

Supplementary Information

A comparative study on the implementation of deep learning algorithms for detection of hepatic necrosis in toxicity studies

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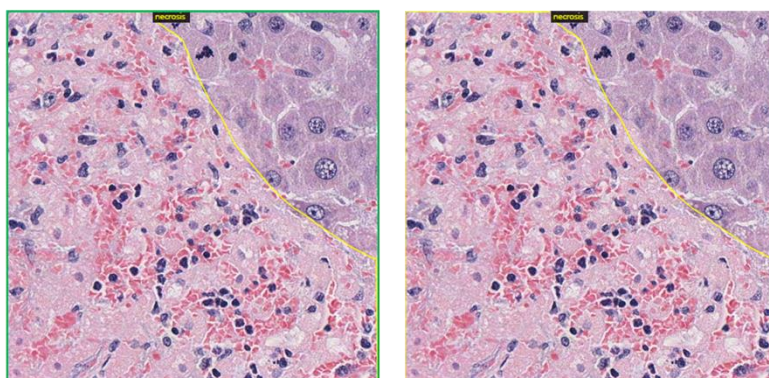
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(a) object detection model label **(b) segmentation model label**



Online Resource 1 - The examples of labels (see yellow outline) according to the models. The lesions were characterized using nuclear dissolution and fragmentation with pale eosinophilic cytoplasm in the image and hemorrhage. In addition, the object detection model SSD's label includes not only the hepatic necrosis but also normal cells in the bounding box annotation (a), occasionally making the 448×448 -pixel tile itself the annotation for the hepatic necrosis (see green outline). The segmentation model separates the lesion from other cells in the annotation (b).

Online Resource 2. The number of images and annotations used for algorithm training. The numbers in parentheses include augmented images or annotations created by reverse, rotation, and brightness image-augmenting techniques.

	Number of images	Number of annotations
Train	350 (5600)	355 (5680)

Validation	100	104
Test	50	51
Total	500 (5750)	510 (5835)

Online Resource 3. Hyperparameters used for training each network

Network Type	Mask R-CNN	DeeplabV3⁺	SSD
Parameters	BACKBONE = resnet152	BACKBONE = "resnet"	COCO_API = "PythonAPI"
	DIST_BACKEND = "nccl"	LR = 0.01	EPOCHS = 400
	BATCH_SIZE = 16	EPOCHS = 200	BATCH_SIZE = 64
	LR = 0.005	BATCH_SIZE = 32	LR = 0.0003
	EPOCHS = 200	DATASET = "COCO"	WEIGHT_DECAY = 0.00003
	WORKERS = 16	MASK_THRESHOLD = 0.6	MOMENTUM = 0.9
	LR_STEPS = 16, 22		CONFIDENCE = 0.5
	CONFIDENCE = 0.5		