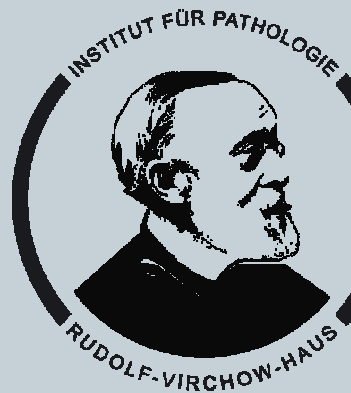


Computer aided navigation on histological whole slide images



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Introduction

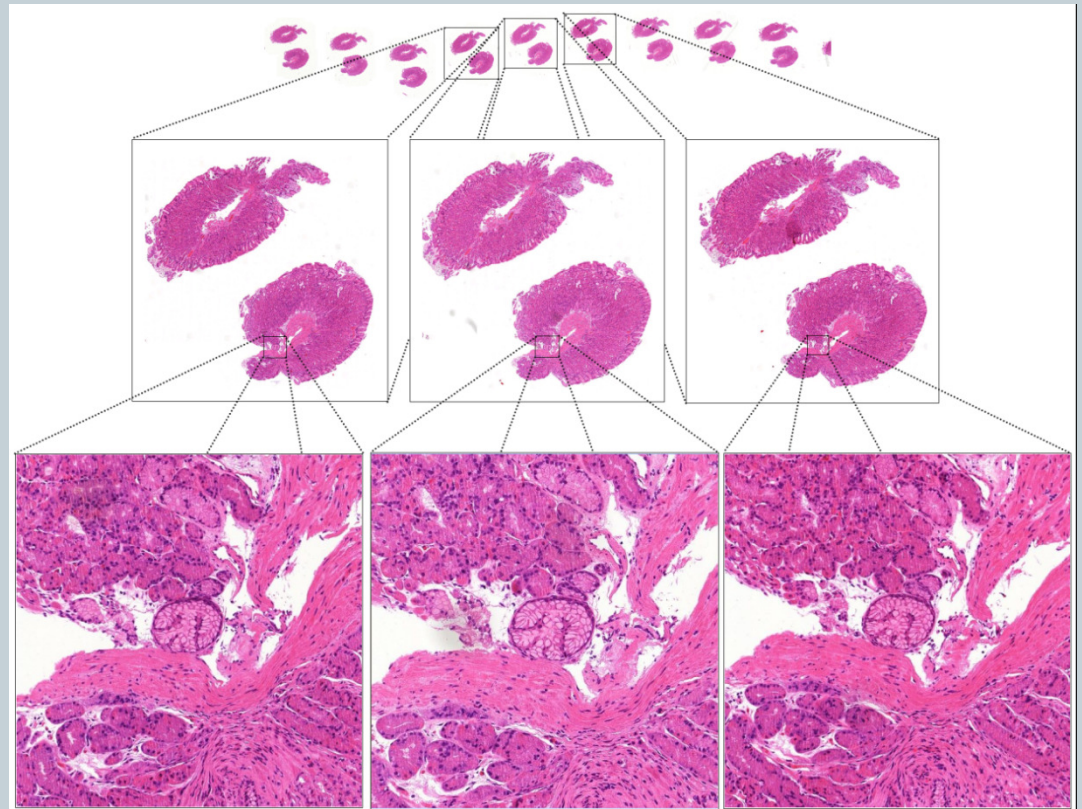


Motivation

- Context based navigation on virtual slides
- Laborious and time-consuming tracking of „diagnostic clues“ over serial sections
- Functionality enhancement of conventional virtual microscopes

