to a common frame.
- We present a system to automatically extract and match features from a colposcopic sequence in order to generate position landmarks.
- These landmarks may be used either to measure the accuracy of proposed registration methods to align image pairs from the colposcopic sequence or as an additional registration cue.

Proposed Method

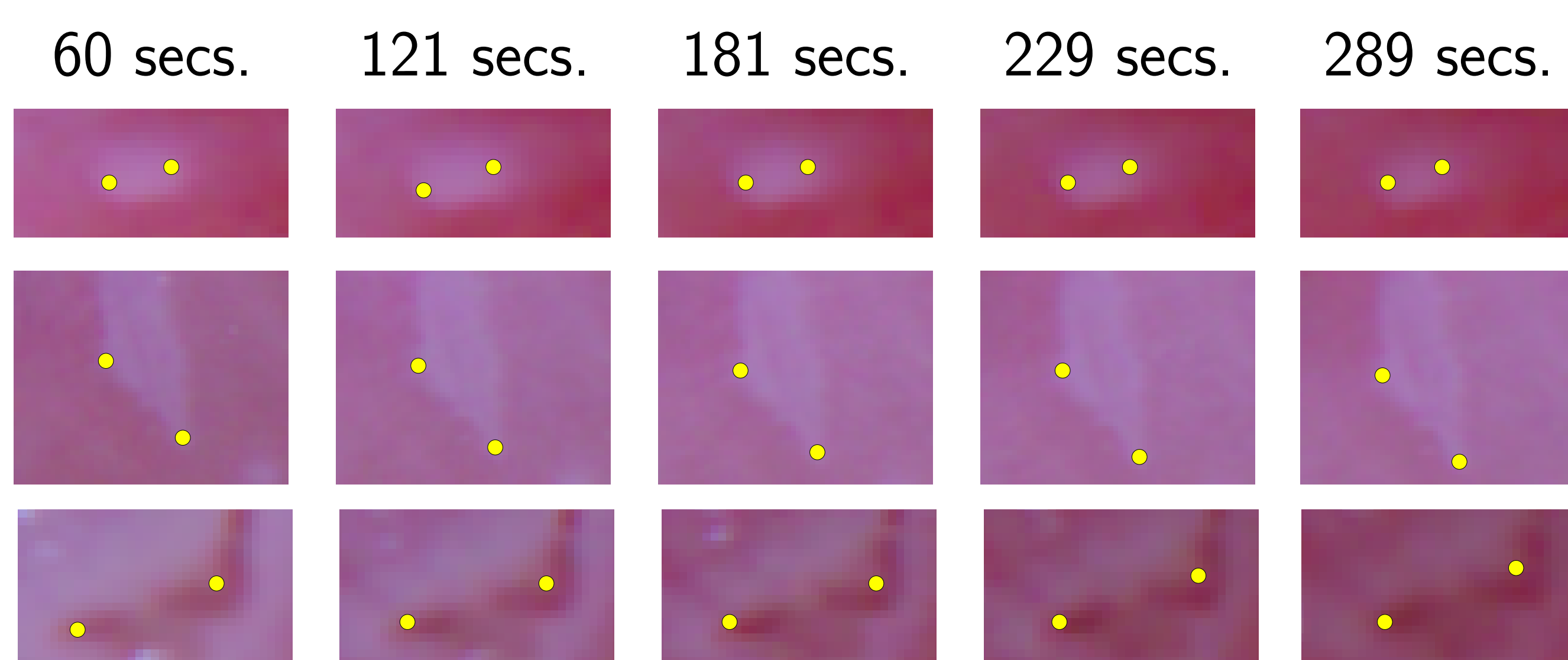
- Images are roughly aligned to each other by sequential rigid registration



