RAF-DB Facial Expression Recognition

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June 6, 2022

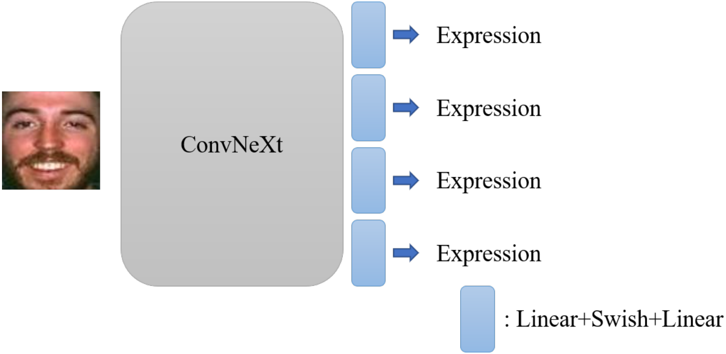


Figure 1: The distribution of the training samples from the seven expressions is sparse in the high-dimensional space, which leads to overfitting. Thus, the feature vector used for classification is divided into several sub-vectors and the corresponding classification heads are **ensembled**. If **channel of CNN** can be viewed as an equivalent structure of **token of Transformer**, it is similar to DeiT. It is also very similar to dropout, but shows superior performance on this dataset (+0.59%).

Experimental Results: **Accuracy 90.97%**

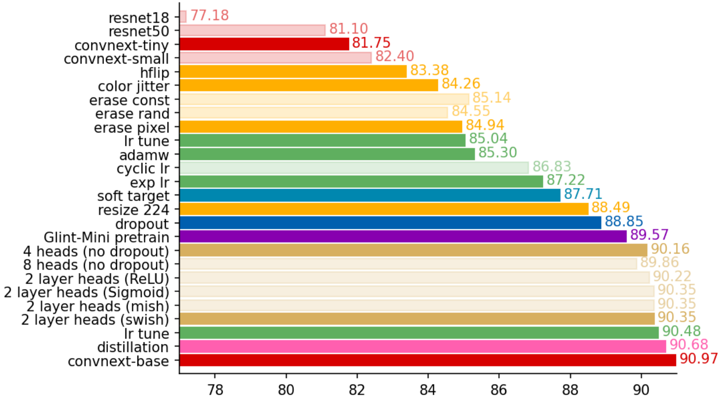


Figure 2: We achieve a performance that is competitive with SOTA (while using less external data) by stacking general tricks for image recognition. Structurally, we use a modern CNN without any attention-based modules and **propose a plug-and-play multi-head trick**.

Compare to SOTA

Method		Acc	Comment
RAN [8]	TIP 2020	86.90	
SCN [7]	CVPR 2020	87.03	
DACL [1]	WACV 2021	87.78	
KTN [2]	TIP 2021	88.07	
PSR [6]	CVPR 2020	88.98	
DMUE [4]	CVPR 2021	89.42	
FDRL [3]	CVPR 2021	89.47	
ARM [5]	arXiv 2021	90.42	Wrong approach with information disclosure.
TransFER [9]	ICCV 2021	90.91	Stacking IR50, 'Local CNN' and 8 layers of ViT, no code available.
POSTER [10]	arXiv 2022.4	92.05	Need a well-trained keypoint detector, no code available.
Ours		90.97	

Confusion Matrix

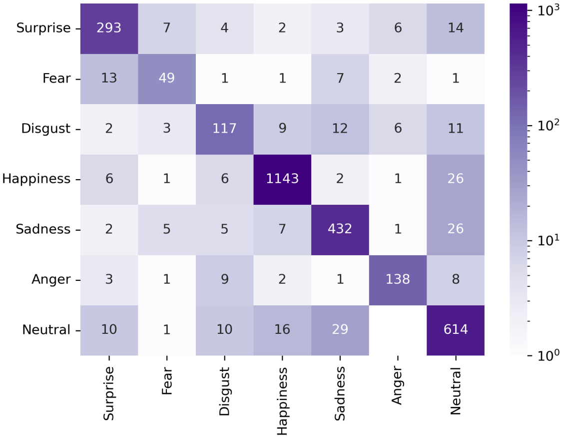
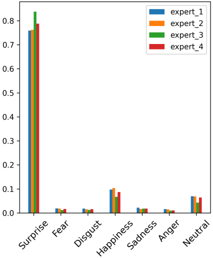
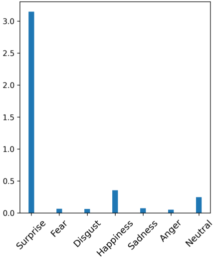


Figure 3: The vertical axis is the true label, and the horizontal axis is the predicted label.

