

The comparison of scanner properties - the results of the 1st European Scanner Contest

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Outline

- 1 Background
- 2 Material & Methods
- 3 Results
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Technology & Consequences

Scanning process

- Mosaic-scan
- Line-scan

Autofocus

- Interpolation
- Dynamic focus

Quality parameter

- Resolution
- Speed of scan
- Image sharpness
- Colour
- Contrast
- Time to present a slide with a viewer

Participating manufacturers



Figure: Overview of manufacturers

Scanner

- Nanozoomer 2.0 HT (Hamamatsu)
- SCN 400 + SL801 (Leica)
- Panoramic Scan 150 (3DHitech)
- Panoramic Desk (3DHitech)
- Metafer 4 (MetaSystems)
- Metafer 4 + Loader (MetaSystems)
- D-Sight 05 (Menarini)
- .slide + VC50 (Olympus)

Subjects of contest

Mass-Scan 35 slides (15 Op, 20 Biopsies), en block, no interaction after start of scanning process allowed

Quality-Scan 10 slides, interaction allowed after start of scanning process

Cytology-Scan 12 cytology slides, interaction allowed

Immun-Scan 11 IHC slides (Ki67, Her2neu u.a.)

Evaluated parameter

Technical parameter

- preparation & scanning time
- correct scanned slides
- scanned area, missing areas
- file size
- area/time relation
- file size / scanned area

Quality parameter

- Rank of manual evaluation
- Automatic evaluation of image sharpness
 - Tennenbaum
 - Laplace
 - Wienert
- Unsharp areas

The beginning of contest - build up the systems



Figure: MetaSystems in action

Briefing of referees



Figure: Students of HTW & K.Saeger (VMScope)

Creation of screenshots for evaluation of quality



Figure: Students of University of Applied Sciences Brandenburg

Optical resolution of scanners

Hersteller	20x	40x
3DHistech	0,35	0,22
Hamamatsu	0,46	0,23
Leica		0,25
MetaSystems	0,32	0,26
Olympus	0,32	0,16
Menarini	0,5	0,25