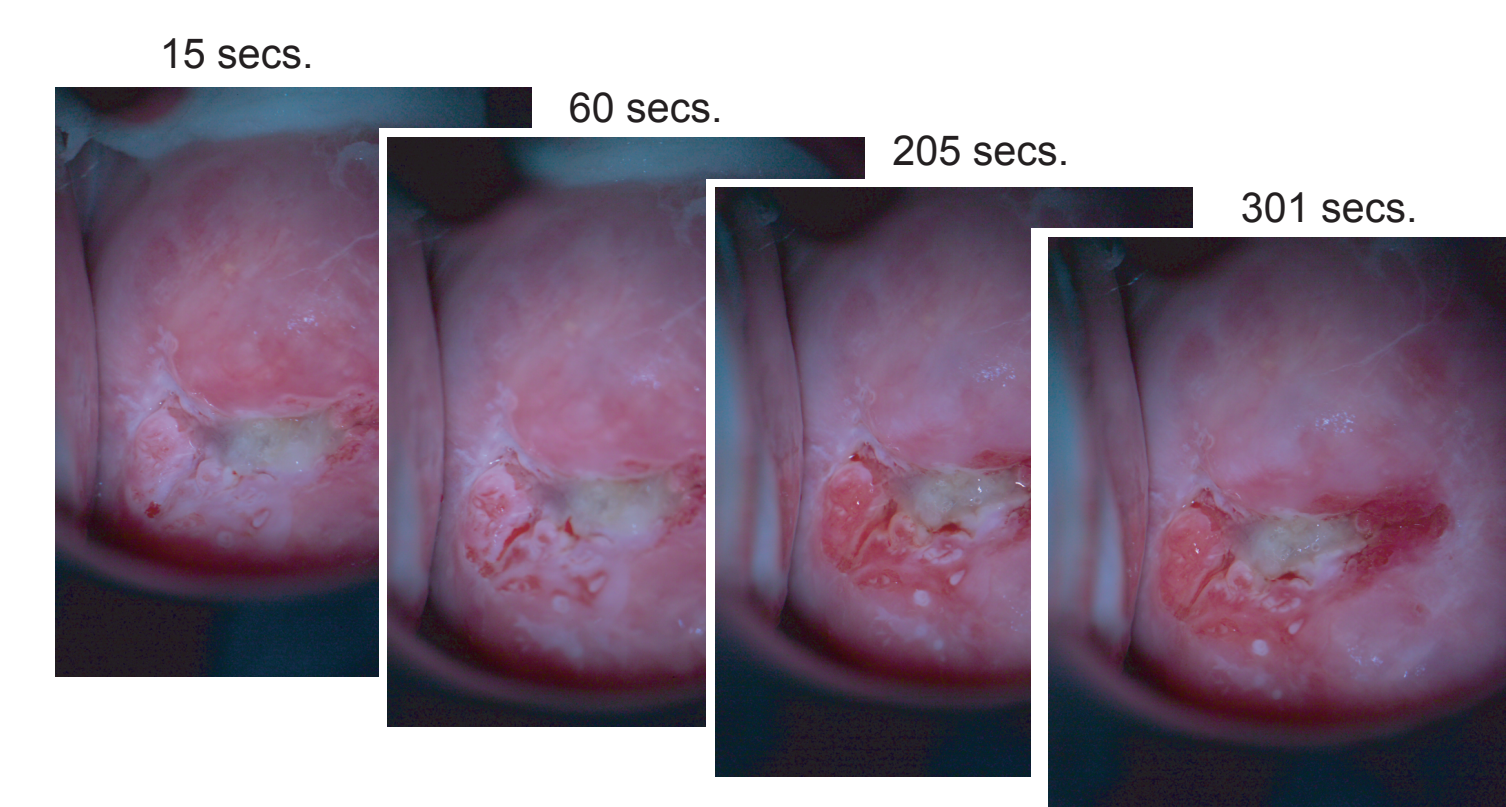
- Points of interest are extracted using the Harris detector.
- Features are matched in consecutive frames by maximizing the Normalized Cross-Correlation within a search window.



