



Emotion Detector

Facial Emotion Detection using CNN
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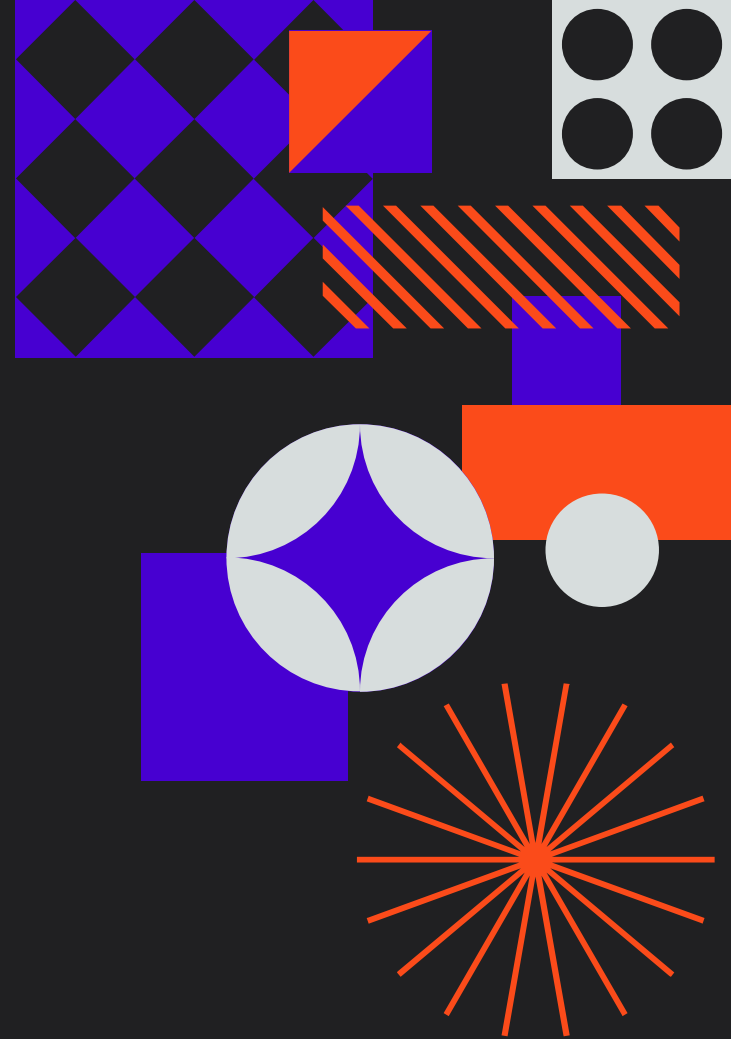
01

Background and Objective



What percentage of communication is non-verbal (not including voice tone or words)?

✱ 55%



Non-Verbal Communication

- More than half of what you communicate is non-verbal
- On a zoom call that is perdomitaly your facial expressions
- Problem is, you can't see your face (without something)
- Even more difficult for neurodivergent and those with trauma



