بنام معمار هستی

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نیمسال اول سال تحصیلی 1404-1403

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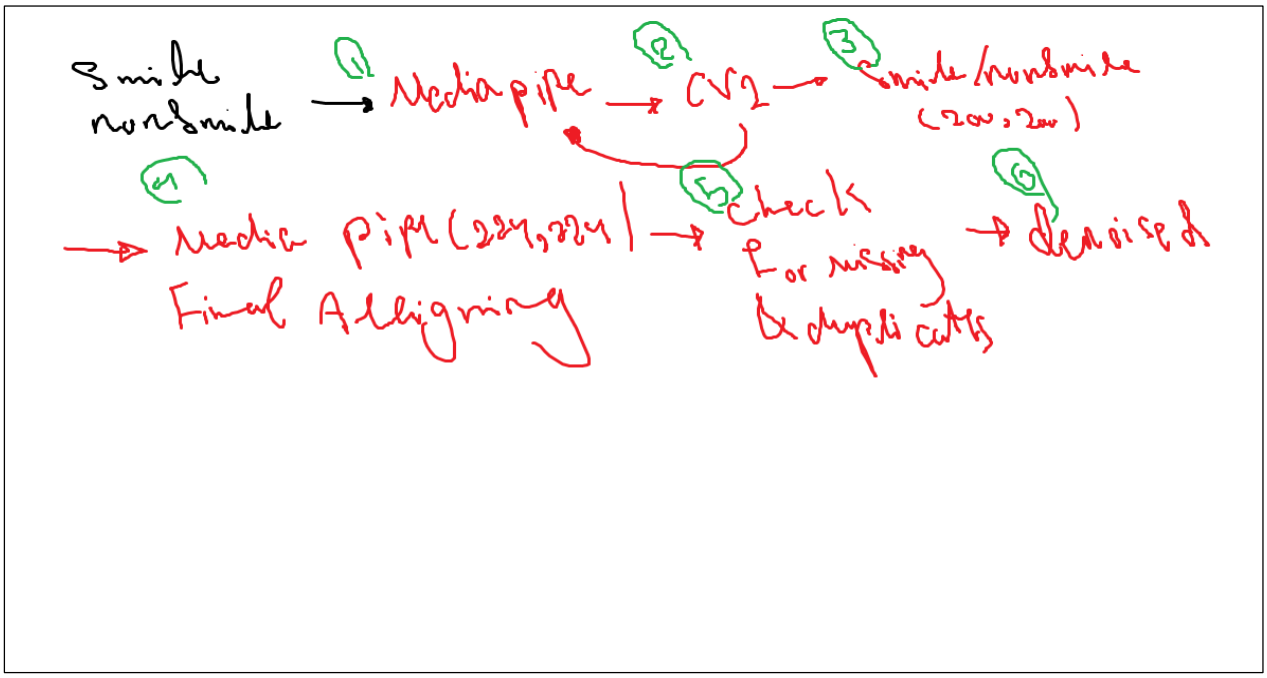
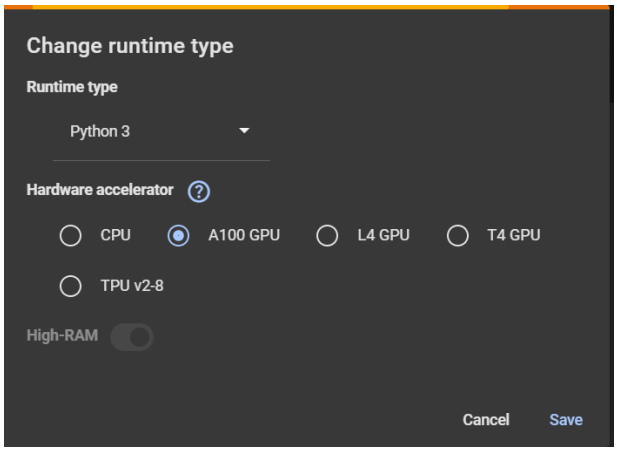
Face Detection

According to [3], we use mediapipe library which is kind of One Millisecond Face Alignment with an Ensemble of Regression Trees Approaches. Also I followed the following road to detect and denoise pictures.



