Digital Image Processing

Final Project

Analysis of Histopathological Images

CE-42 B

Members

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Code:

Preprocessing

```
processed_train_image= np.zeros_like(train_img)
processed_test_image = np.zeros_like(test_img)
gamma_table = [int((i/255.0) ** 5 * 255) for i in range(256)]

for i in range(len(train_img)):
  processed_train_image[i] = (np.power(train_img[i] / 255.0, 8) * 255).astype(np.uint8)
for i in range(len(test_img)):
  processed_test_image[i] = (np.power(test_img[i] / 255.0, 8) * 255).astype(np.uint8)
```

Model

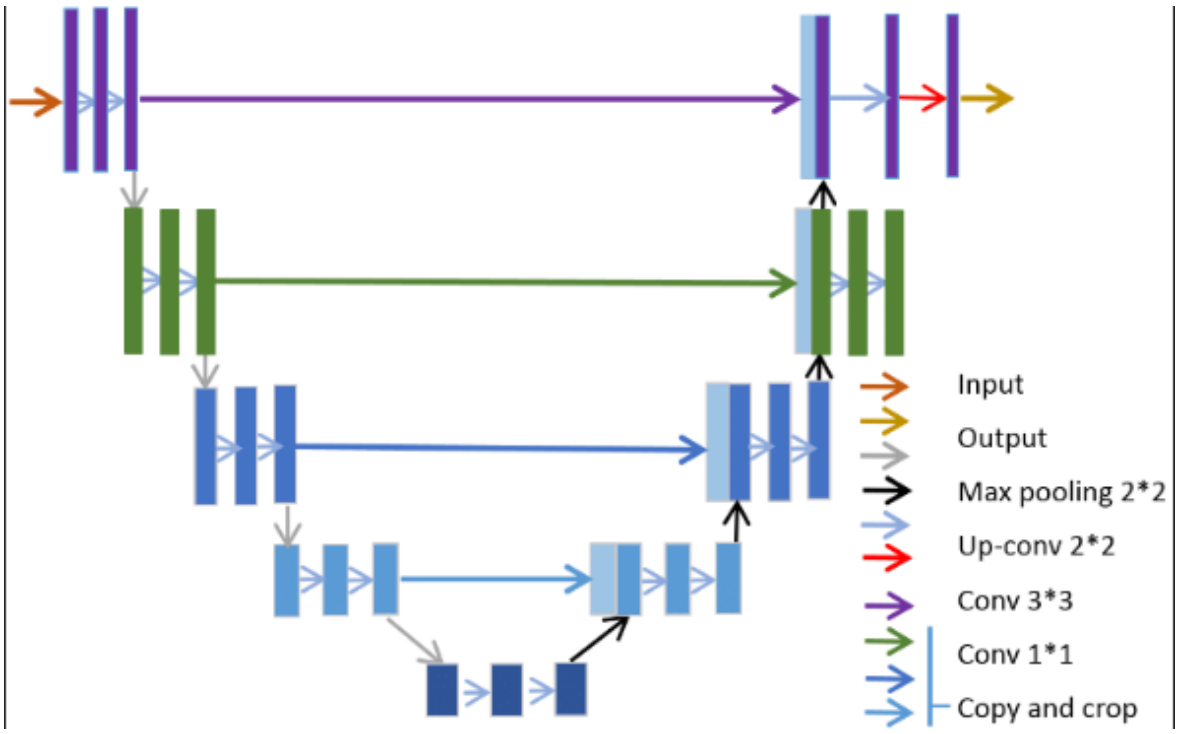
```
modelUnet = keras.models.load_model("modelU_v1_77.h5")
modelClassify = keras.models.load_model("modelC_v1_60.h5")
```

Models

1. Semantic segmentation of an image between 12 classes (modelU_v1_77 : 77% acc, 77% F1, 32% Iou)

2. Classification of input image between 3 classes (modelC_v1_60 : 60% acc, 59% F1)

For the semantic segmentation, we have used a Unet model with 1,925,964 parameters whereas the classification model has 502,083 parameters.

