

Transfer Learning for AI-Assisted Detection of Cervical Cancer in Colposcopic Images

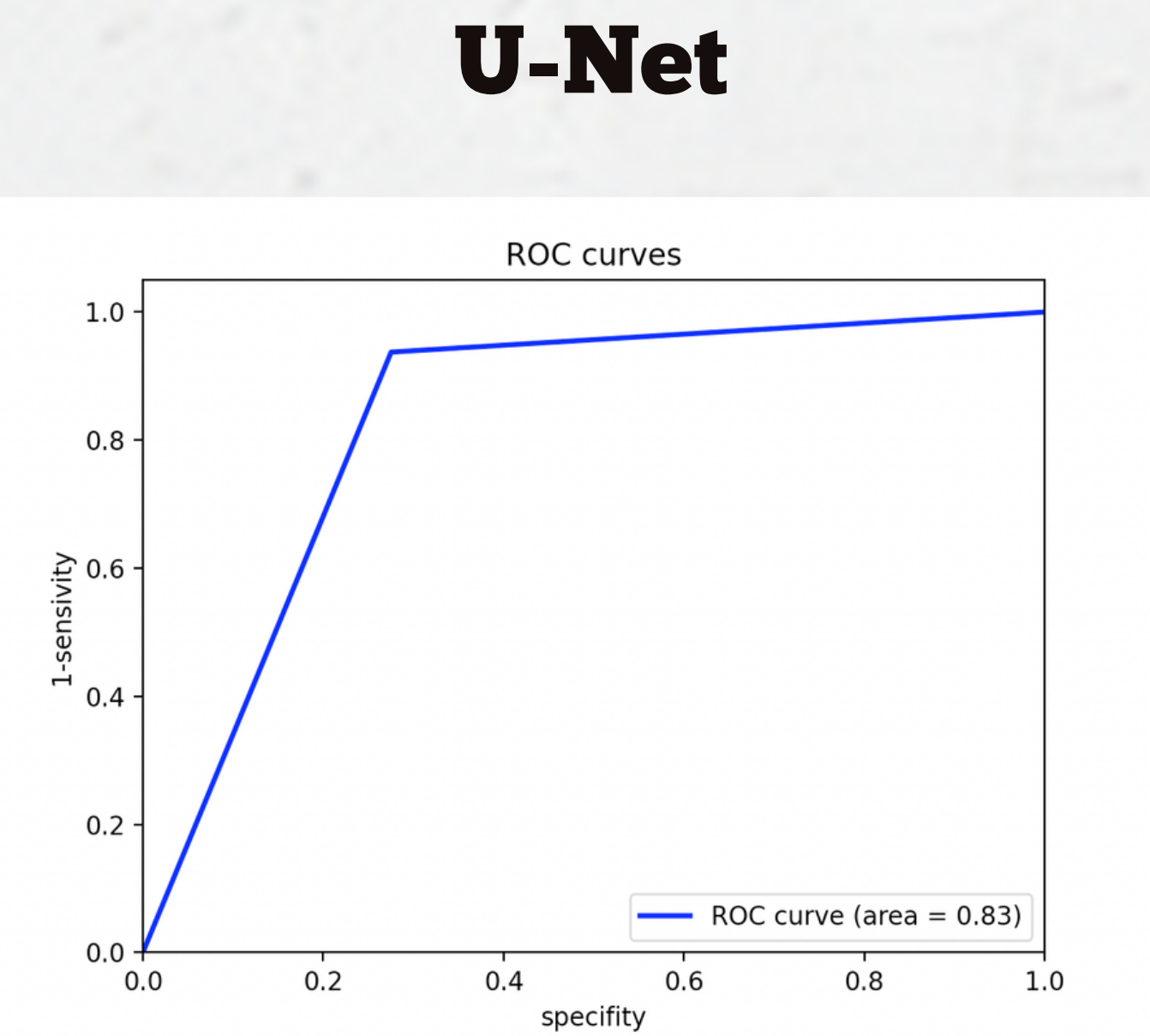
