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# Deep learning for the automatic identification of neoplastic biliary nodules in patients with indeterminate biliary stenosis during digital cholangioscopy

PRECISION MEDICINE

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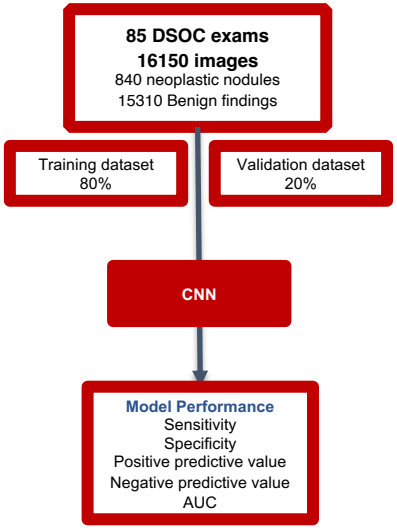
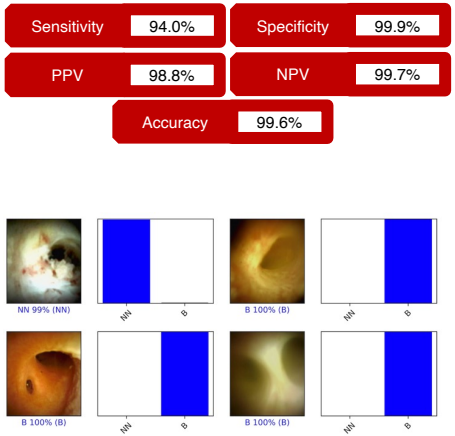
Digital single-operator cholangioscopy (DSOC) provides direct visual exploration of the biliary tract. This tool has become essential for distinguishing benign from malignant biliary strictures. Macroscopic characteristic such as tumor vessels, papillary projections, masses and nodules are common findings in patients with malignant biliary strictures.

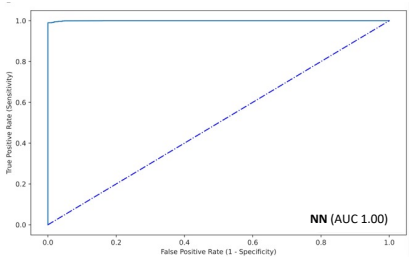
## AIM

To develop a convolutional neural network for automatic detection of biliary nodules in D-SOC images.




**Output provided by the network. NN – Neoplastic nodules; B - benign**




**ROC analyses of the network's performance. NN – Neoplastic nodules**

The development of *deep learning* algorithms for application to DSOC may potentiate the diagnostic capabilities of this modality. The application of these AI systems on real-time may help to guide biopsies, mitigating their current limitations, to achieve a more accurate diagnosis and timelier treatments.

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The authors have no conflict of interest to disclose