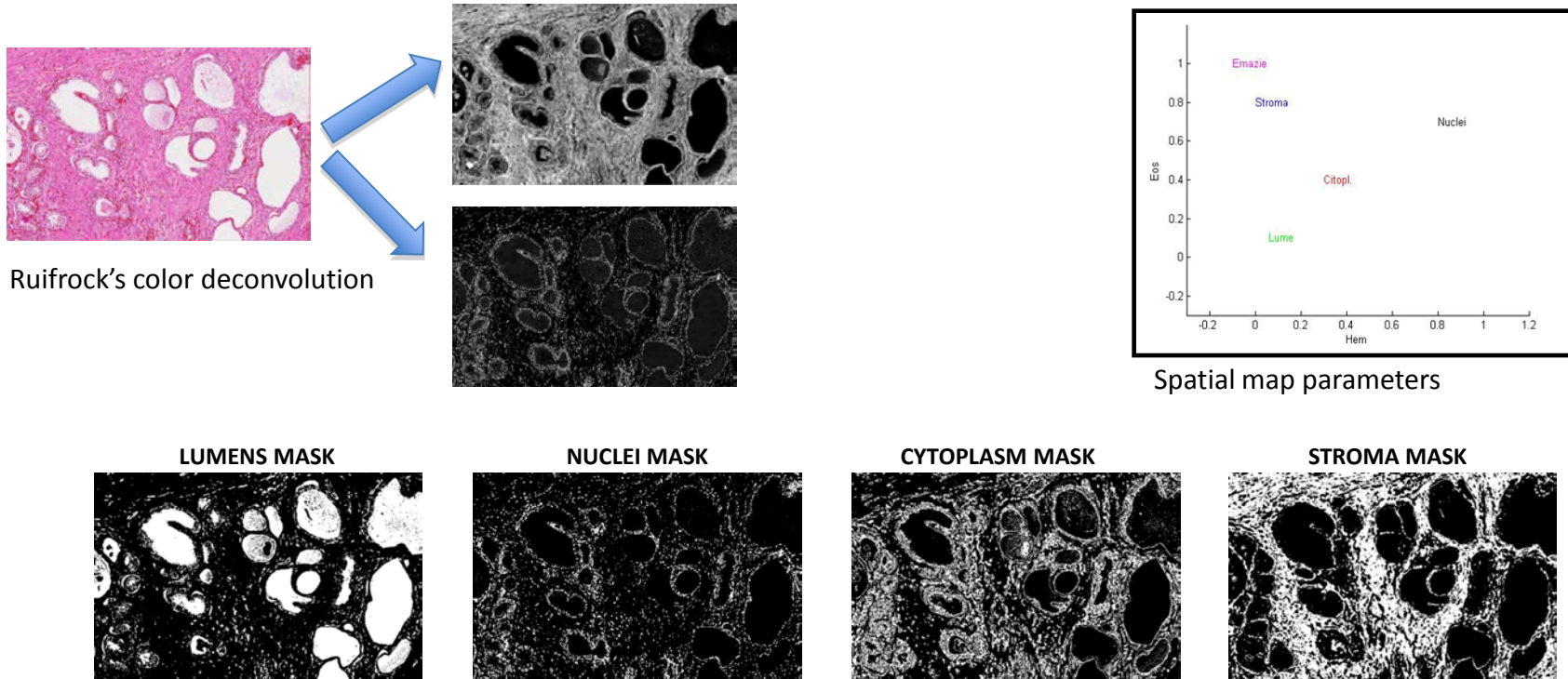


# COMPLETELY AUTOMATED INTEGRATED SYSTEM FOR PROSTATE CANCER GRADING

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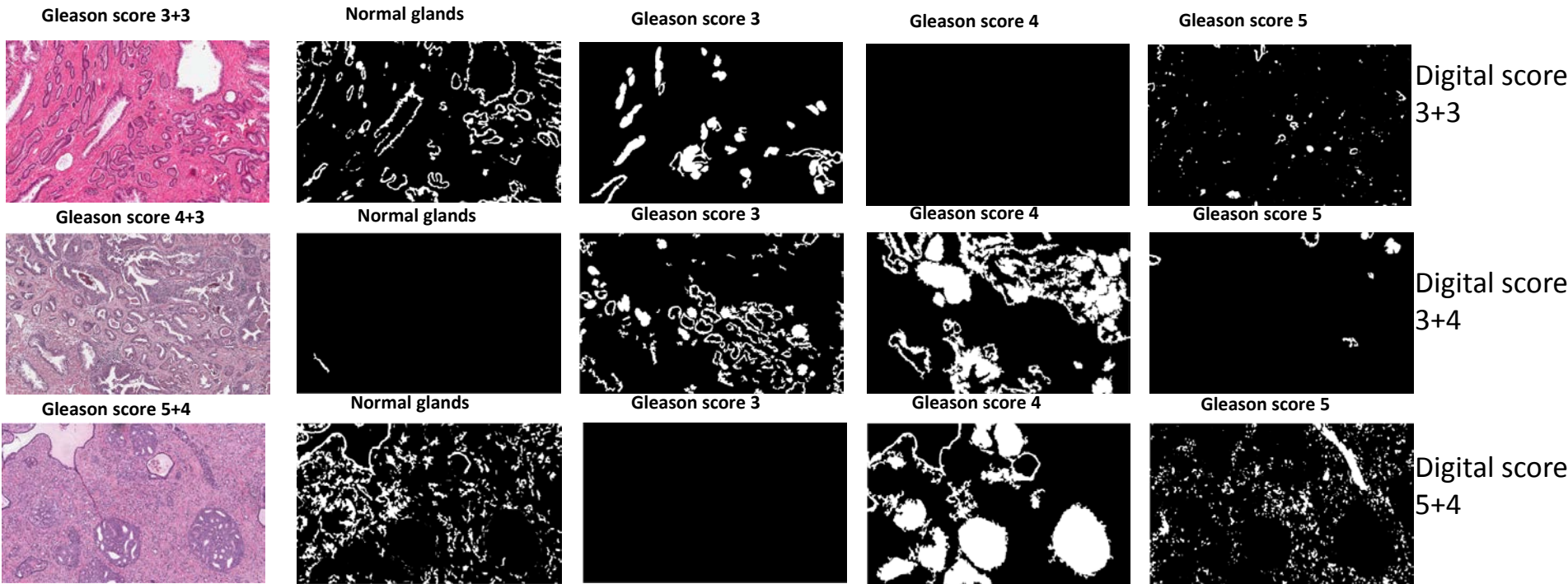
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Gleason score system is based on tumour architecture and is composed of 5 architectural patterns. Ten cases of resected prostate carcinoma from the files of Molinette University Hospital in Turin were selected (two cases for each Gleason score: 6 (3+3), 7 (3+4), 7 (4+3), 8 (4+4) and 9 (4+5)). H&E slides were scanned using Aperio Scan Scope XT at 20x magnification. Several representative fields at 8x digital magnification of pure 3, 4 and 5 patterns were captured and all pictures were reviewed by the pathologist to quantify and determine the Gleason score of each shot.



The masks were used to guide the segmentation of the structures.

- The Ranklet transform was used to segment nuclei.
- Glands were detected by thresholding of the Hem color channel.
- Cribriform structures were identified by a multi-resolution analysis of the Hem channel and by imposing a constraint on the eccentricity of the structure and the presence of at least 20% of nuclei inside it.



- The algorithm successfully discriminated pure pattern 3, cribriform structures of pattern 4 and pattern 5 either as “solid sheet” or “single cell infiltration” architecture.
- Less successful results were observed when discriminating between pattern 3 and glandular pattern 4 with “fused microacinar glands” features.