

Layer information

Model: "model_1"

Layer (type)	Output Shape	Param #
=====		
input_2 (InputLayer)	[(None, 192, 256, 3)]	0
conv1 (Conv2D)	(None, 192, 256, 64)	1792
bn1 (BatchNormalization)	(None, 192, 256, 64)	256
activation (Activation)	(None, 192, 256, 64)	0
conv2 (Conv2D)	(None, 192, 256, 64)	36928
bn2 (BatchNormalization)	(None, 192, 256, 64)	256
activation_1 (Activation)	(None, 192, 256, 64)	0
max_pooling2d_1 (MaxPooling2)	(None, 96, 128, 64)	0
conv3 (Conv2D)	(None, 96, 128, 128)	73856
bn3 (BatchNormalization)	(None, 96, 128, 128)	512
activation_2 (Activation)	(None, 96, 128, 128)	0
conv4 (Conv2D)	(None, 96, 128, 128)	147584
bn4 (BatchNormalization)	(None, 96, 128, 128)	512
activation_3 (Activation)	(None, 96, 128, 128)	0
max_pooling2d_2 (MaxPooling2)	(None, 48, 64, 128)	0
conv5 (Conv2D)	(None, 48, 64, 256)	295168
bn5 (BatchNormalization)	(None, 48, 64, 256)	1024

activation_4 (Activation)	(None, 48, 64, 256)	0
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conv6 (Conv2D)	(None, 48, 64, 256)	590080
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bn6 (BatchNormalization)	(None, 48, 64, 256)	1024
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activation_5 (Activation)	(None, 48, 64, 256)	0
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conv7 (Conv2D)	(None, 48, 64, 256)	590080
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bn7 (BatchNormalization)	(None, 48, 64, 256)	1024