Hardware

We used A100 GPU Google Colab to run the model.

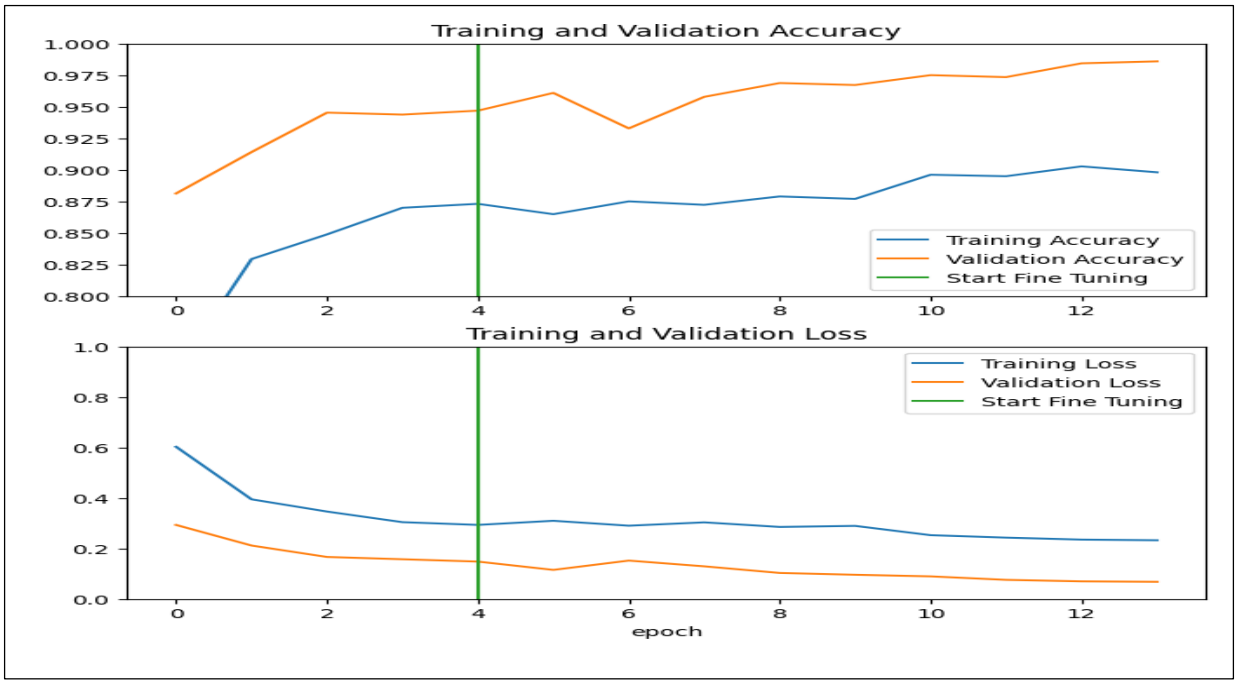


Pre-trained Model

According to [1][4], I used VGG-Face pre-trained model which has been trained with celebrities' images and its model weights is close to our modeling task. It has dataset which has 2,622 identities with over 2.6 million images.

Accuracy and Lost Plotting

The most accuracy is 98.59 which has 0.06 loss accordingly.



