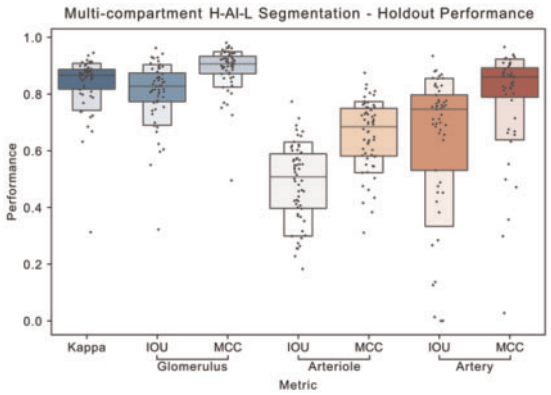
intersection over union (IoU) and Matthews correlation coefficient (MCC) against the nephropathologist's segmentation as ground truth.
**RESULTS:** Over all classes (artery, arteriole, glomerulus) Cohen's kappa was 0.86.

IoU was 0.716 for artery, 0.491 for arteriole and 0.829 for glomerulus.
MCC was 0.837 for artery, 0.664 for arteriole and 0.907 for glomerulus.




MO077 Figure: The figure shows the performance of our segmentation model on the holdout set with Cohen's kappa, intersection of union (IoU) and Matthews correlation coefficient (MCC).

**CONCLUSION:** We achieved good automatic segmentation of arteries, arterioles and glomeruli, even with severe pathological distortion on routine histopathological slides. We will further improve this segmentation technology in order to enable the bulk analysis of these descisive tissue compartments in large clinicopathological repositories of native kidney biopsies with TMA using supervised and unsupervised machine learning algorithms.

MO077

## AUTOMATIC SEGMENTATION OF ARTERIES, ARTERIOLES AND GLOMERULI IN NATIVE BIOPSIES WITH THROMBOTIC MICROANGIOPATHY AND OTHER VASCULAR DISEASES

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**BACKGROUND AND AIMS:** Thrombotic microangiopathies (TMAs) manifest themselves in arteries, arterioles and glomeruli. Nephropathologists need to differentiate TMAs from mimickers like hypertensive nephropathy and vasculitis which can be problematic due to interobserver disagreement and poorly defined diagnostic criteria over a wide spectrum of morphological changes with partial overlap. As a first step towards a machine learning analysis of TMAs, we developed a computer vision model for segmenting arteries, arterioles and glomeruli in TMA and mimickers.
**METHOD:** We manually segmented n=939 arteries, n=6,023 arterioles, n=4,507 glomeruli on whole slide images (WSIs) of 34 renal biopsies and their HE, PAS, trichrome and Jones sections (19 TMA, 11 hypertensive nephropathy, 4 vasculitis with preglomerular involvement). As a segmentation model we used DeepLab V3, pretrained on 61,734 segmented glomeruli from 768 WSIs. 58 randomly chosen WSIs served as the intrainstitutional holdout testing set after training of the model on the remaining slides. Automatic segmentation accuracies were reported as Cohen's kappa,