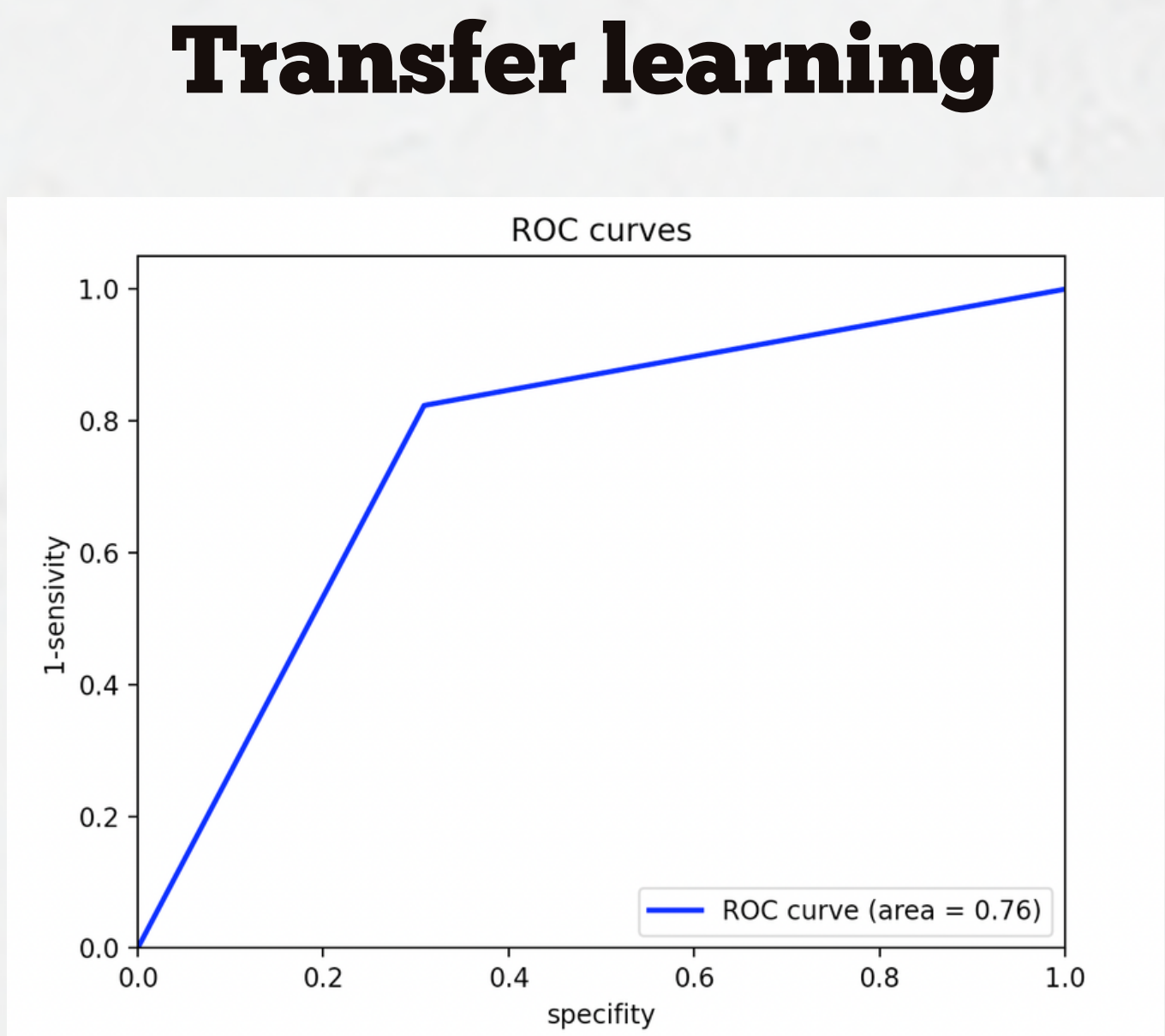
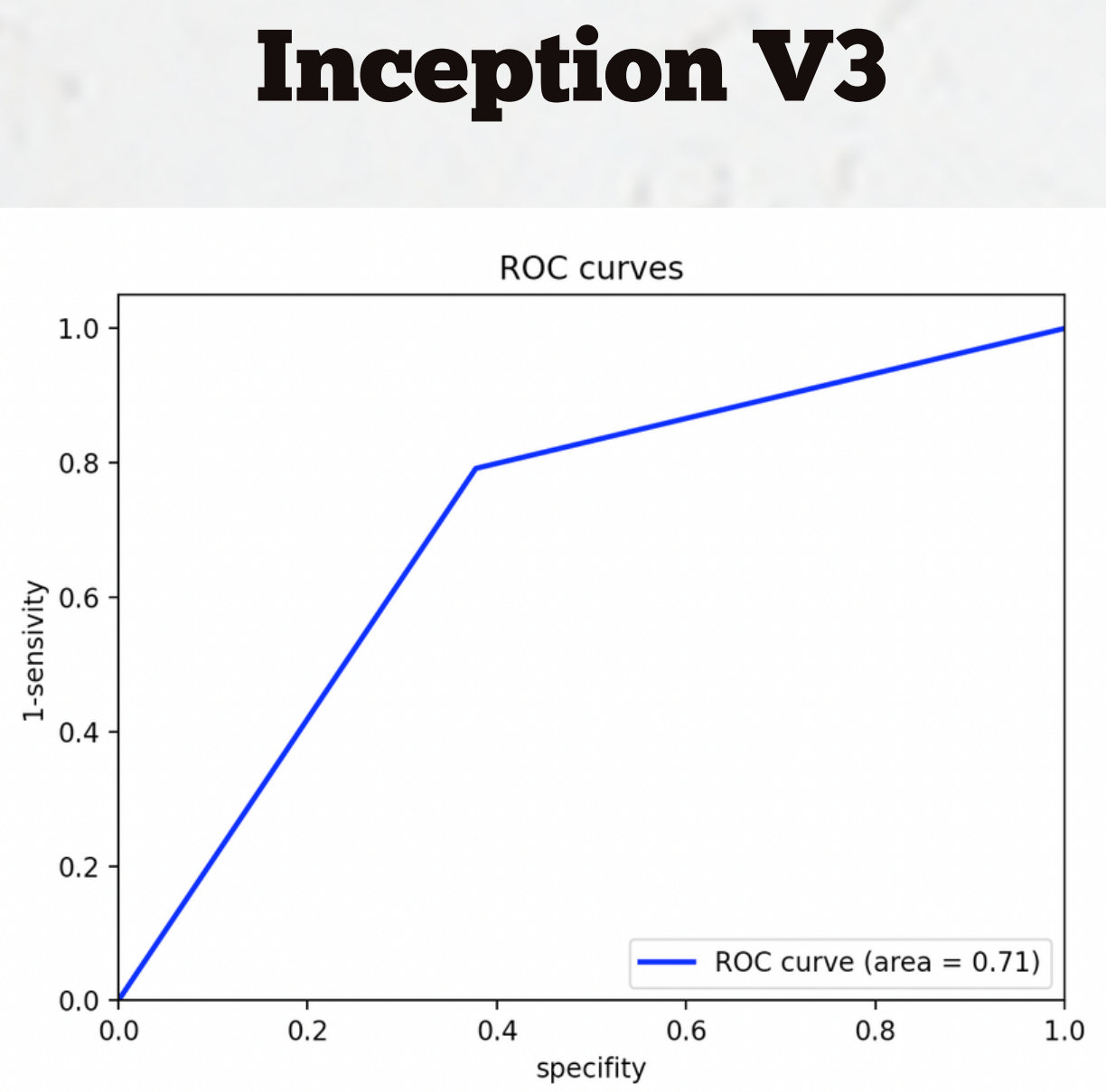
Artur Vysotskyi, Research conducted at **Igor Sikorsky Kyiv Polytechnic Institute**
Currently **IMT, Portsmouth Hospitals University NHS Trust**