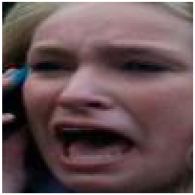
Mistakes

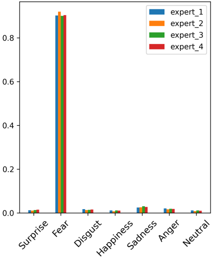
Happiness

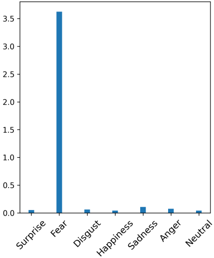


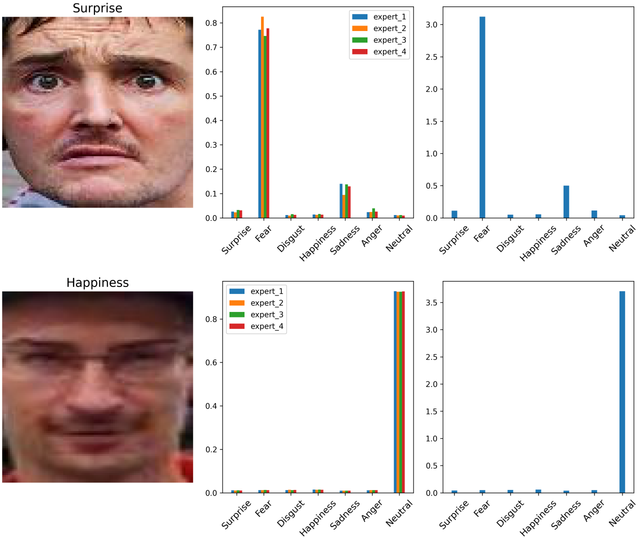


Sadness

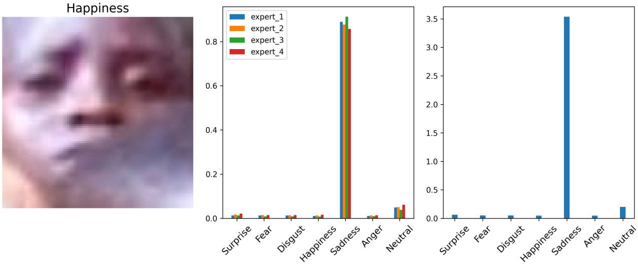


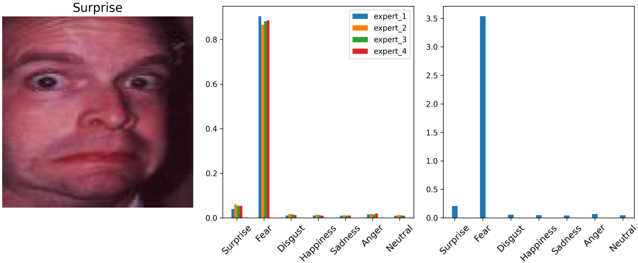





Surprise
Happiness
expert_1
expert_2
expert_3
expert_4
Surprise
Fear
Disgust
Happiness
Sadness
Anger
Neutral

Mistakes


Happiness
expert_1
expert_2
expert_3
expert_4
0.0
0.2
0.4
0.6
0.8
Surprise
Fear
Disgust
Happiness
Sadness
Anger
Neutral
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Surprise
Fear
Disgust
Happiness
Sadness
Anger
Neutral


Surprise
expert_1
expert_2
expert_3
expert_4
0.0
0.2
0.4
0.6
0.8
Surprise
Fear
Disgust
Happiness
Sadness
Anger
Neutral
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Surprise
Fear
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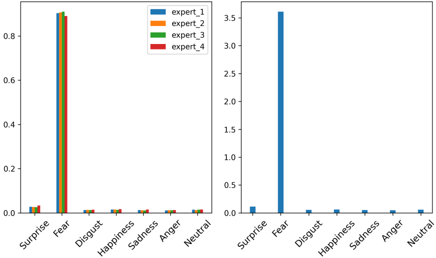
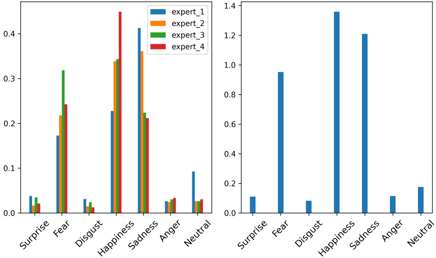
Mistakes

Surprise

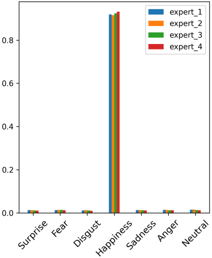


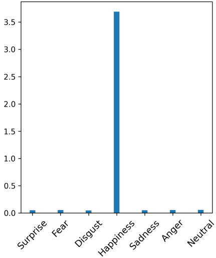
Sadness



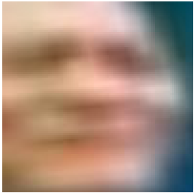
Mistakes

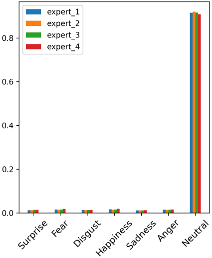
Sadness

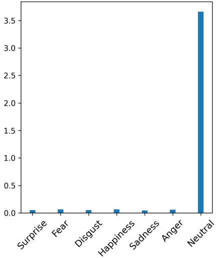




Happiness







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Thanks!