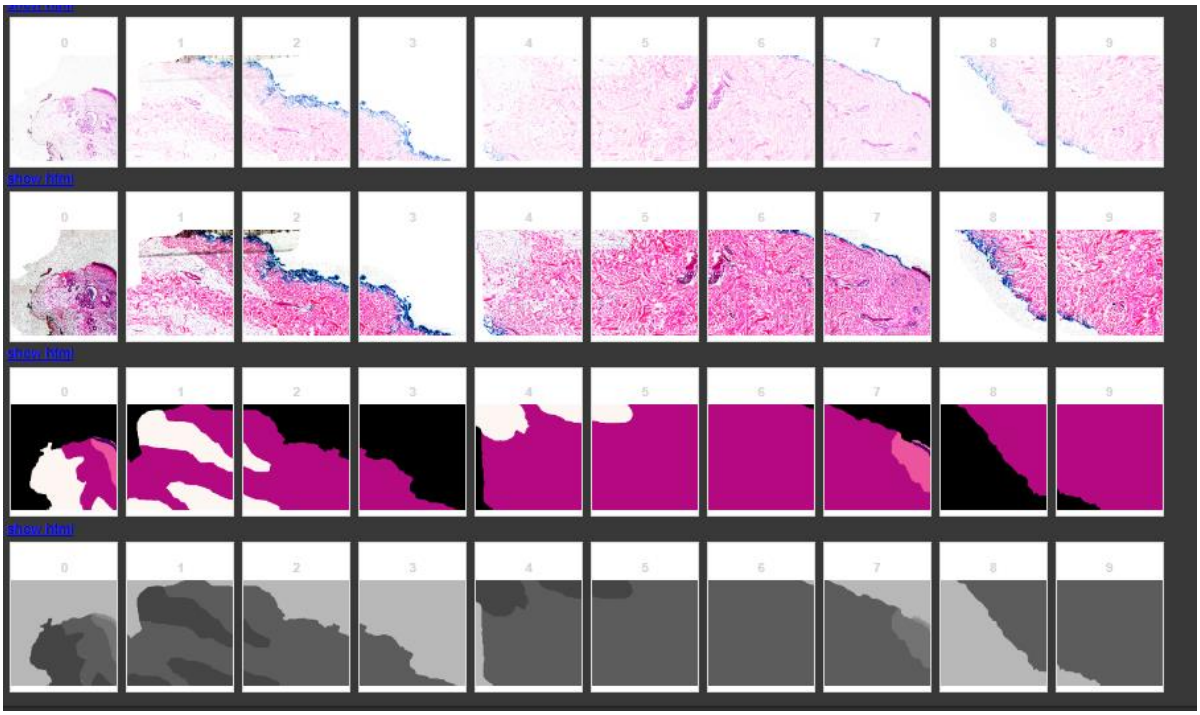


Pre-Processing

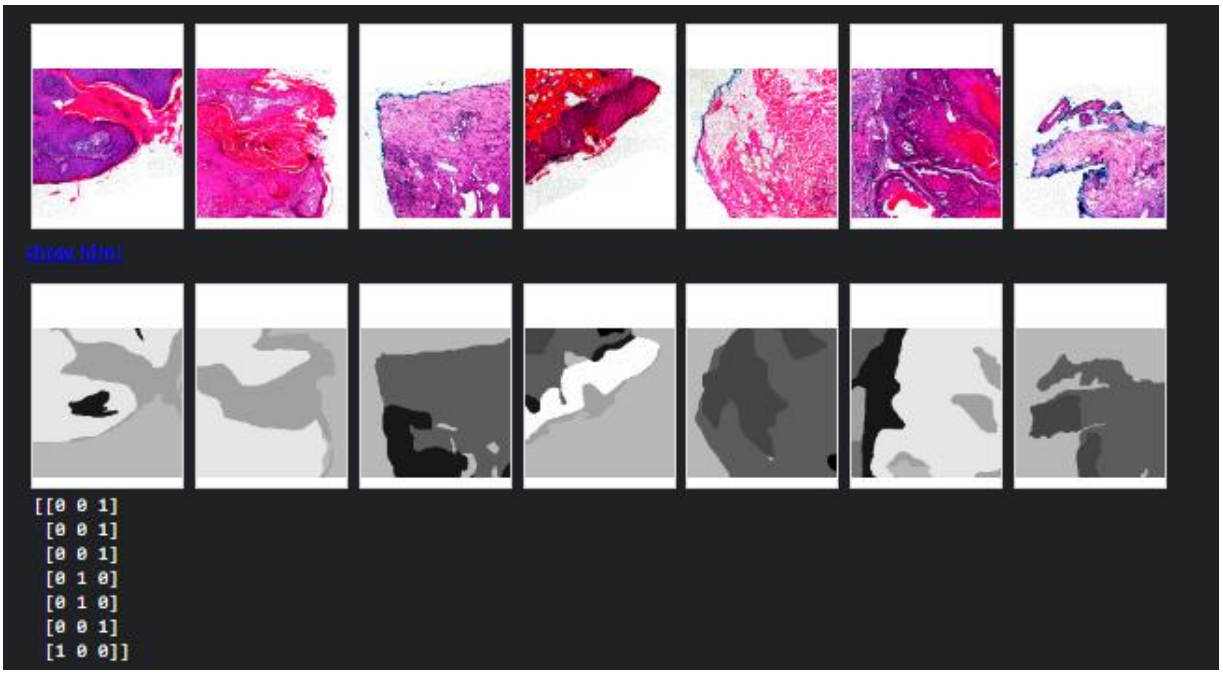
The queensland data used in the following code is processed by following steps

1. Images: Gamma Correction (6)