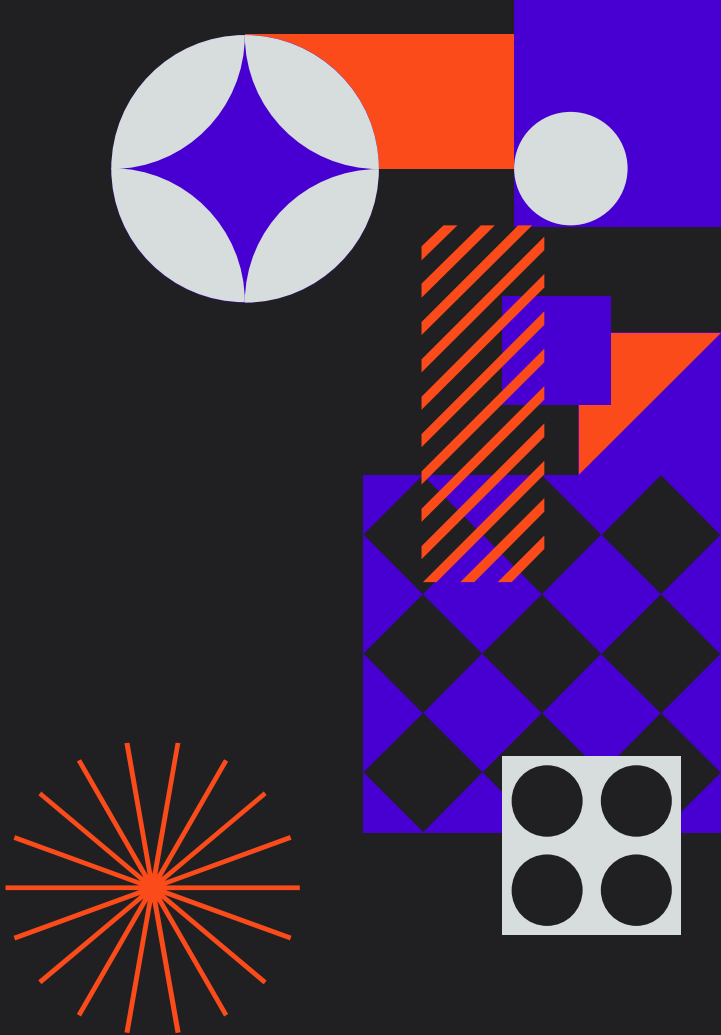
Purpose

- Create a AI model that can help clarify what you are communicating with your face
- Particularly useful for those that are neural divergent or have a history of trauma