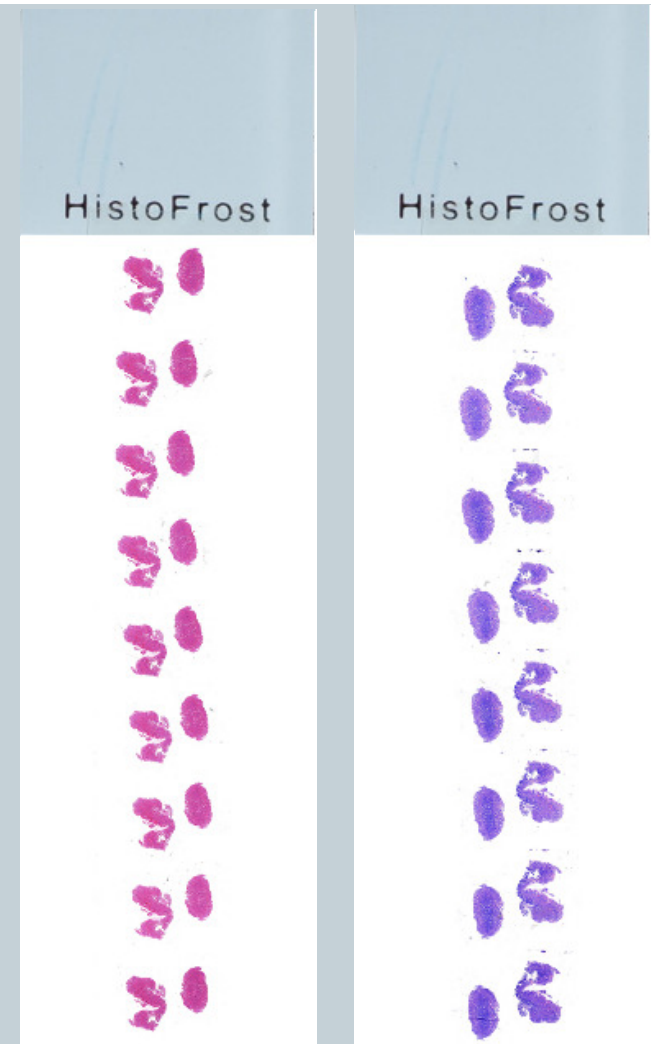
Goal

- Computer assisted navigation based on automated image analysis of whole slide images (WSI)



Material & Methods (1)

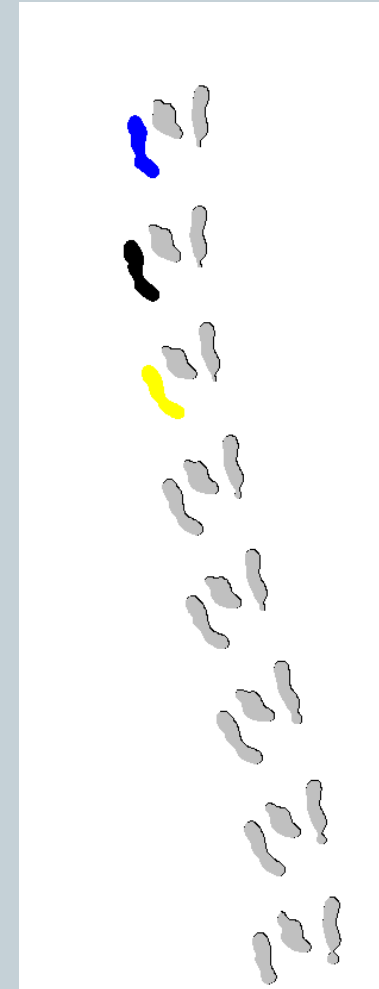
- Degrees of complexity
 - Material
 - ✦ Preparation artifacts
 - ✦ Biopsy versus surgical specimen
 - Methods
 - ✦ Tile versus WSI based processing
 - ✦ Intra versus inter slide tracking
 - ✦ Intra versus inter stain tracking
- Focus
 - Biopsies
 - WSI
 - Intra slide tracking
 - Rigid tissue model



Material & Methods (2)



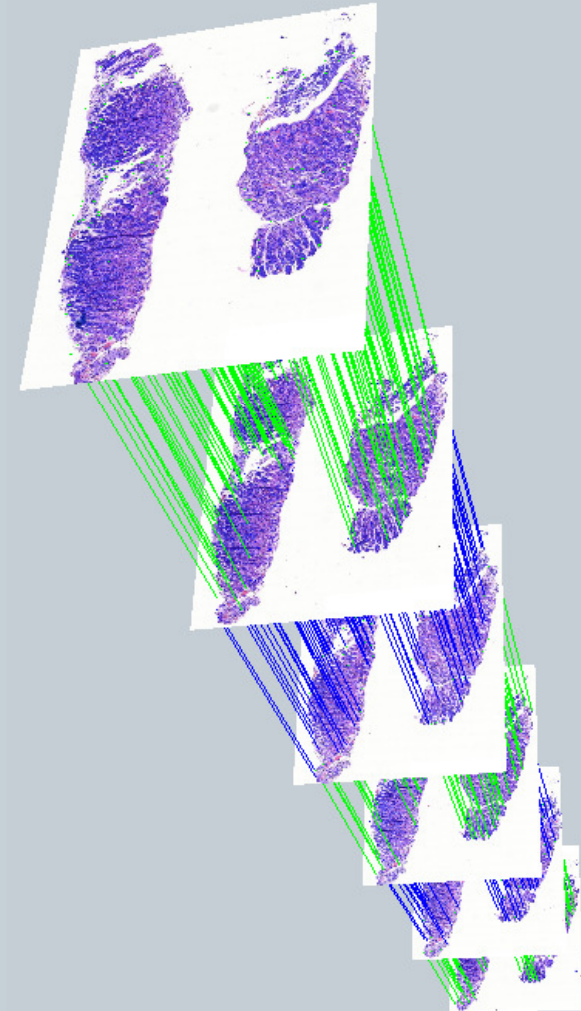
- **Preprocessing**
 - Segmentation of tissue particles
 - Reconstruction of serialization curve
 - Identification of serial sections
- **Classification**
 - Rotation and translation invariant contour based features
 - Expectation maximization classifier
 - Reconstruction of particle sequence