Purpose: Cervical screening is subjective. AI may improve consistency and early detection.

Methods: Three deep learning approaches were compared: the InceptionV3 convolutional neural network, the U-Net segmentation model, and transfer learning using a pretrained neural network.

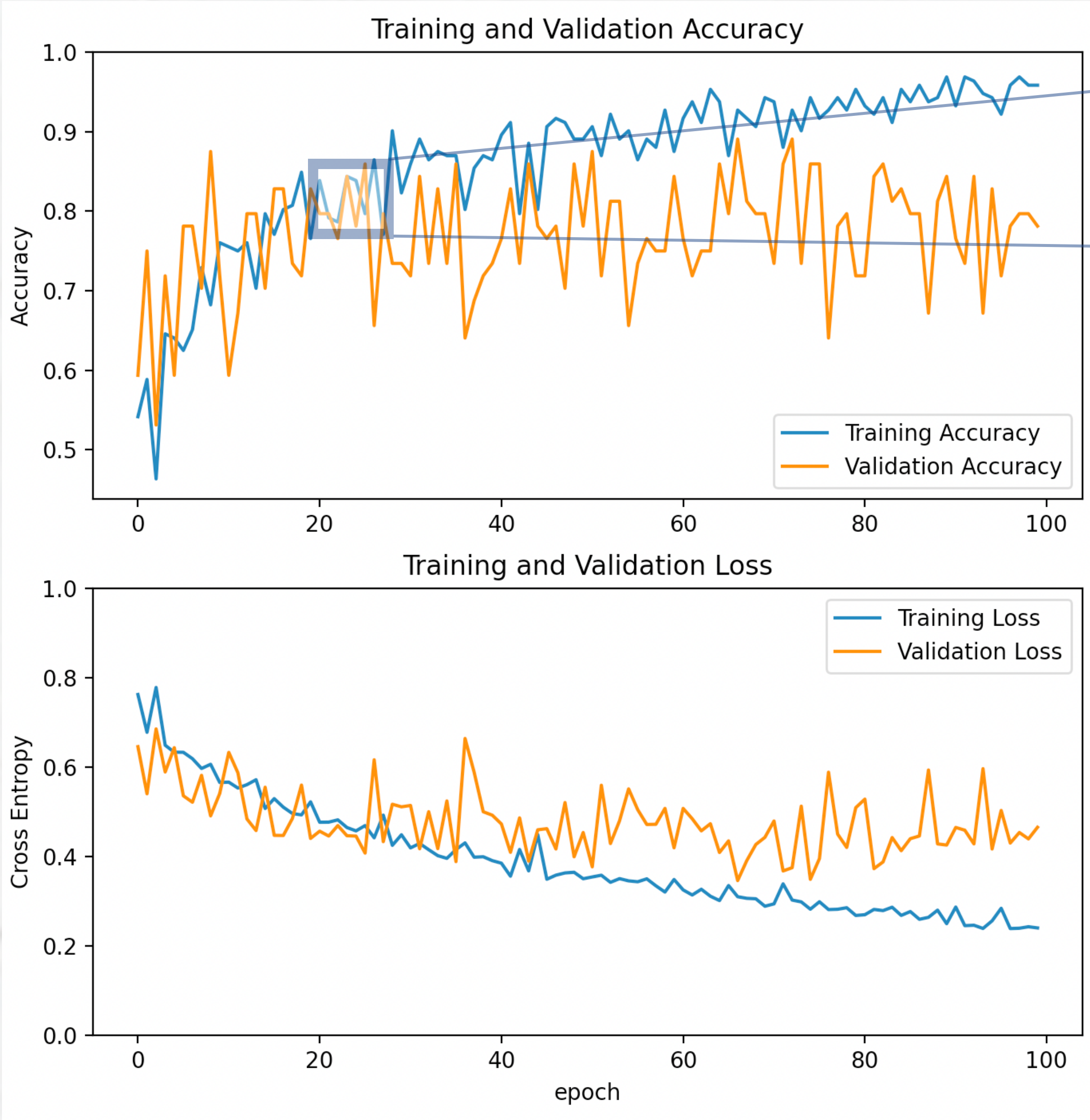
Results:

	Inception V3	Transfer Learning	U-Net
AUC	0.76	0.83	0.71



Materials: A total of 391 images were analysed and divided into a training (211 images), validation (95 images), and test (85 images) sets.

Performance of the InceptionV3 neural network using transfer learning



Sensitivity: 0.72
Specificity: 0.94

* Training vs validation accuracy:
Training accuracy reflects performance on known data; validation reflects generalisation to unseen data. Slight divergence suggests mild overfitting due to the limited dataset size.

Clinical implication: detects high-risk lesions.
AUC=0.83 (good discrimination, 1.0=perfect, 0.5=random).

Conclusion: Deep learning analysis of colposcopic images demonstrates potential as a decision-support tool in cervical cancer screening. Transfer learning showed the most promising results and may support clinicians in identifying early cervical lesions. Further studies with larger datasets are required to improve model performance and clinical applicability.