Expression Recognition using Curriculum Learning Method

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I. INTRODUCTION
During the last few years, the interest in facial expression recognition has been increasing. In order to solve the challenges of overfitting and influence of expression-unrelated situation in deep expression recognition, we apply curriculum learning strategy when training.

II. METHOD AND EXPERIMRNT
A. CNNs
In our experiment, we use two CNNs including Pre-trained CNN and Result CNN. The Pre-trained CNN is used to design curriculum and the Result CNN is what we get in the end.

B. Curriculum Design
The pre-trained CNN is trained on laboratory-controlled dataset, Extended CohnKanade (CK+) dataset, allowing it to learn the feature in the ideal conditions. Then, we use pre-trained CNN do expression classification task on in-the-wild dataset, Static Facial Expressions in the Wild 2.0 (SFEW 2.0), to divide the SFEW 2.0 into three small subsets according to the classification result.

C. Pre-processing
For in-the-wild dataset SFEW 2.0, the samples contain a lot of noise, thus it is necessary to process it at first. The input and results of the procedures can be seen in Fig.1.

D. Optimization
The training starts with easiest subset. If the result on validation data doesn’t improve in m epochs, we will start learning the next course. At this time, the next difficulty subset will merge into current subset. Importantly, in order to low down the impact of difficulty subset, we need to low down the learning rate.

III. RESULT AND DISCUSSION
The result shows the accuracy can arrive at 56.15%, which surpass the baseline of competition on SFEW 2.0 of 35.96%. By the way, without curriculum learning method, the accuracy is only 27.38%

Fig.2 shows the confusion matrices of Result CNN on seven different emotions. The figure illustrates there is still some room for its improvement on disgust and fear expression.

Figure 2: Confusion matrices of Result CNN on SFEW 2.0

IV. CONCLUSION
In this paper, we have adapted curriculum learning training strategy in deep expression recognition field. Our proposed method achieves great result on SFEW 2.0 dataset, indicating the great potential of curriculum training strategy.

V. REFERENCE