02

Project Overview

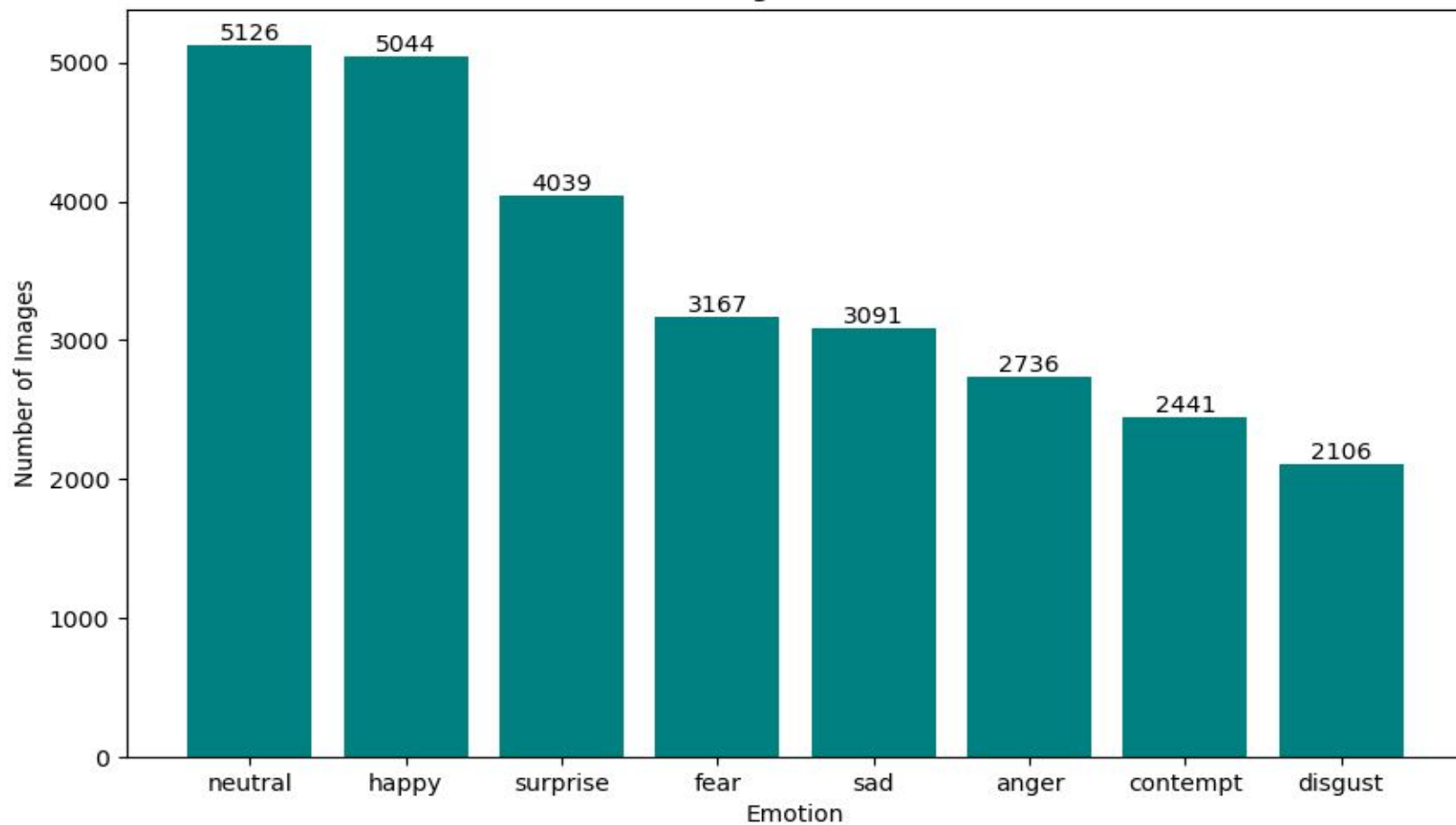


Data

- Images were acquired from Kaggle and were a portion of the AffectNet Dataset
- This dataset did not include valence and arousal
- This dataset consisted of 29,000 images