2. Masks: Pixels that did not classify as one of the 12 classes were converted to background pixels and the resulting image is encoded as 255x255x1 images.

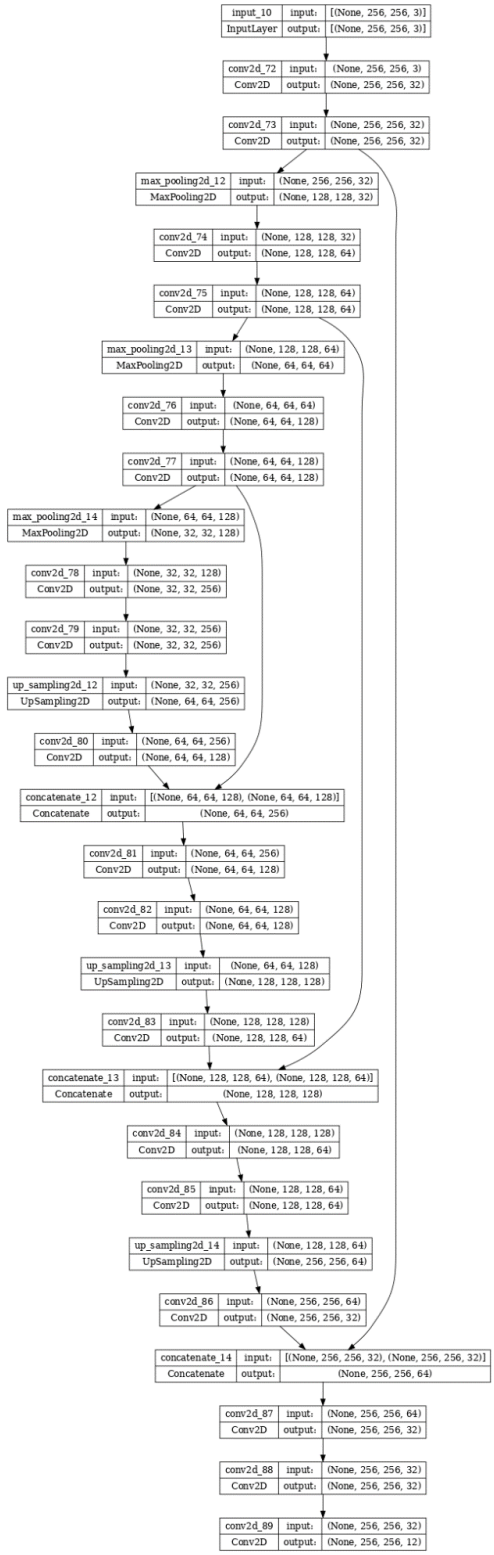


Input to model (shuffled)

