# 模型优化记录

# 一，网络性能

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Net** | **GFLOPs** | **Params** | **MACs** | **CPU pytorch** | **CPU MNN** | **DSP(int8)** |
| slim | 0.01574016 | 174.859K | 15.740M | 6.605ms |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

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# 二，最优结果对比

[***\*\*\*数据清洗具体情况戳这里\*\*\****](https://yuque.antfin-inc.com/zppdqz/tg1g0l/gidwk5#SvROc)

***Green: online version Red: best version Purple: question vesrion***

## Data clean : 3th

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Exp** | **Net** | **Test Set** | **Avg Precision** | **Avg Recall** | **Avg F1** |
| **current release** | **slim** | **data3** | **0.6940** | **0.5380** | **0.5275** |
| base\_clean\_20211115 | slim | data3 | 0.8476 | 0.7135 | 0.7167 |
| base\_clean\_20211116 | slim | data3 | 0.8057 | 0.7104 | 0.7116 |
| base\_clean\_hard2other\_20211116 | slim | data3 | 0.8153 | 0.5999 | 0.6142 |
| base\_clean\_20211123 | slim | data3 | 0.7727 | 0.5724 | 0.5900 |
| **base\_clean\_hard2rm\_20211124** | **slim** | **data3** | **0.8235** | **0.7057** | **0.7187** |
| base\_clean\_hard2rm\_lre2\_20211124 | slim | data3 | 0.6988 | 0.6391 | 0.5778 |
| **base\_clean\_hard2rm\_20211125** | **slim** | **data3** | **0.7183** | **0.6769** | **0.6725** |
| base\_clean\_h2rm\_h1rm\_20211125 | slim | data3 | 0.7974 | 0.6091 | 0.6323 |

## Data clean : 4th

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Exp** | **Net** | **Test Set** | **Avg Precision** | **Avg Recall** | **Avg F1** |
| **current release** | slim | **data3** | 0.7123 | 0.5387 | 0.5424 |
| base\_clean\_20211115 | slim | **data3** | 0.8859 | 0.7306 | 0.7544 |
| base\_clean\_20211116 | slim | **data3** | 0.8597 | 0.7473 | 0.7774 |
| base\_clean\_hard2other\_20211116 | slim | **data3** | 0.8526 | 0.7232 | 0.7522 |
| base\_clean\_20211123 | slim | **data3** | 0.8162 | 0.5915 | 0.6329 |
| **base\_clean\_hard2rm\_20211124** | slim | **data3** | **0.8696** | **0.7524** | **0.7836** |
| base\_clean\_hard2rm\_lre2\_20211124 | slim | **data3** | 0.7709 | 0.6927 | 0.6741 |
| **base\_clean\_hard2rm\_20211125** | slim | **data3** | **0.7530** | **0.6858** | **0.6996** |
| base\_clean\_h2rm\_h1rm\_20211125 | slim | **data3** | 0.8740 | 0.7045 | 0.7518 |
| base\_clean\_unsim\_20211220 | slim | **data3** | 0.8116 | 0.6880 | 0.7044 |
| base\_clean\_unsim\_20211222 | slim | **data3** | 0.7342 | 0.6571 | 0.6628 |
| base\_clean\_unsim\_20220207 | slim | **data3** | 0.7633 | 0.5732 | 0.5622 |
| **current release** | slim | **adsT1** | 0.7997 | 0.7787 | 0.7369 |
| base\_clean\_hard2rm\_20211124 | slim | **adsT1** | 0.8735 | 0.8629 | 0.8404 |
| base\_clean\_unsim\_20211220 | slim | **adsT1** | 0.9308 | 0.7888 | 0.8268 |
| base\_clean\_unsim\_20211222 | slim | **adsT1** | 0.9127 | 0.8595 | 0.8773 |
| **base\_clean\_unsim\_20220207** | slim | **adsT1** | **0.9204** | **0.9095** | **0.9029** |
| **current release** | slim | **adsT2** | 0.8607 | 0.7779 | 0.8032 |
| base\_clean\_hard2rm\_20211124 | slim | **adsT2** | 0.9585 | 0.9025 | 0.9206 |
| base\_clean\_unsim\_20211220 | slim | **adsT2** | 0.9580 | 0.8225 | 0.8736 |
| base\_clean\_unsim\_20211222 | slim | **adsT2** | 0.9724 | 0.8687 | 0.9097 |
| **base\_clean\_unsim\_20220207** | slim | **adsT2** | **0.9846** | **0.9326** | **0.9551** |
| base\_clean\_unsim\_20220207 | slim | mifa | 0.8535 | 0.8073 | 0.8270 |
| base\_clean\_unsim\_20220216 | slim | mifa | 0.8764 | 0.8373 | 0.8553 |

