PREDICTING INVASIVE DUCTAL CARCINOMA USING CNNS

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MODEL ARCHITECTURE :

Layer Name	No. of Filters/ No.of Nodes	Filter/Pool Size	Strides	No.of Parameters
Conv	32	3x3	1	896
Conv	32	3x3	1	9248
MaxPool	-	2x2	2	0
Conv	64	3x3	1	18496
Conv	64	3x3	1	36928
MaxPool	-	2x2	2	0
FCN	64	3x3	1	36928
FCN	128	3x3	1	73856
FCN	128	3x3	1	147584
FCN	64	3x3	-	73794
Average Pool	-	-	-	0
Dense	32	-	-	2080
Dense	2	-	-	66
Total				399,874

TRAINING SETTING :

Variable	Setting
Batch Size	32
Number of Epochs	30
Learning Rate	0.001
Validation Samples	41629
Patience Epochs	5

STATE-OF-THE-ART RESULTS COMPARISON

Method	**Precision**	**Recall**	**F1-Score**	**Balanced Accuracy**
Fuzzy Color Hist.	0.7086	0.6450	0.6753	0.7874
RGB Hist.	0.7564	0.5956	0.6664	0.7724
Gray Hist.	0.7102	0.5240	0.6031	0.7337
JPEG Coefficient Hist	0.7570	0.4646	0.5758	0.7126
MPEG7 Edge Hist	0.7360	0.4372	0.5485	0.6979
Nuclear Textual	0.6246	0.2851	0.3915	0.6199
LBP Hist	0.7575	0.2291	0.3518	0.6048
Nuclear Architectural	0.6184	0.2413	0.3472	0.6009
HSV Color Hist.	0.7662	0.2223	0.3446	0.6022
3-layer CNN	0.6540	0.7960	0.7180	0.8423
Alexnet, resize + dropout	-	-	0.7570	0.8423
Alexnet, resize	-	-	0.7648	0.8468
Proposed CNN	**0.8894**	**0.8894**	**0.8894**	**0.8675**