WIDS - AI For Healthcare

WEEK 03:

TASK 01:

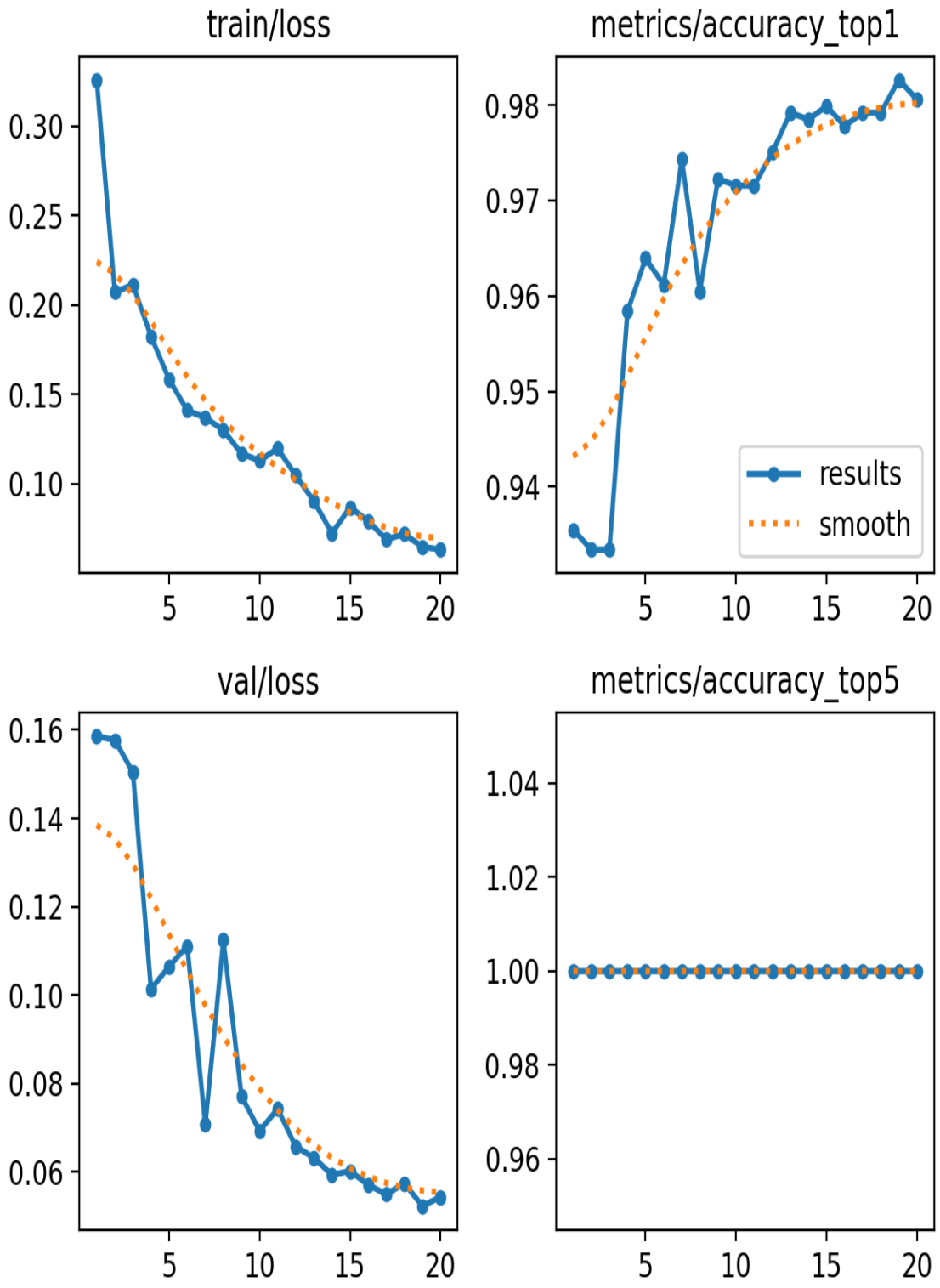
Dataset: https://universe.roboflow.com/cxrdataset/skin-ga5ww

- ***Type of images***: Skin Images
- ***Number of samples***: 7206 Images
- ***Classes***: This dataset has 4 classes.
    I. **Basal Cell Carcinoma**: a type of skin cancer.
    II. **Melanoma**: a serious form of skin cancer.
    III. **Nevus**: usually a benign mole.
    IV. Unlabeled
- ***Dataset Splits***: The dataset is divided into training, validation, and test sets.
    I. Training set: 5044 images
    II. Validation set: 1442 images
    III. Test set: 720 images
- ***Imbalance*** :
    I. Some classes have more images than others.
    II. Skin tone variation.
    III. Lighting differences.