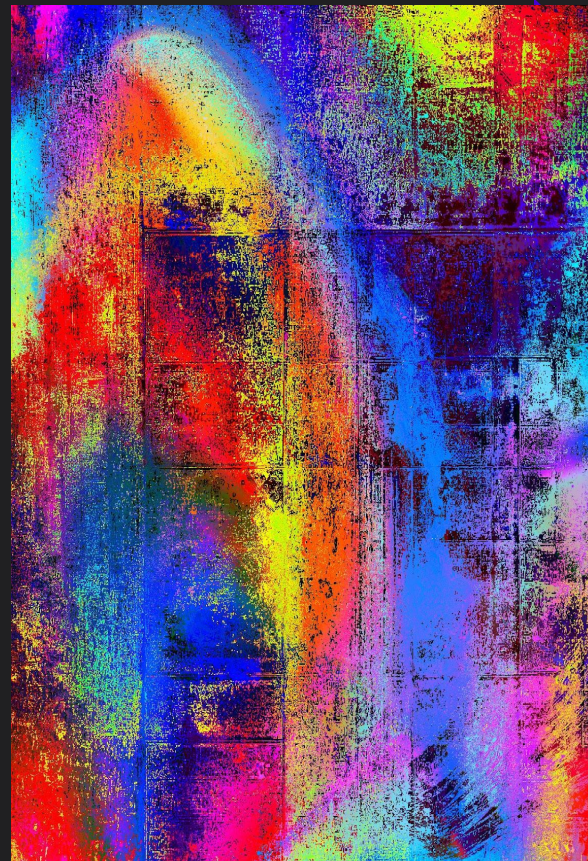


Number of Images for each emotion



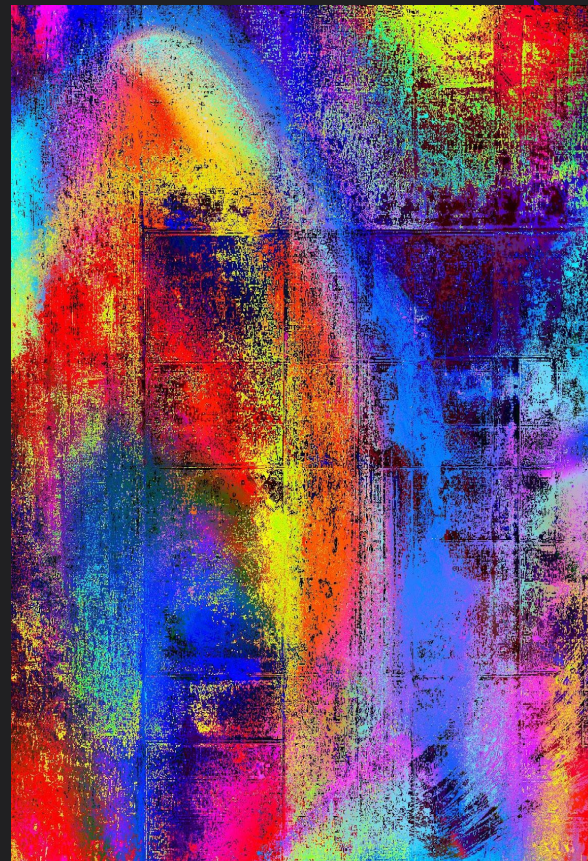
Modeling

- DenseNet, MobileNet, and Resnet were used
- Data augmentation of:
 - rotation of up to 45 degrees
 - width shift of up to 20%
 - height shift of up to 20%
 - shear range of up to 20%
 - zoom range of up to 20%
 - brightness was lowered or raised by 20%
- A total of 6 models were used with various combinations of augmentation and image categories being used.



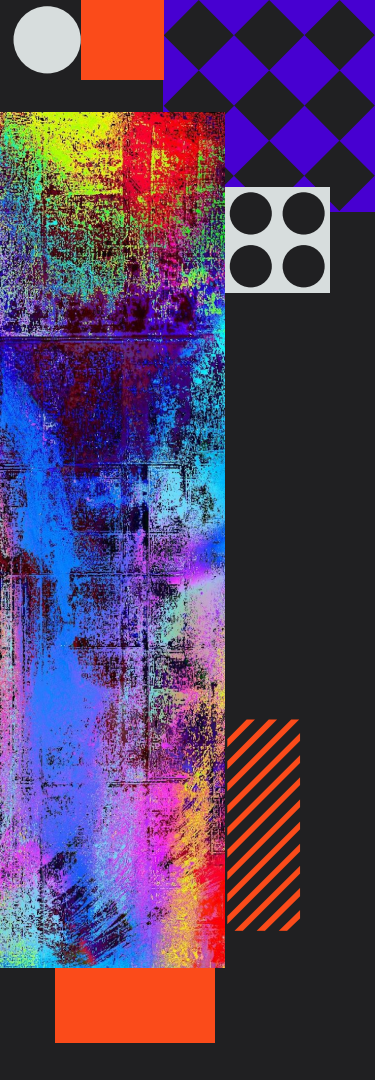
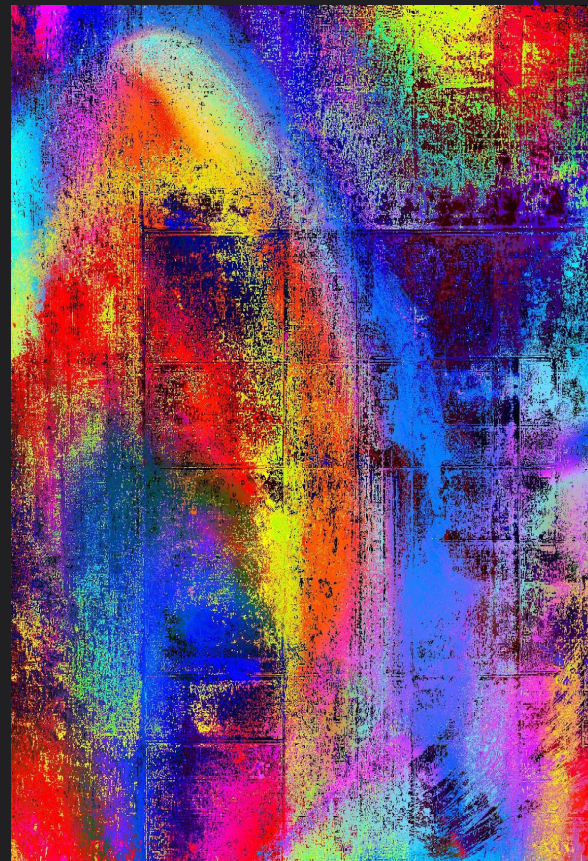
Modeling

- Model 0
 - Self made with 4 levels and 16 nodes each. After a day this model was stopped.
- Model 1
 - DenseNet
 - Full augmentation
 - Full Emotion Range
 - Base 12% T.A. 24%
- Model 2
 - MobileNet
 - Full augmentation
 - Full Emotion Range
 - Base 12% T.A. 23%