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# 三，实验结果分析：

**1.实验1，2结果上看除了类别比心和ok学习更标准的动作会提升模型效果外，其他类别增加hard样本更好**

**2.实验0，1，2结果上看，增加了数据增强可以抑制过拟合，但是会影响模型学习更有效特征**

**3.实验3结果在第4轮清洗前后都不好。v,ok,silence容易混淆；比赞，silence容易混淆；但是左右手势有精度提升**

**4.实验4训练的loss在100epoch突然上升，验证集recall和F1在400epoch比赞手势下降，这个问题还未分析出原因。但是保存的最优模型目前来看在第4轮清洗后的测试集上表现最优**

**5.实验5和4仅区别在于初始学习率为1e-2,曲线表现正常，并没有发生实验4的问题。但是整体没有收敛到一个比较好的值。说明1e-2 次方还是有点大。**

# 四，详细实验记录

## 通用配置：

* **学习率策略：cosiine+warmup=5, 1e-6,1e-3**
* **优化器：Adam**
* **预训练：无**
* **loss: label smooth + 交叉熵**
* **轮数：600**
* **batchsize:64**
* **训练集：data1,data2,data4,data5\_1,data5\_2,data6(仅用嘘这个类数据)的全部数据**
* **测试集：data3**
* **input:128x128+gray**
* **net: slim**
* **classes: 11**

## Detail for current release:

|  |  |
| --- | --- |
| **3th data clean** | [MISSING IMAGE: image.png, image.png ] |
| **4th data clean** | [MISSING IMAGE: image.png, image.png ] |

## 0.数据清洗后第一次训练：

**\*\*\*可以看到train loss 在400 epoch断崖式下降，val loss 同时上升，val P/R/F1同时下降。说明模型在400 epoch出现过拟合了！！!\*\*\***

### a.配置：

* 通用配置

### b.loss/P/R/F1

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[MISSING IMAGE: val\_loss.jpg, val\_loss.jpg ]

### c.最优结果

#### 3th data clean:

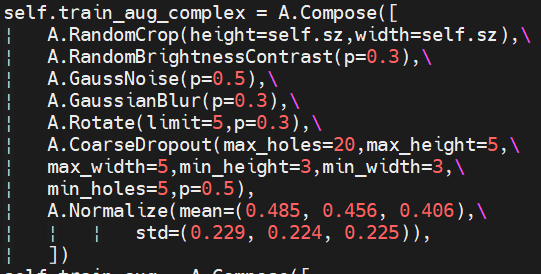
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#### 4th data clean:

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## 1.base\_clean\_20211116：

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard 标签样本，采样概率设置=0.5<----让模型更趋向于学习标准手势，同时也能兼顾困难样本**
* **数据增强：增加了CoarseDropout，加大了高斯噪声概率<----避免了实验0过拟合**
* 

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 2.base\_clean\_hard2other\_20211116：

**这里val loss 100 epoch 附近上升，应该并不是过拟合，因为val P/R/F1并未下降。个人认为是由于数据集中others类别数量更大了，模型前期选则全部趋于预测为others类，后期模型逐渐预测其他类别导致loss上升，但是精度指标也依然上升。**

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard 标签样本，除握拳类别外其他类别hard标签样本手势类型改为others**

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 3.base\_clean\_20211123:

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard=1 标签样本，采样概率设置=0.5<----让模型更趋向于学习标准手势，同时也能兼顾困难样本**
* **hard=2 标签样本标签设置为others类**