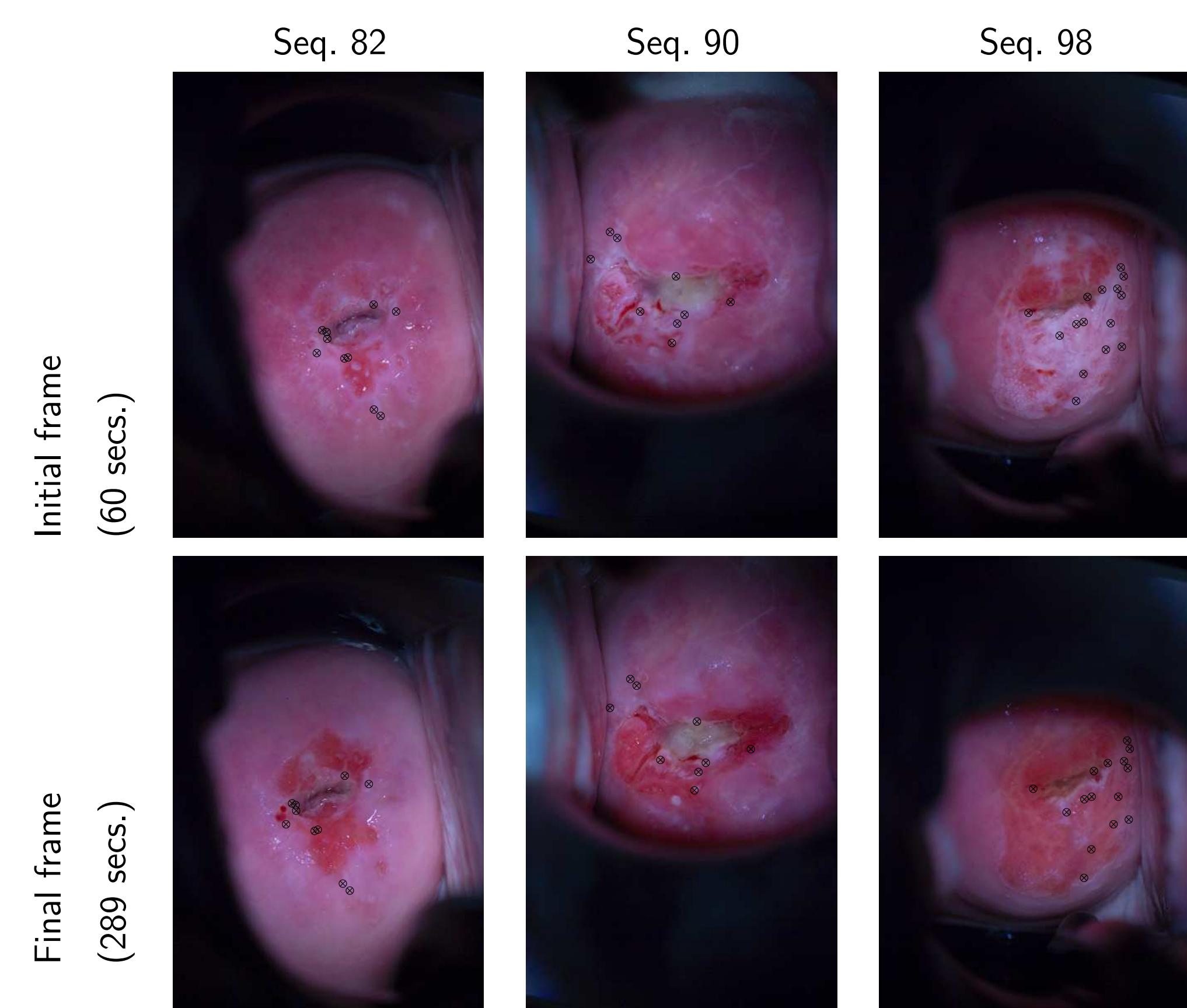
- Only features appearing and matched in all frames are taken into account.



- A human operator checks the results and rejects any remaining mismatches.