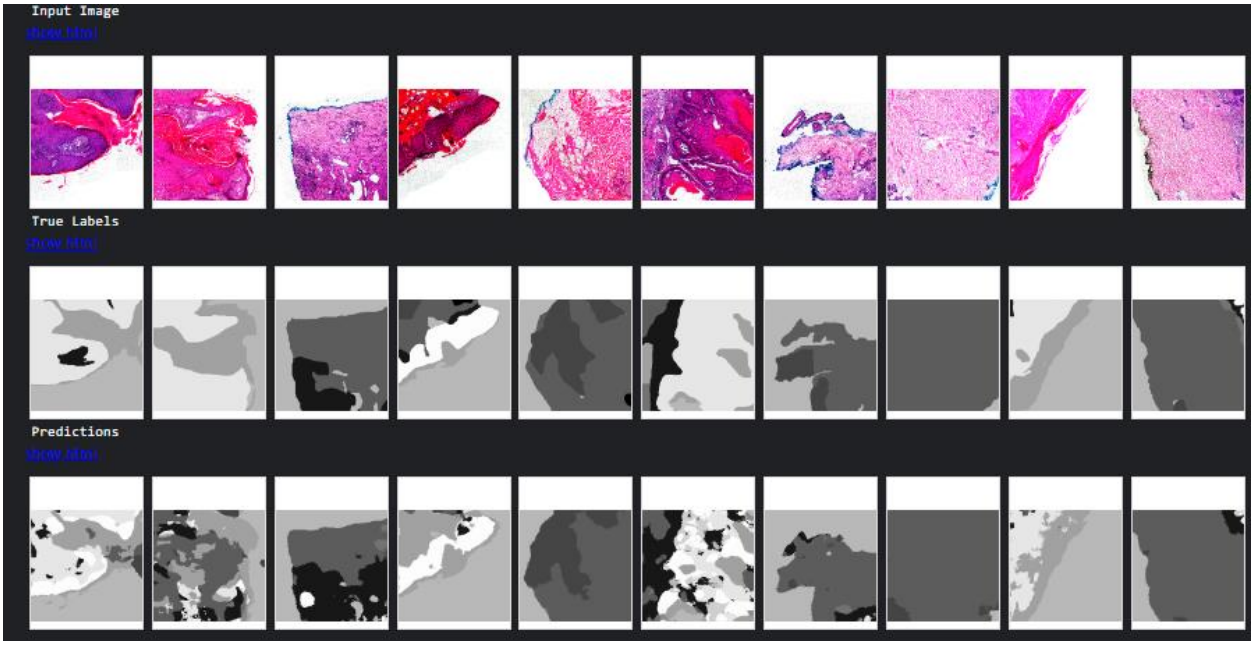


Segmentation Models:

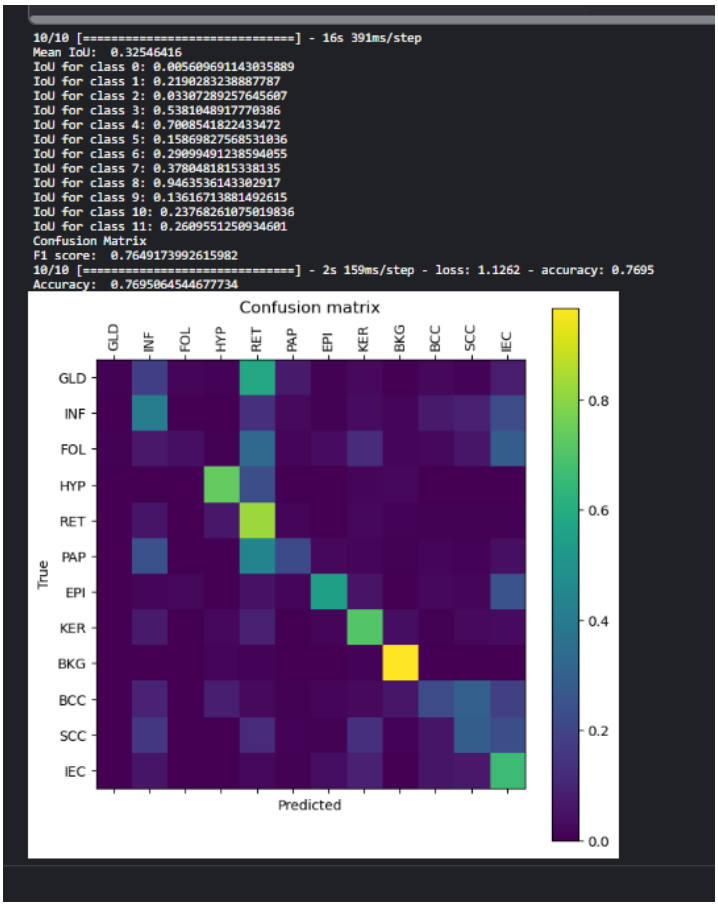
1. modelU_v1_77: Trained over 50-50 epochs