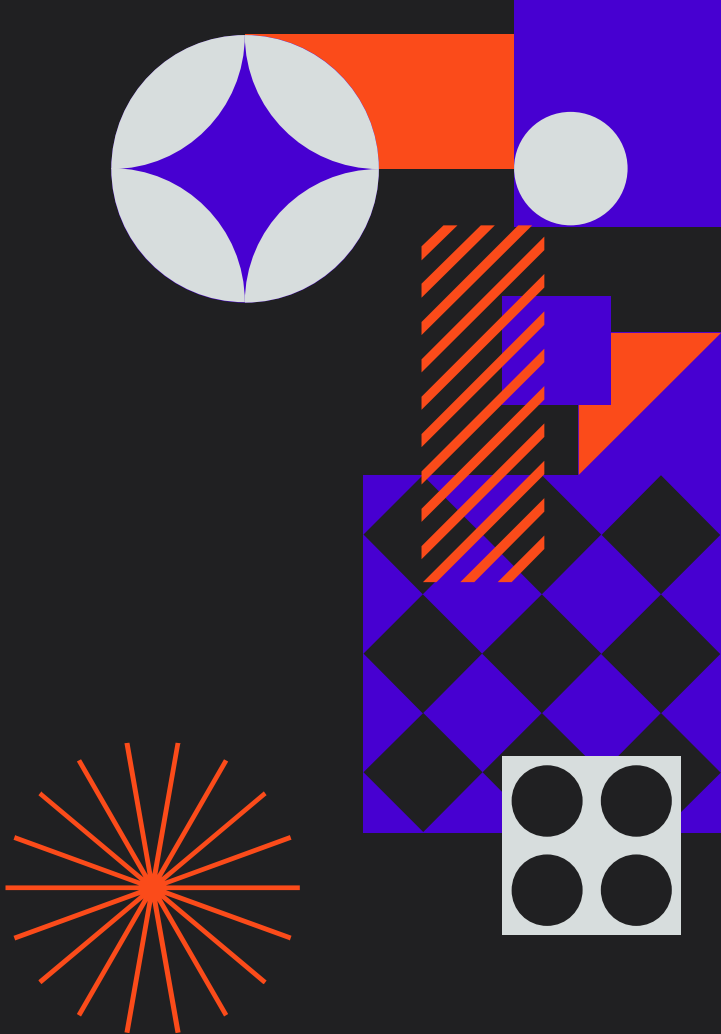
Modeling

- Model 3
 - ResNet
 - No Neural Images
 - Full Augmentation
 - Base 14% 24%
- Model 4 -6
 - ResNet
 - Sad, Angry, Fear, and Happy
 - Only Rotation
 - Base 25% TA. 24%, 33%, and 22%
- Ensemble of Model 4-6
 - No increase in the score