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activation_6 (Activation)	(None, 48, 64, 256)	0
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max_pooling2d_3 (MaxPooling2)	(None, 24, 32, 256)	0
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conv8 (Conv2D)	(None, 24, 32, 512)	1180160
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bn8 (BatchNormalization)	(None, 24, 32, 512)	2048
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activation_7 (Activation)	(None, 24, 32, 512)	0
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conv9 (Conv2D)	(None, 24, 32, 512)	2359808
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bn9 (BatchNormalization)	(None, 24, 32, 512)	2048
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activation_8 (Activation)	(None, 24, 32, 512)	0
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conv10 (Conv2D)	(None, 24, 32, 512)	2359808
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bn10 (BatchNormalization)	(None, 24, 32, 512)	2048
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activation_9 (Activation)	(None, 24, 32, 512)	0
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max_pooling2d_4 (MaxPooling2)	(None, 12, 16, 512)	0
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conv11 (Conv2D)	(None, 12, 16, 512)	2359808
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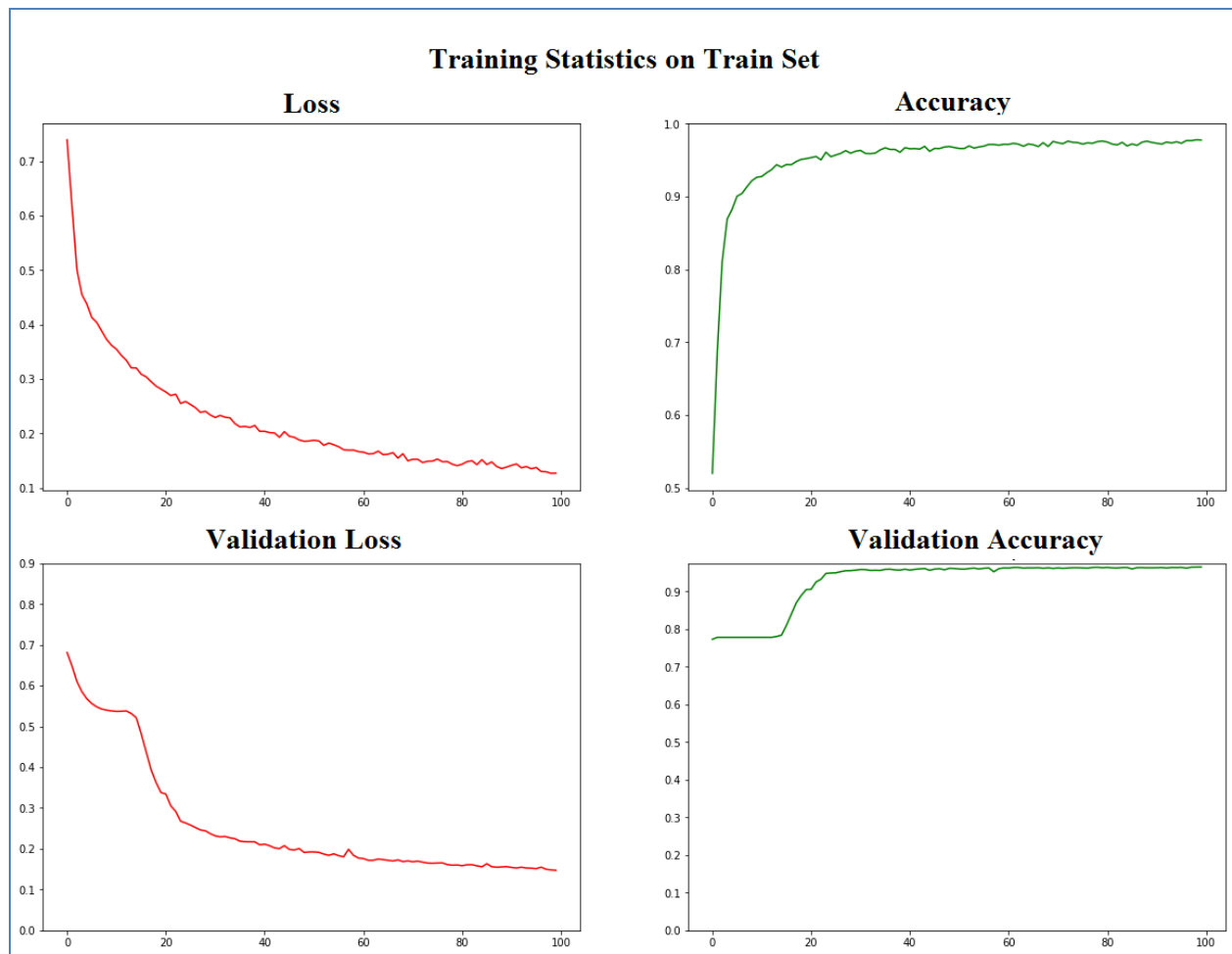
bn11 (BatchNormalization)	(None, 12, 16, 512)	2048