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 4.base\_clean\_hard2rm\_20211124:

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard=1 标签样本，采样概率设置=0.5<----让模型更趋向于学习标准手势，同时也能兼顾困难样本**
* **hard=2 标签样本不参与训练**

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 5.base\_clean\_hard2rm\_lre2\_20211124:

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard=1 标签样本，采样概率设置=0.5<----让模型更趋向于学习标准手势，同时也能兼顾困难样本**
* **hard=2 标签样本不参与训练**
* **learning rate=1e-4,1e-2**

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 6.base\_clean\_hard2rm\_20211125:

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard=2 标签样本不参与训练**

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 7.base\_clean\_h2rm\_h1rm\_20211125:

### a.配置：

* **others类，采样概率设置=0.5<----others类数据量最大，避免模型趋向于全部预测为others类**
* **hard=2 标签样本不参与训练**
* **hard=1 部分样本参与训练，采样概率=1：1:data1 data2 data4 data5\_1 ；2:data1 data2；4:data4；5:data1 9：data5\_1 data5\_2；10: data5\_1 data5\_2**

### b.loss/P/R/F1

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### c.最优结果

#### 3th data clean:

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#### 4th data clean:

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## 8.base\_clean\_unsim\_20211220:

### a.配置：

* **数据进行去重---->**[详细过程，戳这里！！](https://yuque.antfin-inc.com/zppdqz/tg1g0l/gidwk5)
* **hard=2 标签样本不参与训练**

### b.loss/P/R/F1

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### c.最优结果

#### data3:

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#### ADS Test1 <----- disturbed data were removed

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## Temper Test On ADS First Test Data:

***The testing data was labeld on videos which were the first collection from ADS. Its contains non-standard gesture poses. All serious blured and occluded datas were wiped. All label of disturbed samples were assigned to "others" label, "8".***

***​***

**current release:**

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**current release <------ *All disturbed samples were removed!!! Comparing above result,*** ***"silence","Love","Like",Fist" and "Right" tend to be disturbed.***[MISSING IMAGE: image.png, image.png ]

**base\_clean\_20211115**

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**base\_clean\_20211116**

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**base\_clean\_hard2other\_20211116**

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**base\_clean\_20211123**

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**base\_clean\_hard2rm\_20211124**

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**base\_clean\_hard2rm\_lre2\_20211124**

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**base\_clean\_h2rm\_h1rm\_20211125**

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## 9.base\_clean\_unsim\_20211222:

### a.配置：

* **数据进行去重---->**[详细过程，戳这里！！](https://yuque.antfin-inc.com/zppdqz/tg1g0l/gidwk5)
* **hard=2 标签样本不参与训练**
* **others类数据权重设置为0.4 保持为其他类数据的3倍**
* **666，比赞权重设置为2.0 保持数据量和其他类相似**
* **使用multistep方式调整学习率**
* **maxepoch=200，lrvalue=1e-3,1e-4,1e-5，milestone=50,170**

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### b.loss/P/R/F1

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### c.最优结果

#### data3:

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#### ADS Test1 <----- disturbed data were removed

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## 10.base\_clean\_unsim\_20220207:

### a.配置：

* **数据进行去重---->**[详细过程，戳这里！！](https://yuque.antfin-inc.com/zppdqz/tg1g0l/gidwk5)
* **除ADS数据集外，hard=2 标签样本不参与训练**
* **others类数据权重设置为0.4 保持为其他类数据的3倍**
* **666，比心权重设置为2.0 保持数据量和其他类相似**
* **增加ADS数据,各类别权重均为1.0，且包含干扰动作（嘘和V）数据**
* **使用multistep方式调整学习率**
* **使用base\_clean\_unsim\_20220206 作为预训练模型(其ads数据为返修前无干扰动作数据）**
* **maxepoch=200，lrvalue=1e-3,1e-4,1e-5，milestone=50,170**

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### b.loss/P/R/F1 <----MIFA

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### c.最优结果

#### data3:

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#### ADS Test1 <----- disturbed data were removed

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#### ADS Test2 <----- disturbed data were removed

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#### MIFA

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