Weekly Report (4/14/22~4/20/22)

Accomplishments

- Attempted the SVM with pure SIFT, the accuracy is 16.06%.
- Trimming the amount of layers unfrozen in CNN yields worsening performance by roughly 2~3% resulting in accuracy around 58%
- Utilizing augmented data yielded improvement for models such as ResNet50 and DenseNet169 from 55 to 58% and 50 to 56% respectively. VGG16 however had nearly no improvement (stagnant around 60%), possibly due to what is mentioned in upcoming goal bullet 1.

Upcoming Goal

- Look at the class weights for the SVM model.
- One very recent observation that papers [1], [2] notated is the resizing of the image from 48x48 pixels to 197x197 pixels or even larger when doing transfer learning with their CNN which has not been taken into account, resulting in the goal of further testing with resizing the image to be larger. The reasoning outlined is that the transfer learning models utilized such as VGG16 and Resnet50 expect inputs of at least 197x197. Might not be able to detect features efficiently with such a small data shape.
- Begin balancing methods such as condensed nearest neighbor (undersampling) and SMOTE

Issue & Barriers

- Overfitting is still an issue to be tackled, however when comparing to other existent papers training FER-2013, it seems to be that overfitting is an issue with not many solutions addressed by paper authors.

Reference

[1] Khanzada, A., Bai, C. and Celepcikay, F.T., 2020. Facial expression recognition with deep learning. *arXiv preprint arXiv:2004.11823 Link:* https://arxiv.org/abs/2004.11823

[2] Khaireddin, Y. and Chen, Z., 2021. Facial emotion recognition: State of the art performance on FER2013. *arXiv preprint arXiv:2105.03588.* Link: https://arxiv.org/abs/2105.03588