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activation_10 (Activation)	(None, 12, 16, 512)	0
conv12 (Conv2D)	(None, 12, 16, 512)	2359808
bn12 (BatchNormalization)	(None, 12, 16, 512)	2048
activation_11 (Activation)	(None, 12, 16, 512)	0
conv13 (Conv2D)	(None, 12, 16, 512)	2359808
bn13 (BatchNormalization)	(None, 12, 16, 512)	2048
activation_12 (Activation)	(None, 12, 16, 512)	0
max_pooling2d_5 (MaxPooling2D)	(None, 6, 8, 512)	0
fc1 (Dense)	(None, 6, 8, 1024)	525312
fc2 (Dense)	(None, 6, 8, 1024)	1049600
up_sampling2d (UpSampling2D)	(None, 12, 16, 1024)	0
deconv1 (Conv2DTranspose)	(None, 12, 16, 512)	4719104
bn14 (BatchNormalization)	(None, 12, 16, 512)	2048
activation_13 (Activation)	(None, 12, 16, 512)	0
deconv2 (Conv2DTranspose)	(None, 12, 16, 512)	2359808
bn15 (BatchNormalization)	(None, 12, 16, 512)	2048
activation_14 (Activation)	(None, 12, 16, 512)	0
deconv3 (Conv2DTranspose)	(None, 12, 16, 512)	2359808
bn16 (BatchNormalization)	(None, 12, 16, 512)	2048
activation_15 (Activation)	(None, 12, 16, 512)	0

up_sampling2d_1 (UpSampling2 (None, 24, 32, 512))	0
deconv4 (Conv2DTranspose) (None, 24, 32, 512)	2359808
bn17 (BatchNormalization) (None, 24, 32, 512)	2048
activation_16 (Activation) (None, 24, 32, 512)	0
deconv5 (Conv2DTranspose) (None, 24, 32, 512)	2359808
bn18 (BatchNormalization) (None, 24, 32, 512)	2048
activation_17 (Activation) (None, 24, 32, 512)	0
deconv6 (Conv2DTranspose) (None, 24, 32, 256)	1179904