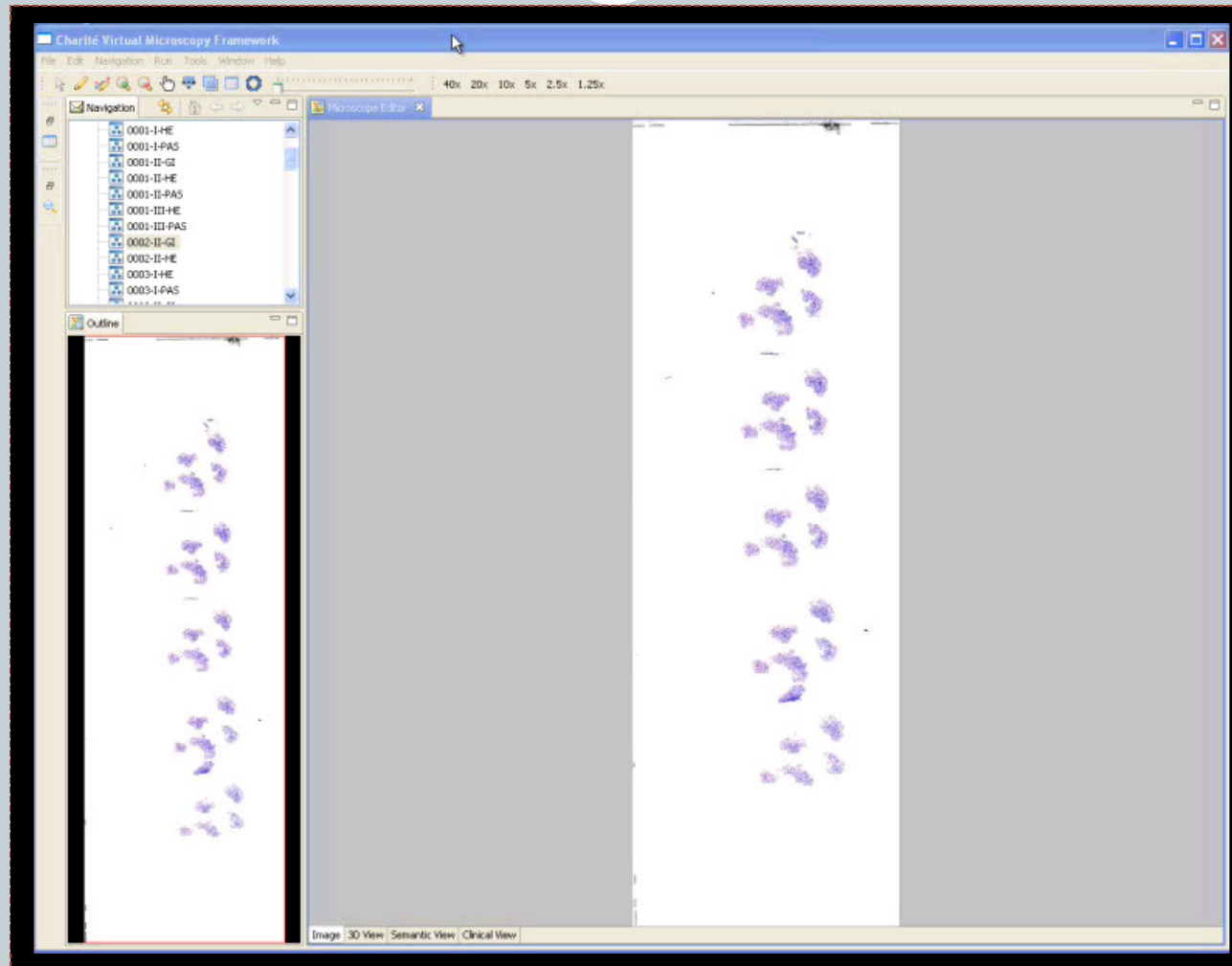
Material & Methods (3)