TASK 02:

- ***Model Used:***
    - *Model:* YOLOv8 Classification Model
    - *Framework:* Ultralytics
    - *Training Platform:* Google Colab
    - *Hardware Used:* GPU (when enabled)

    YOLOv8 was chosen because it provides fast training and good performance for image classification tasks.
- ***Training Results:***
    - **Number of Epochs:** 20
    - **Image Size:** 224 × 224
    - **Training / Validation Accuracy:** 98.3%
    - **Training Loss:** 0.0639


train/loss
0.30
0.25
0.20
0.15
0.10
5
10
15
20
metrics/accuracy_top1
0.98
0.97
0.96
0.95
0.94
results
smooth
5
10
15
20
val/loss
0.16
0.14
0.12
0.10
0.08
0.06
5
10
15
20
metrics/accuracy_top5
1.04
1.02
1.00
0.98
0.96
5
10
15
20

- ***Confusion Matrix*** : The confusion matrix shows that the model correctly classifies most images.
  Minor confusion exists due to visual similarity between skin conditions.
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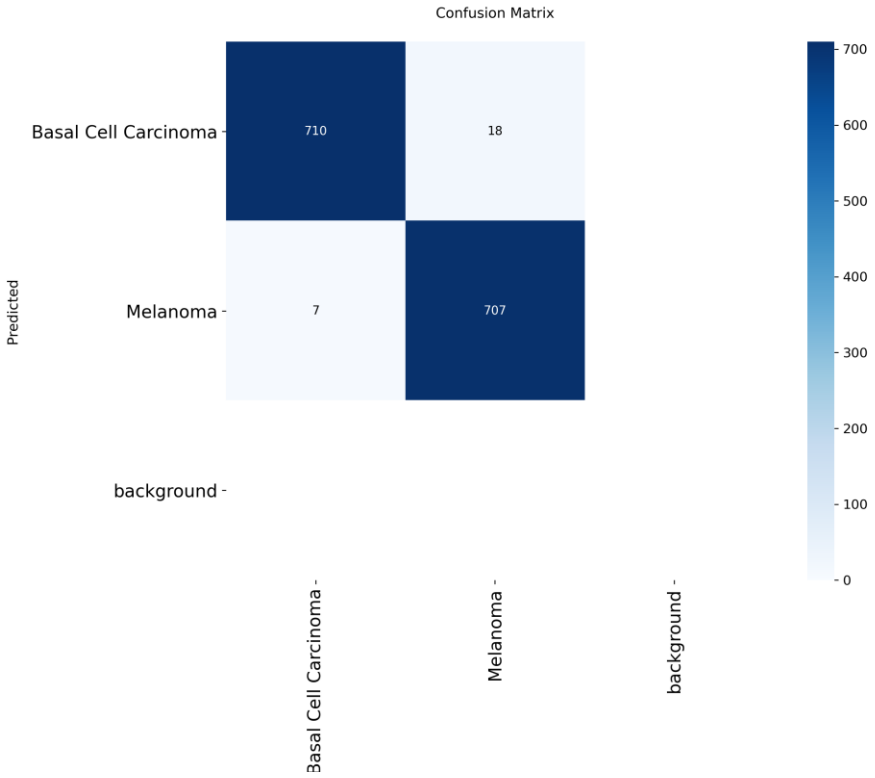

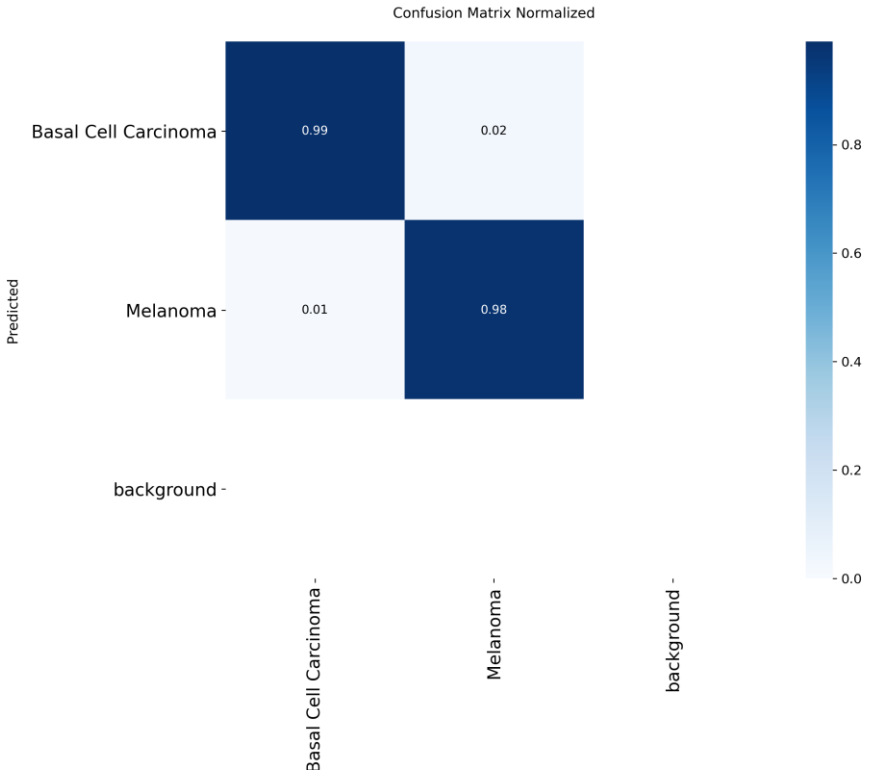

- ***Sample Predictions :*** Sample predictions show correct classification of Basal Cell Carcinoma and Melanoma images.
- ***Brief Observations :***
    - The model achieves high accuracy on available classes.
    - Limited class availability affected multi-class training.
    - YOLOv8 provides fast and efficient classification.
    - Dataset quality strongly impacts performance.
    - GPU acceleration significantly reduces training time.