bn19 (BatchNormalization) (None, 24, 32, 256)	1024
activation_18 (Activation) (None, 24, 32, 256)	0
up_sampling2d_2 (UpSampling2 (None, 48, 64, 256))	0
deconv7 (Conv2DTranspose) (None, 48, 64, 256)	590080
bn20 (BatchNormalization) (None, 48, 64, 256)	1024
activation_19 (Activation) (None, 48, 64, 256)	0
deconv8 (Conv2DTranspose) (None, 48, 64, 256)	590080
bn21 (BatchNormalization) (None, 48, 64, 256)	1024
activation_20 (Activation) (None, 48, 64, 256)	0
deconv9 (Conv2DTranspose) (None, 48, 64, 128)	295040
bn22 (BatchNormalization) (None, 48, 64, 128)	512
activation_21 (Activation) (None, 48, 64, 128)	0

up_sampling2d_3 (UpSampling2 (None, 96, 128, 128))	0
deconv10 (Conv2DTranspose) (None, 96, 128, 128)	147584
bn23 (BatchNormalization) (None, 96, 128, 128)	512
activation_22 (Activation) (None, 96, 128, 128)	0
deconv11 (Conv2DTranspose) (None, 96, 128, 64)	73792
bn24 (BatchNormalization) (None, 96, 128, 64)	256
activation_23 (Activation) (None, 96, 128, 64)	0
up_sampling2d_4 (UpSampling2 (None, 192, 256, 64))	0
deconv12 (Conv2DTranspose) (None, 192, 256, 64)	36928
bn25 (BatchNormalization) (None, 192, 256, 64)	256
activation_24 (Activation) (None, 192, 256, 64)	0
deconv13 (Conv2DTranspose) (None, 192, 256, 1)	577
bn26 (BatchNormalization) (None, 192, 256, 1)	4
activation_25 (Activation) (None, 192, 256, 1)	0
reshape (Reshape) (None, 192, 256)	0
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Training Analysis