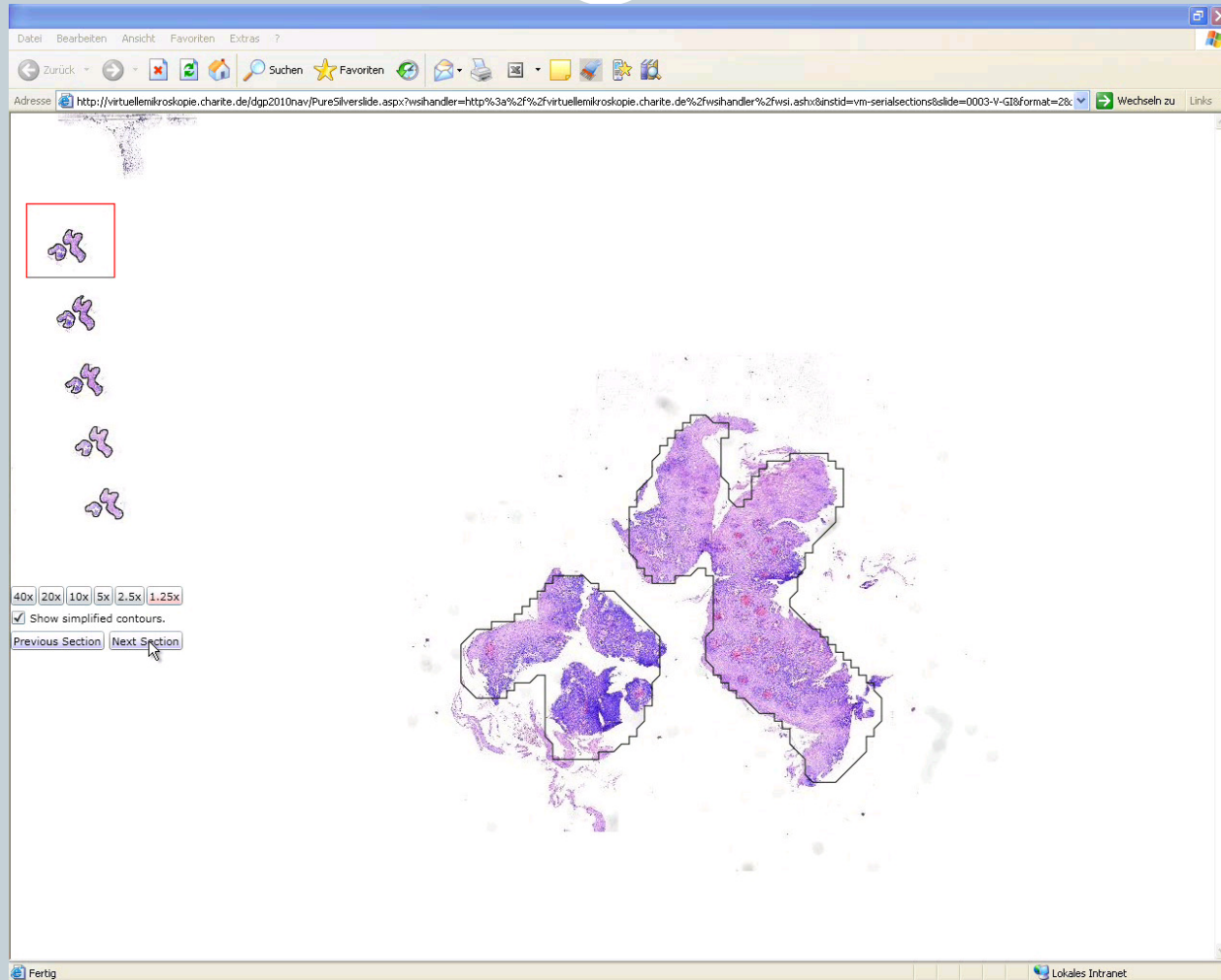
- **Alignment**
 - ROI based extraction and mapping of key points
 - Calculation of transformations for navigation
- **Offline/Online Processing**
 - case, slide, serial sections, particles
 - Key point pairs
 - Transformations