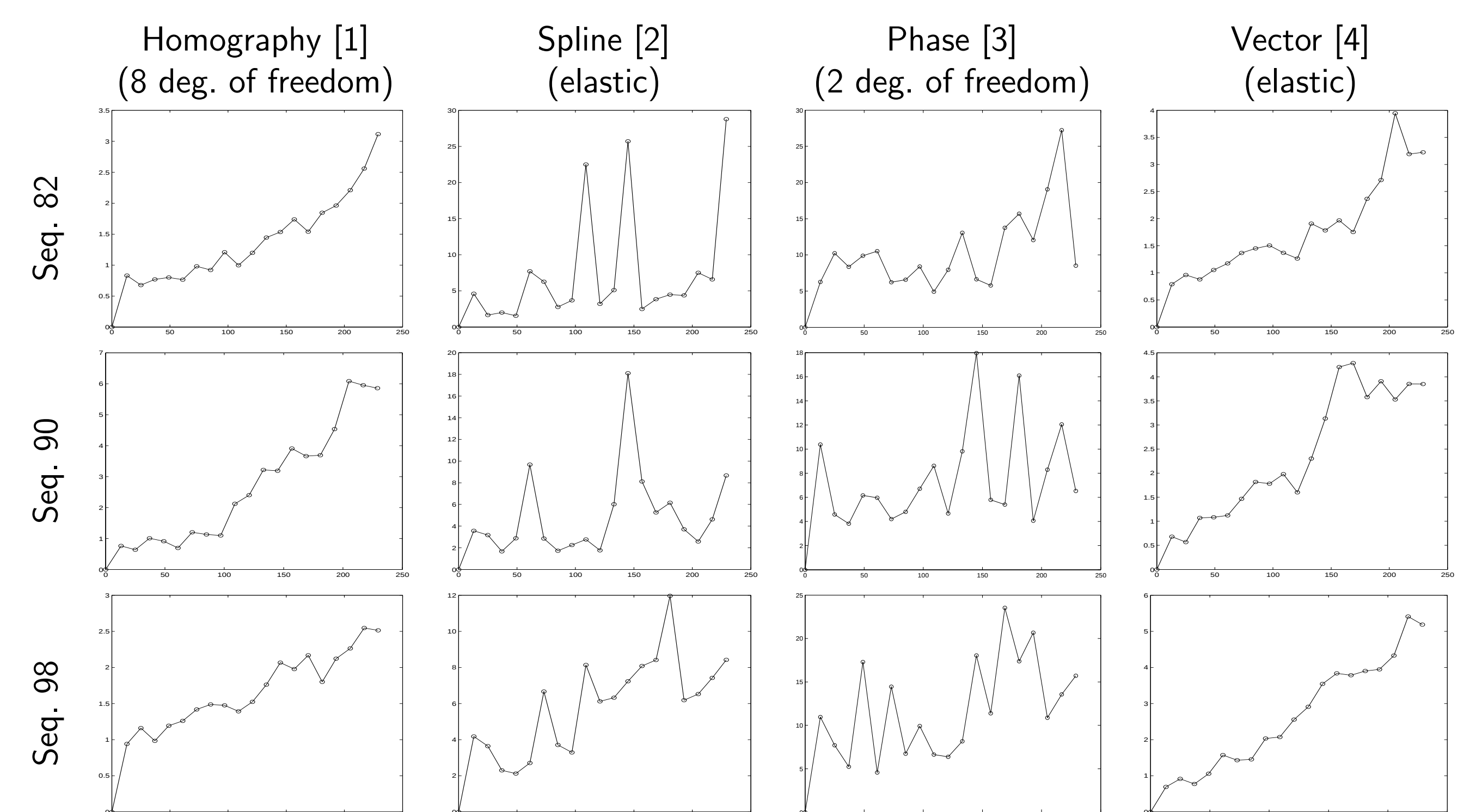


Detected Landmarks



Test Results

Four registration algorithms previously proposed for cervical image registration were tested using the detected landmarks.



Registration error in pixels as a function of the time difference evaluated using detected landmarks.

$$Err = \frac{1}{N} \sum_{j=1}^N |H(\mathbf{x}_{test}^j) - \mathbf{x}_{ref}^j| \quad (1)$$

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