Model Evaluation with Test Dataset

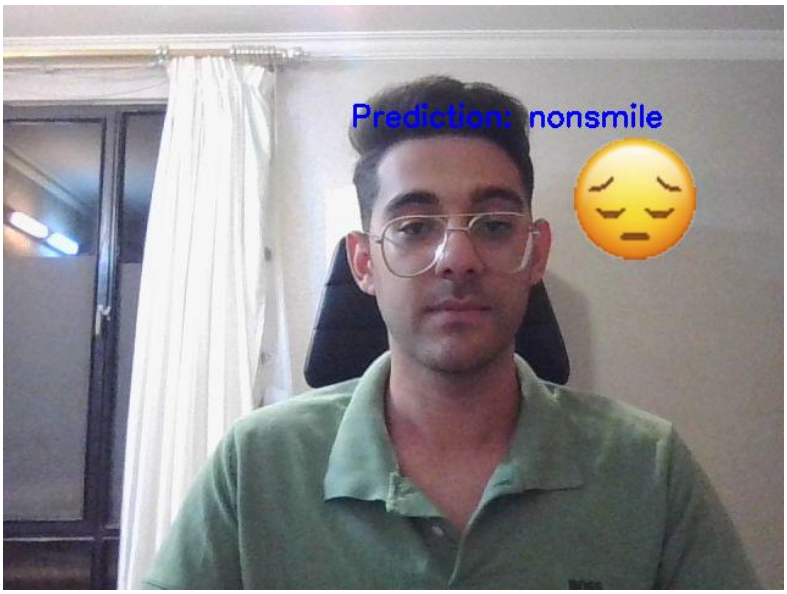
The result is as shown below:

```
25/25 [==============================] - 25s 631ms/step - loss: 0.3387 - accuracy: 0.8687
Test accuracy : 86.87499761581421
```

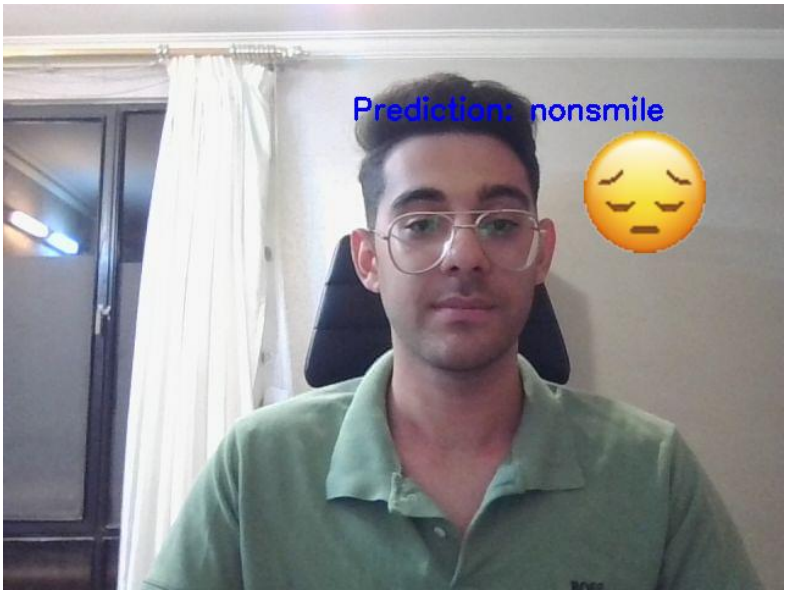
It's notable that depends on our seed, epochs number and number of Dense layer, this result could fluctuate between 84.25 to 88.79. As shown in video my prior running was almost 87.12. Due to compute units running exhaustion, I could not tune it better (To be honest; it was my first time using Colab and would have thought that I wouldn't have any limitation if I buy Colab pro)

Result

During using webcam in recording because of scrolling mouse up and down, I got distracted, therefore, the face detection did not detect face and may apply nonsmile due to failing face rectangle border. But as shown in recorded video, it works perfectly fine.




Prediction: smile


Prediction: nonsmile


Prediction: smile

Attached Files

- Face detection and denosing:
  - "Face_detction_preprocess_Rudmehr_Aghakhani_4003663002.ipynb"
- CNN Model:
  - "CNN_Model_Rudmehr_Aghakhani_4003663002.ipynb"
- References
- Video:
  - "Rudmehr_Aghakhani_4003663002.mp4"

References

[1] **Smile Detection in the Wild Based on Transfer Learning Xin Guo, Luisa F. Polan´ıa Kenneth E. Barner**

[2] **hands on machine learning**

[3] **V. Kazemi and J. Sullivan, "One millisecond face alignment with an ensemble of regression trees," in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2014.**

[4] **O. M. Parkhi, A. Vedaldi, and A. Zisserman, "Deep face recognition," in *Proceedings of the British Machine Vision Conference (BMVC)*, 2015.**

FINISH