Results after First Epoch

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reshape_2 (Reshape)          (None, 192, 256)          0
=====
Total params: 33,393,669
Trainable params: 33,377,795
Non-trainable params: 15,874

Epoch 1/100
16/16 [=====] - 545s 34s/step - loss: 0.7581 - iou: 0.6617 -
dice_coef: 0.3774 - precision: 0.3225 - recall: 0.5471 - accuracy: 0.5578 - val_loss:
0.6715 - val_iou: 0.6689 - val_dice_coef: 0.3017 - val_precision: 0.0000e+00 -
val_recall: 0.0000e+00 - val_accuracy: 0.7782
Epoch 2/100
15/16 [=====>..] - ETA: 33s - loss: 0.5580 - iou: 0.7441 -
dice_coef: 0.4753 - precision: 0.5168 - recall: 0.8079 - accuracy: 0.7401
```

IPython console History

Results after each 10 Epoch

		IOU	DI	Precision	Recall	Accuracy
After 1 Epoch	Training	65.81	37.28	31.37	49.28	53.81
	Validation	66.96	30.12	0	0	77.82
After 10Epoch	Training	84.59	58.67	85.80	88.40	92.38
	Validation	74.13	25.25	0	0	77.82
After 20Epoch	Training	89.43	65.31	90.67	92.90	94.60
	Validation	87.56	54.34	93.69	73.92	93.19
After 30Epoch	Training	91.54	69.02	92.63	92.91	95.77
	Validation	91.08	63.22	92.21	87.04	95.48
After 40Epoch	Training	92.96	72.45	93.74	92.88	95.96
	Validation	92.62	66.86	92.60	88.39	95.90
After 50Epoch	Training	94.19	74.37	93.71	94.92	96.88
	Validation	93.50	69.57	91.62	90.61	96.08
After 60Epoch	Training	95.06	76.78	94.81	95.23	97.25
	Validation	94.10	71.62	91.02	91.98	96.25
After 70Epoch	Training	94.58	75.69	91.36	91.55	97.28