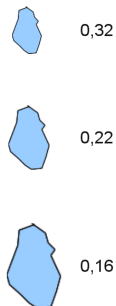


Figure: Implications of different resolutions

Image quality example 1

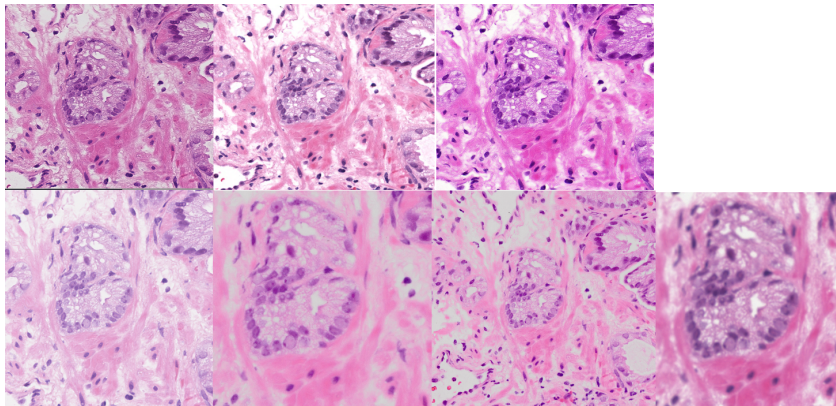


Figure: HE-Slide

Results example 1

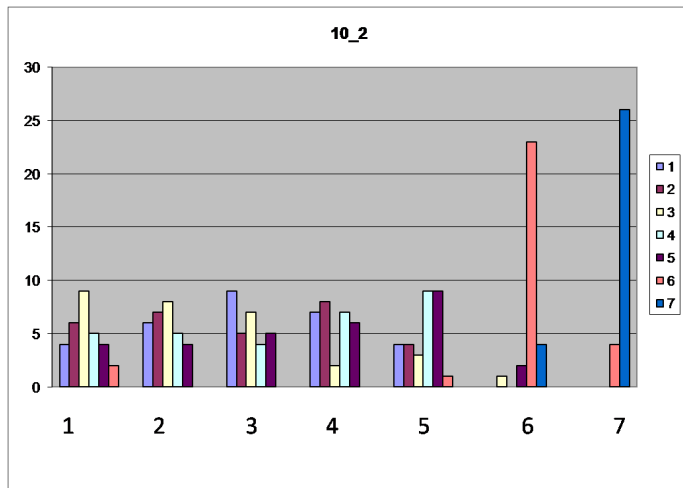


Figure: Comparison of image quality

Image quality example 2

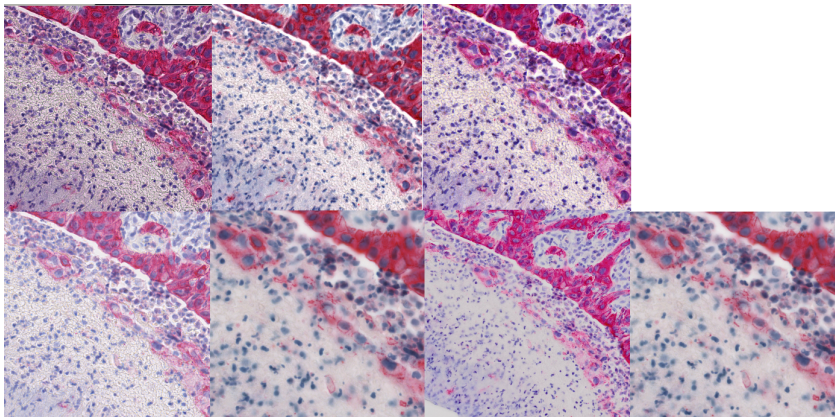


Figure: IHC-Slide

Results example 2

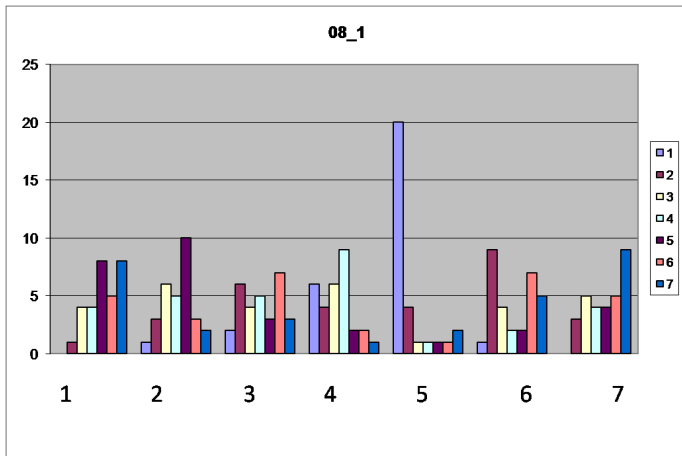


Figure: IHC-Slide

Image quality example 3

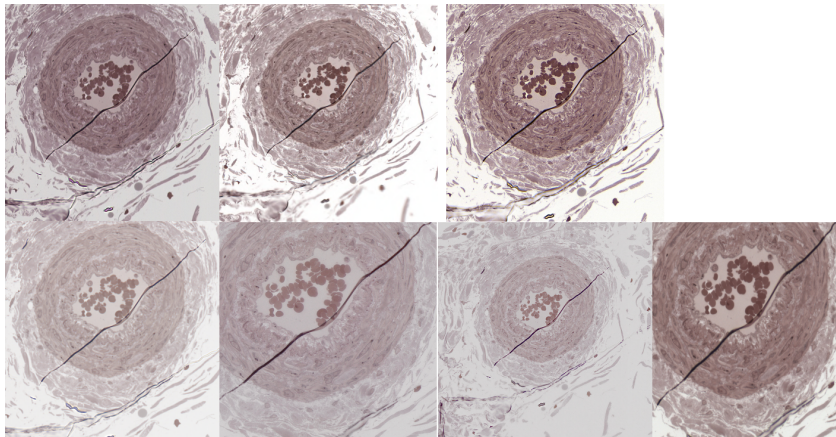


Figure: Semi thin slide

Results example 3

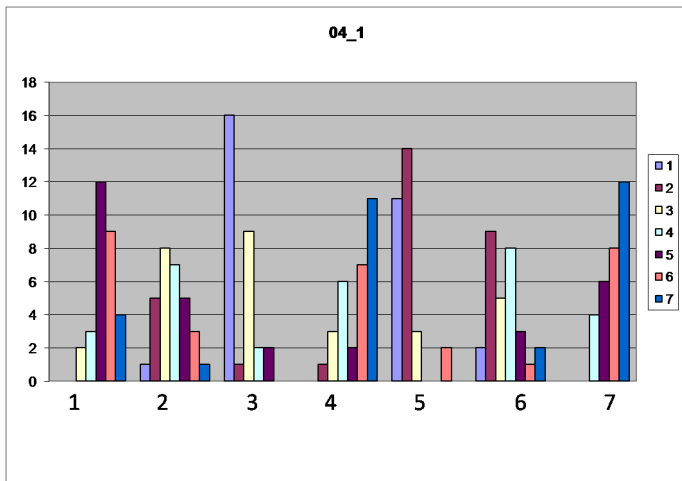


Figure: Semi thin slide

Scanning time

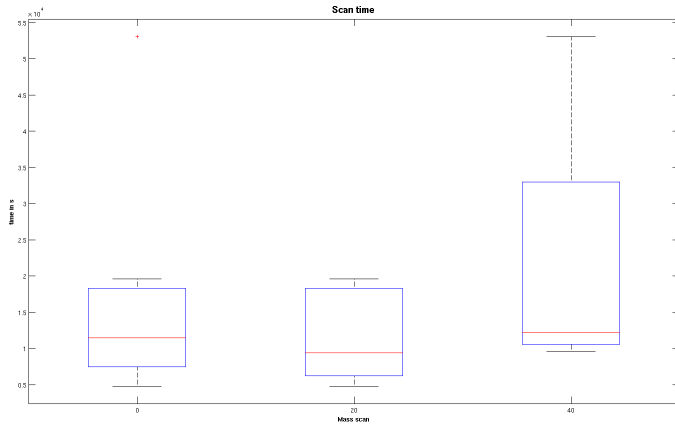


Figure: Mass scan

Limits of the first scanner contest

- Evaluation of image quality
 - Manual
 - Automatic
- Comparability of resolution, used objective and monitor
- Comparability of viewer
- Current tested: light microscopy for routine, no fluorescence
- No image analysis

Vilnius Conference

- 10th European Congress on Telepathology and 4th International Congress on Virtual Microscopy
- July, 1st, 2010, 17:30 o'clock
- Round table & Award ceremony of Scanner Contest

Take home message

- First Scanner contest with comparable images and measurements
- Every participant will get a personal feedback with detailed information
- Website will be published soon.
- Next contest - next year
 - Fluorescence Microscopy
 - Additional quality parameter
 - Image analysis

Sponsors

- European Society of Pathology
- Deutsche Gesellschaft für Pathologie
- Bundesverband Deutscher Pathologen
- Barco (Monitors)
- COST Action IC 0604 WG 3, WG4

Resourcing of slides

- I. Anagnostopoulus (Berlin)
- H. Guski (Potsdam)
- G. Haroske (Dresden)
- F. Heppner (Berlin)
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- J. Slodkowska (Warsaw)
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Organisation

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- Hochschule Technik und Wirtschaft
- Fachhochschule Brandenburg