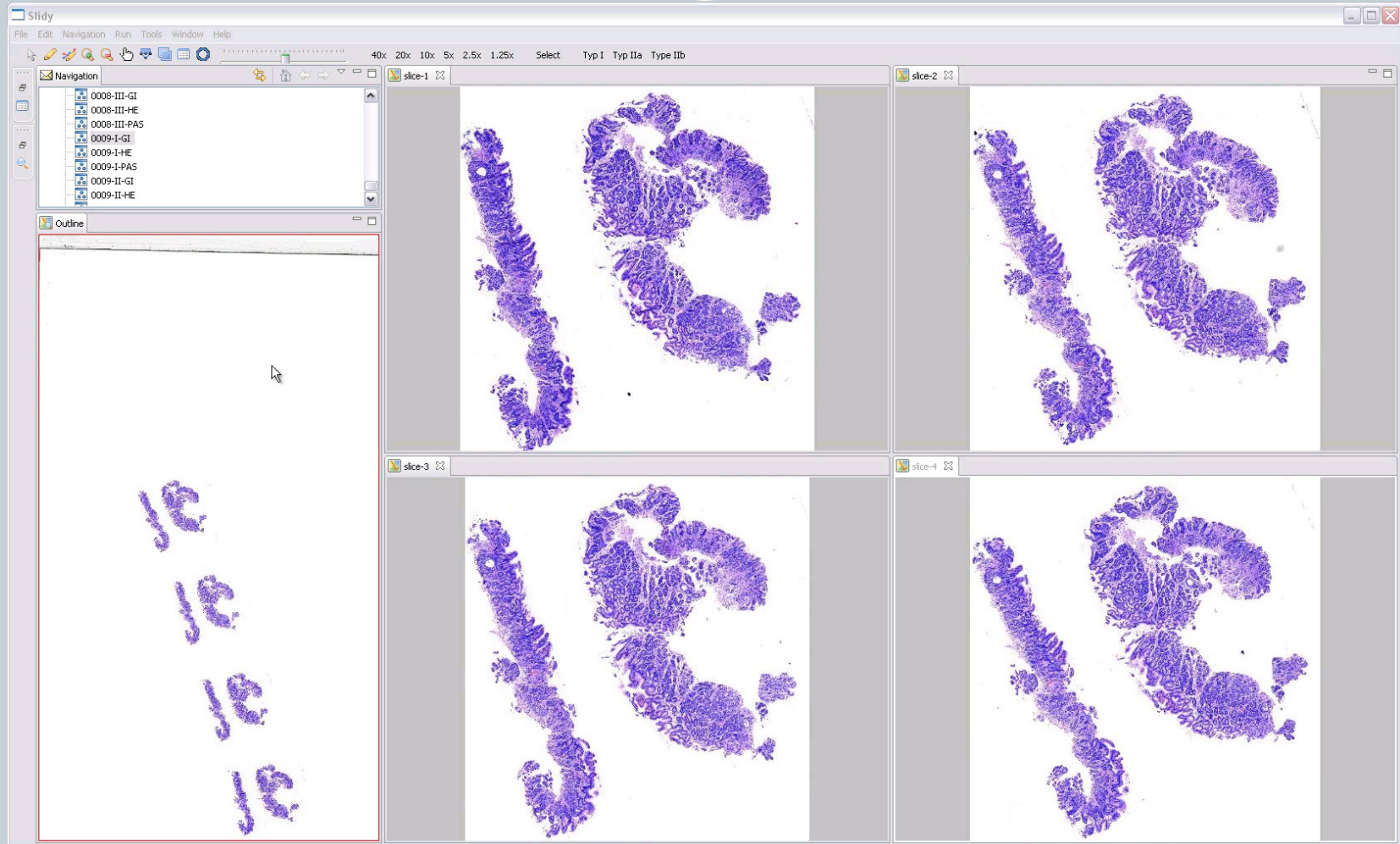
Results (1)



Results (2)



Results (3)



Future Work



- Tracking across multiple slides and stains
- Enhancement related to surgical specimens
- Provide algorithms via web services

Conclusion



- Tracking of „diagnostic clues“ across serial sections by retaining a relative position
- Time efficient navigation in serial sections of histological slides
- New diagnostic utility which does not exist in conventional virtual microscopes



Thank you for your attention!

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