	Validation	94.50	73.48	90.49	93.23	96.37
After 80Epoch	Training	95.48	78.55	93.82	95.59	97.07
	Validation	94.80	74.49	92.51	90.98	96.39

After 90Epoch	Training	96.26	80.71	95.64	95.87	97.65
	Validation	95.08	75.82	91.39	92.86	96.48
After 100Epoch	Training	96.28	80.98	94.57	95.97	97.42
	Validation	95.22	76.41	91.79	92.18	96.47

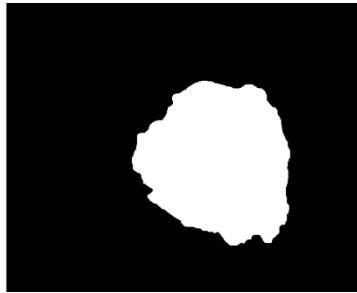
Testing Analysis

Qualitative Analysis

1. IMD390



(a) Input Image

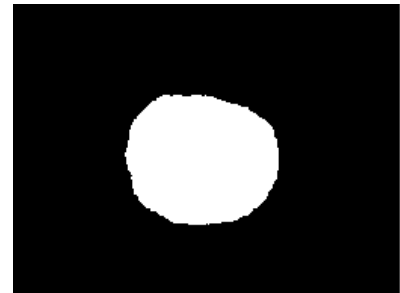
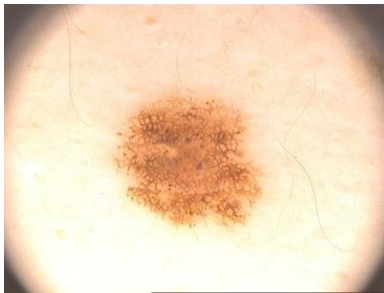


(b) GT image

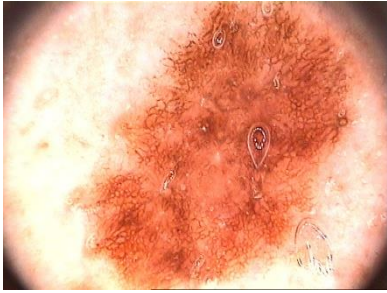


(c) Predicted output

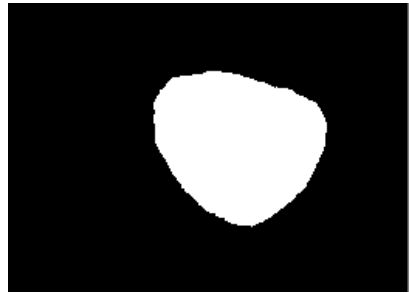
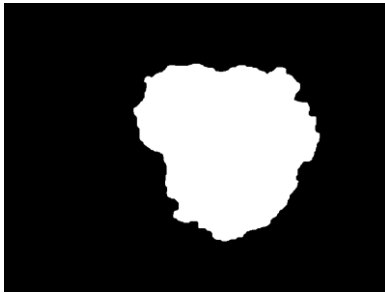
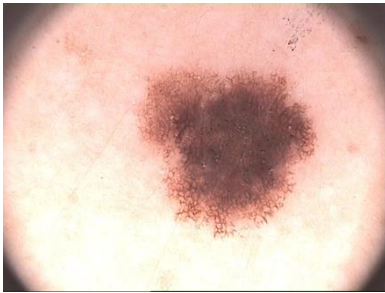
2. IMD392



3. IMD393



4. IMD394



5. IMD395



6. IMD396



7. IMD397



8. IMD398



9. IMD399



10. IMD400



11. IMD402



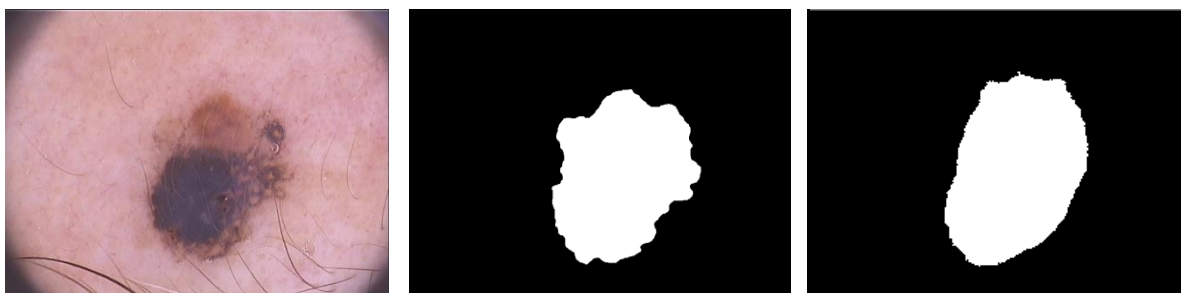
12. IMD403



13. IMD404



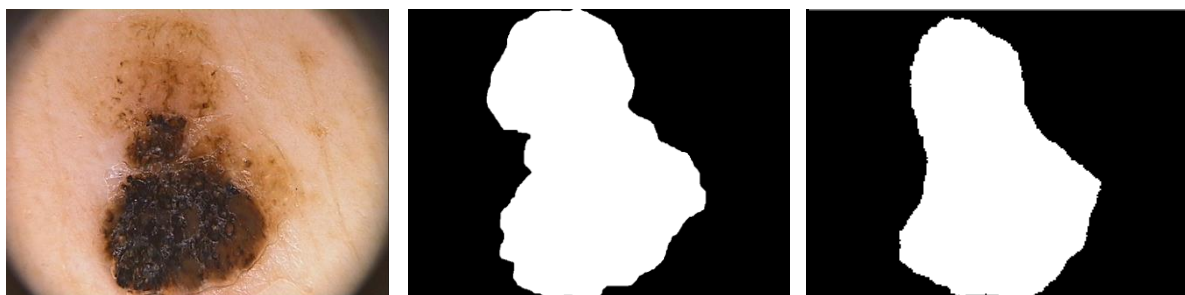
14. IMD405



15. IMD406



16. IMD407



17. IMD408



18. IMD409



19. IMD410



20. IMD411



21. IMD413



22. IMD417



23. IMD418



24. IMD419



25. IMD420



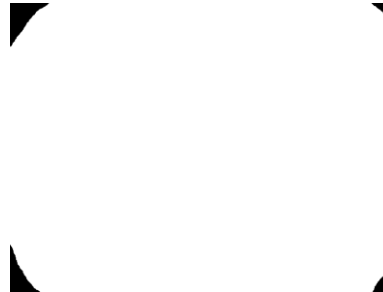
26. IMD421



27. IMD423



28. IMD424



29. IMD425



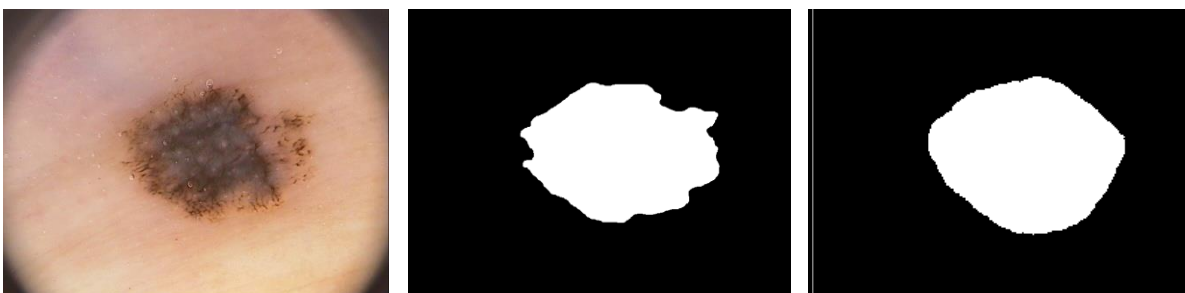
30. IMD426



31. IMD427



32. IMD429



33. IMD430



34. IMD431



35. IMD432



36. IMD433



37. IMD434



38. IMD435



39. IMD436

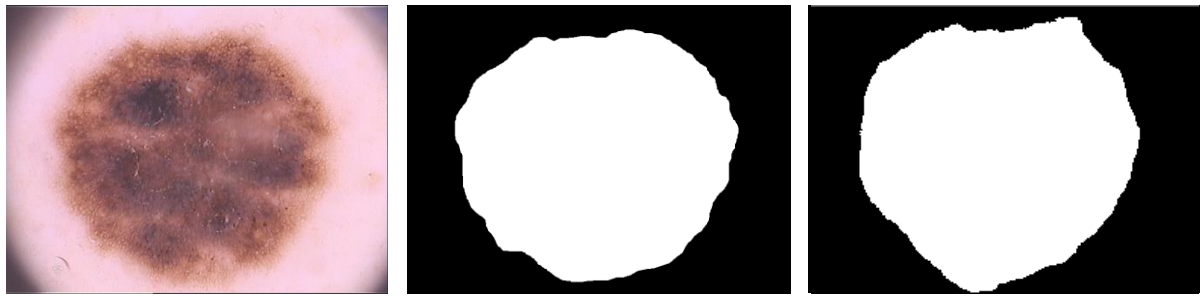


