文章主要是对EmotionNet challenge中的方法和结果进行详细说明。

1、EmotioNet建立及组成

- 文献1主要介绍了建立EmotioNet所使用的算法【EmotioNet: An accurate, real-time algorithm for the automatic annotation of a million facial expressions in the wild】
- EmotioNet包含1,000,000张图片，其中有950,000由文献1标记，剩余的则由人工标注。950K的训练集，标注准确度在81%左右，25K的验证集，25K的测试集。

2、EmotioNet Challenge任务

- AUs定义
  - Muscle groups that lead to a clearly visible image change are called action units (AUs).
- Track 1：检测识别11种AUs
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AU #	Action	AU #	Action
1	inner brow raiser	2	outer brow raiser
4	brow lowerer	5	upper lid raiser
6	cheek raiser	9	nose wrinkler
12	lip corner puller	17	chin raiser
20	lip stretcher	25	lips part
26	jaw drop	–	–

Table 1: The 11 AUs used in track 1 of the challenge. Listed here are the 11 AUs alongside the definitions of their actions.

- Track 2：检测识别AUs组合后的16种表情（前7类为基本表情，其余为复合表情）
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Category	AUs	Category	AUs
Happy	12, 25	Sadly disgusted	4, 10
Sad	4, 15	Fearfully angry	4, 20, 25
Fearful	1, 4, 20, 25	Fearfully surpd.	1, 2, 5, 20, 25
Angry	4, 7, 24	Sadly angry	4, 7, 15
Surprised	1, 2, 25, 26	Angrily surprised	4, 25, 26
Disgusted	9, 10, 17	Appalled	4, 9, 10
Happily surpd.	1, 2, 12, 25	Angrily disgusted	4, 10, 17
Happily disgd.	10, 12, 25	Awed	1, 2, 5, 25

Table 2: Prototypical AUs used to produce each of the sixteen basic and compound emotion category of track 2 of the challenge.

3、评价指标

- accuracy
  - accuracy(i)=(true positives(i)+true negatives(i))/total population
- precision
  - precision(i)= detected(i)/true(i)
- recall（sensitivity）
  - recall(i)= correct(i)/true(i)
- 结合精度Fβ分
  - $$\mathrm{F}_{\beta_i} = \left(1+\beta^2\right)\frac{\mathrm{precision}_i \mathrm{recall}_i}{\beta^2 \mathrm{precision}_i + \mathrm{recall}_i}.$$
- 最终得分
  - final score = (accuracy+F1)/2

4、训练集和测试集

- 训练集和验证集：
  - Track 1：训练集：950K（81%左右精度），验证集：25K人工标记数据
  - Track 2：训练集：由950K组合而成的数据，验证集：2K数据
- 测试集：
  - Track 1：88K（22K手工标记，44K resize，22K occlusion）
  - Track 2：40K（10K手工标记，20K resize，10K occlusion）

5、Results

- 见论文