Outputs:

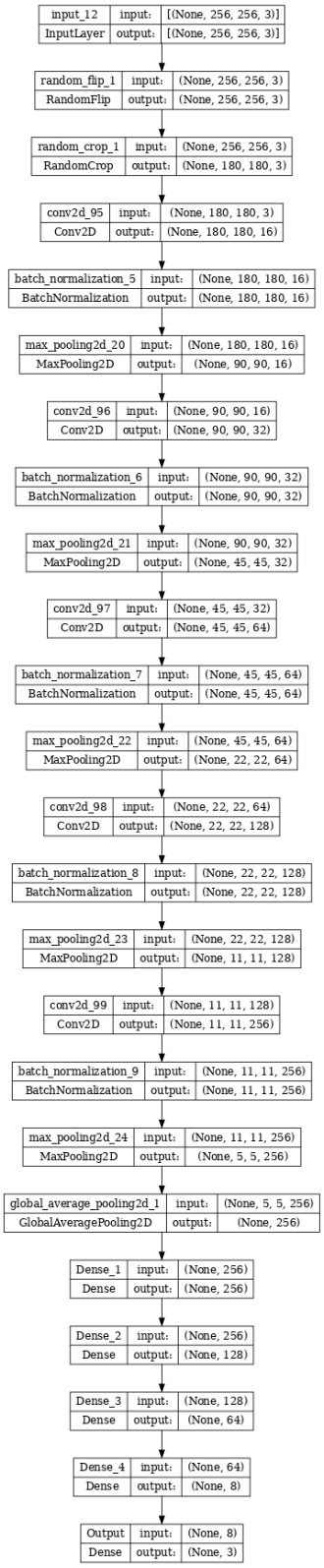


Evaluation:



Classification Models:

1. modelC_v1_60: Trained over 50,50,50,30,30,40,20,20 epochs



Outputs:

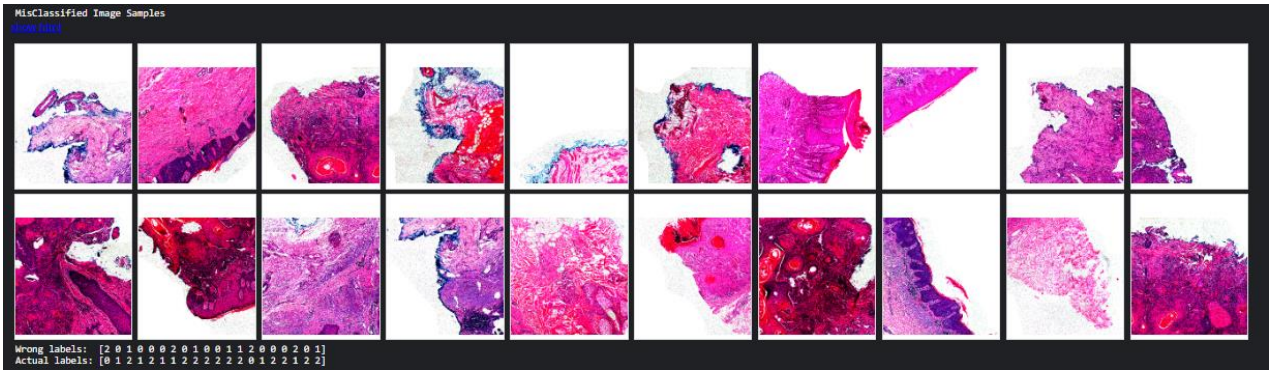
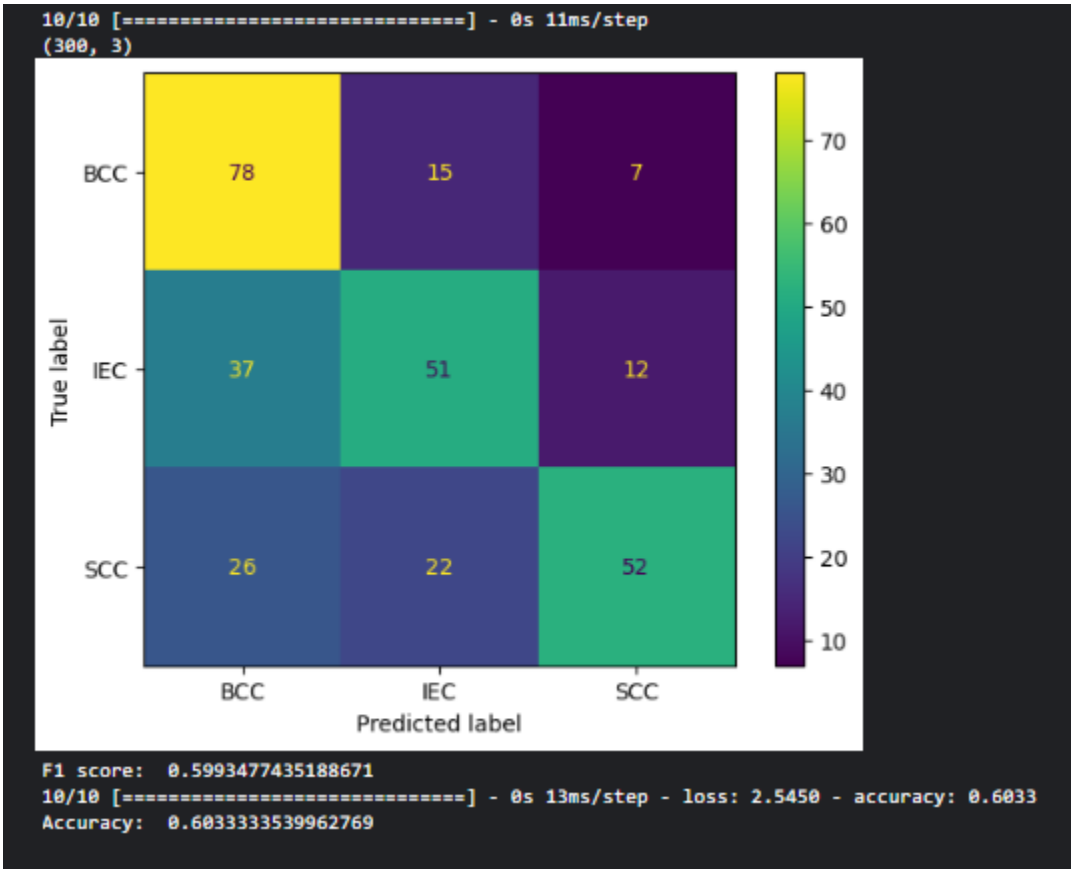


Figure 1 Falsely Classified

Evaluation:



References:

1. Preprocessing code

https://colab.research.google.com/drive/1svDtOr0nt82beMu3U1fGOCcjP2TnJ3gK?usp=sharing

2. Machine Learning code

https://www.kaggle.com/code/zakriyaparacha/final-project

3. Multiclass Semantic Segmentation:

https://www.youtube.com/watch?v=XyX5HNuv-xE