(a) Input Image

(b) GT image

(c) Predicted output

40. IMD437



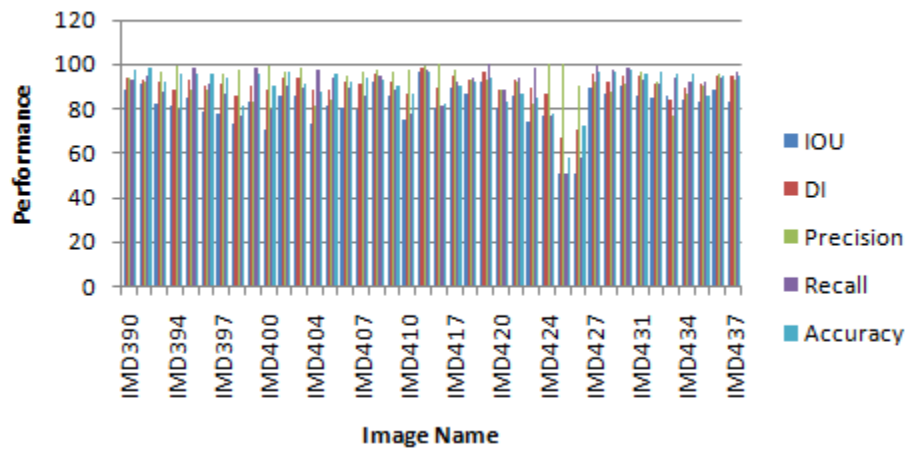
Quantitative Analysis

Image Name	IOU	DI	Precision	Recall	Accuracy
IMD390	88.64876627922058	93.69598	94.15635	93.30312	97.58911
IMD392	91.38093590736389	93.10577	91.75506	94.45334	97.9594
IMD393	82.50918388366699	91.7462	96.866295	87.07514	91.61377

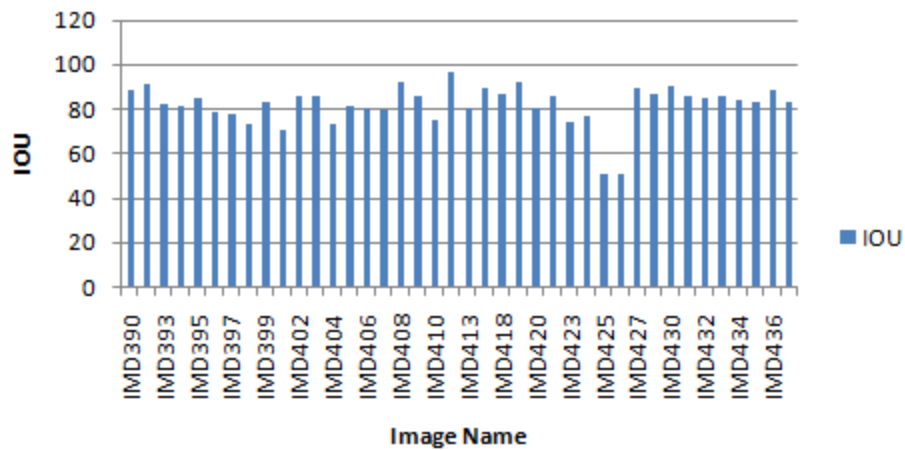
IMD394	81.47158622741699	88.30257	99.044624	79.41433	95.493576
IMD395	84.57967638969421	93.04717	88.335625	98.16817	95.21077
IMD396	78.66345047950745	89.826416	88.36653	91.28511	95.788574
IMD397	77.43825912475586	90.69895	95.42235	86.36947	93.794754
IMD398	73.45824241638184	85.79105	97.364	76.64271	80.8492
IMD399	83.2597553730011	90.054214	83.151825	98.08917	95.89436
IMD400	70.54912447929382	88.26089	99.56925	79.21228	90.340164
IMD402	86.06975078582764	93.46888	96.637085	90.449295	96.88924
IMD403	86.05318069458008	93.55156	98.5809	88.99332	91.06242
IMD404	72.87251353263855	88.18394	80.7587	97.055725	87.91301
IMD405	81.53980374336243	88.6892	83.671	94.198586	96.030685
IMD406	79.92820739746094	91.754654	94.64985	88.93595	92.29329
IMD407	79.82683777809143	90.984856	96.39	86.02913	93.47737,
IMD408	92.10969805717468	95.88687	97.31471	94.49093	92.87517
IMD409	85.8480453491211	92.11975	96.44004	88.146385	90.15706
IMD410	74.60851669311523	86.75947	97.73578	77.95522	86.99544
IMD411	96.49600982666016	98.306114	99.36812	97.26248	96.728516