03

Model Performance



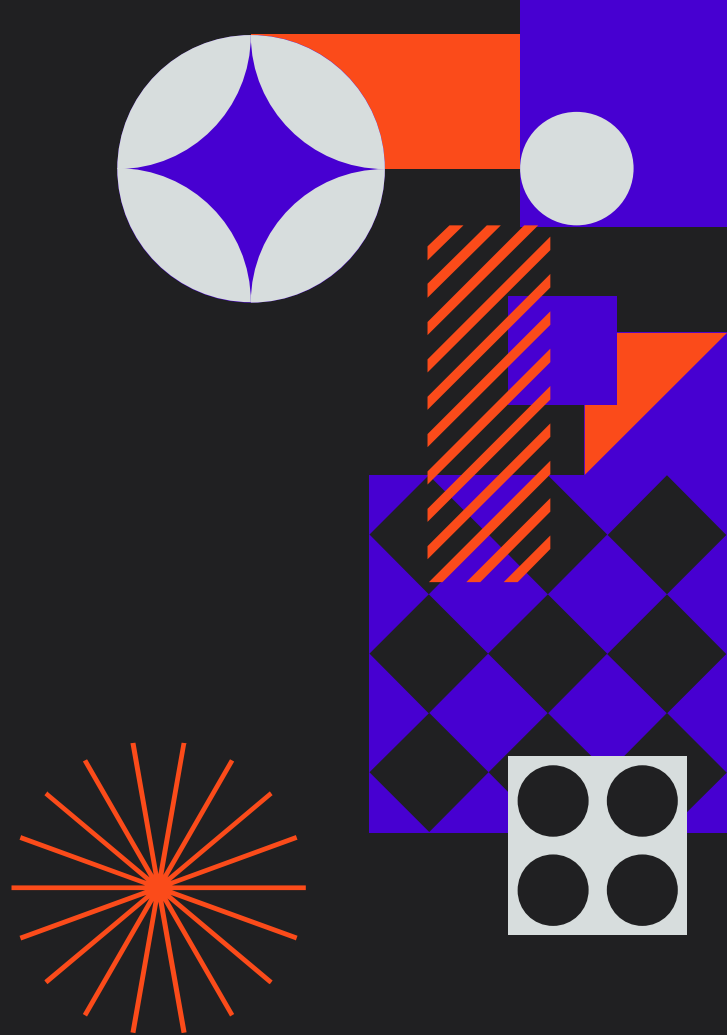
Performance

- Best performing was the mobile net at 23% accuracy compared to a baseline of 12% .
- but it is an angry model
- The DenseNet scored 1% better, but was extremely skewed toward contempt.



04

Examples



anger: 18.19%
surprise: 16.28%
disgust: 13.65%
fear: 13.37%
contempt: 13.30%
sad: 12.94%
happy: 12.27%



surprise: 15.56%
anger: 15.48%
disgust: 14.35%
fear: 14.31%
contempt: 13.99%
sad: 13.94%
happy: 12.37%



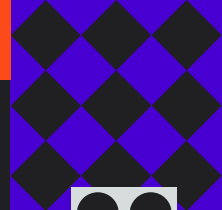
anger: 18.23%
surprise: 16.24%
disgust: 13.58%
fear: 13.39%
contempt: 13.35%
sad: 12.93%
happy: 12.27%



anger: 17.85%
surprise: 16.50%
disgust: 14.00%
fear: 13.31%
contempt: 13.12%
sad: 12.94%
happy: 12.28%



anger: 36.85%?surprise: 30.08%?disgust: 14.16%?fear: 7.79%?con



05

Conclusion



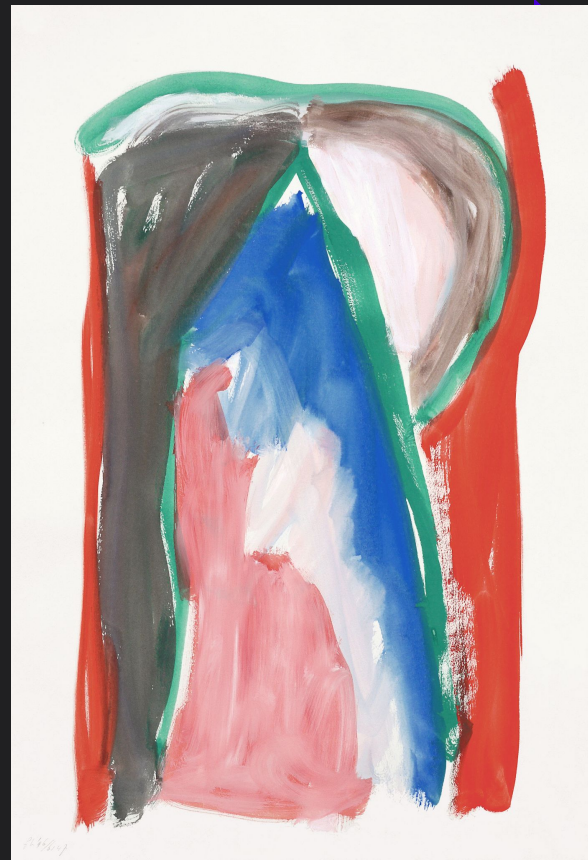
Conclusion

- Create a AI model that can help clarify what you are communicating with your face
- This can be a tool to help, but the model is not refined enough to be a stand alone tool



Recommendations

- Reduce noise by removing background
- Increase dataset
- Explore using gif or short videos



Thanks

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