IMD413	80.70566058158875	89.55011	100.0	81.05725	82.08008
IMD417	89.19248580932617	94.424614	97.35936	91.64992	89.801025
IMD418	86.70944571495056	93.00064	92.53906	93.44162	92.004395
IMD419	91.72585606575012	96.34332	93.13841	99.767075	93.90666
IMD420	79.89689707756042	88.328705	88.13361	88.49207	82.893875
IMD421	85.46357154846191	92.82641	91.87337	93.7829	87.044266
IMD423	74.40158724784851	89.65701	82.141754	98.65062	85.048416
IMD424	76.54312252998352	86.94463	100.0	76.88058	77.27051
IMD425	50.2752959728241	67.03011	100.0	50.350475	57.92033
IMD426	50.759291648864746	70.31997	89.89949	57.657433	71.956375
IMD427	89.46740627288818	95.44872	92.12103	98.99659	96.88924
IMD429	86.8115246295929	91.91255	87.09026	97.26289	96.84041
IMD430	90.14069437980652	94.41771	91.015396	98.22274	97.615555
IMD431	85.47788262367249	94.77829	96.529335	93.05108	95.336914
IMD432	84.37514305114746	91.389694	91.71924	91.001564	96.32771
IMD433	86.15303635597229	84.31622	76.52418	93.6214	95.79468
IMD434	84.33831334114075	89.37466	86.809006	91.983475	95.66853
IMD435	82.93375968933105	91.102295	89.96306	92.247215	85.94563
IMD436	88.54090571403503	94.91207	95.70194	94.08304	94.30745
IMD437	83.05168747901917	94.54582	92.95589	96.16815	94.527176

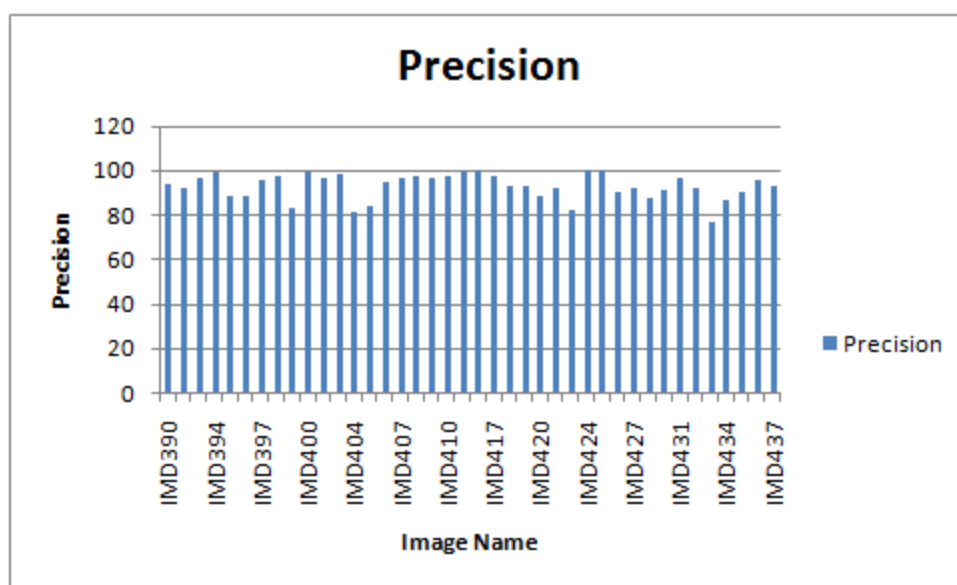
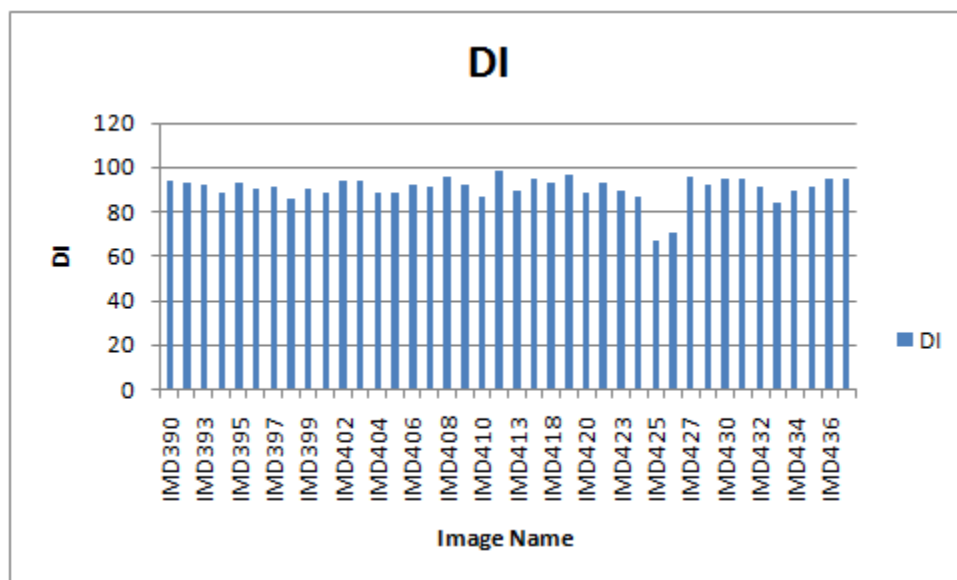
Graphical Analysis

Quantitative Analysis

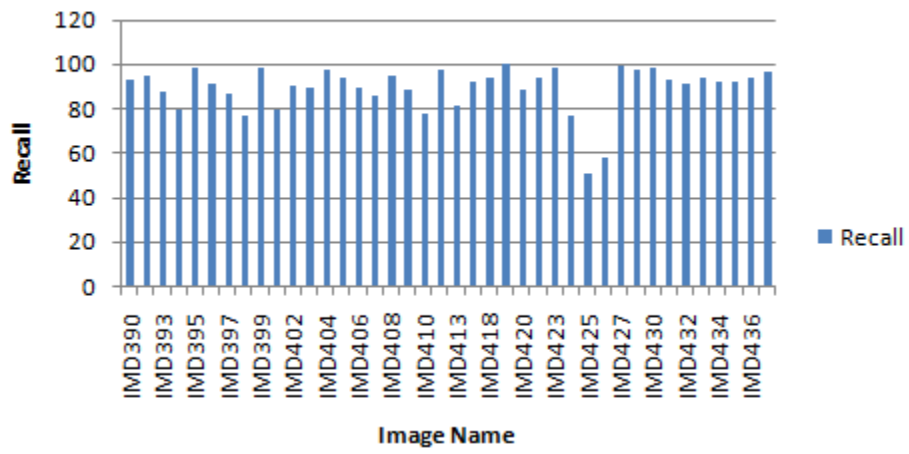


IOU





Recall



Accuracy

