第xx组

嵌入式系统设计专业综合项目答辩

2023/12/2

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Investment Business Plan

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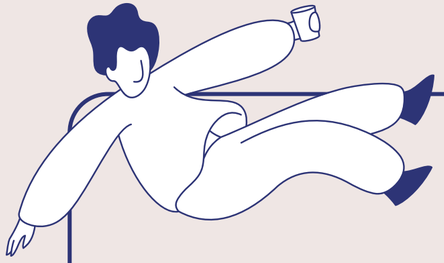
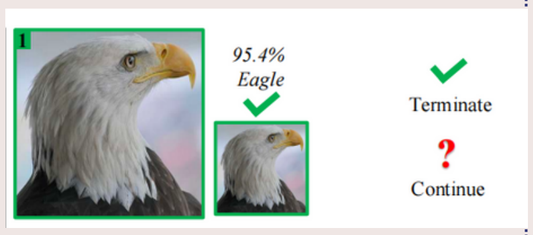
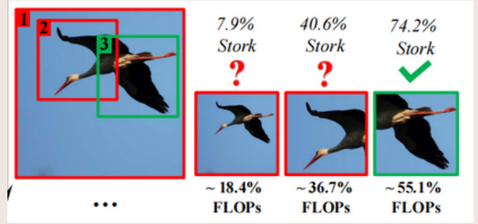
Annual Work Review

论文背景



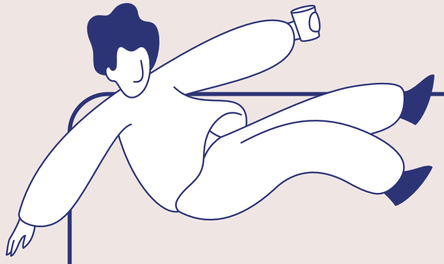




所提出的GFNet的一个显著特征是它是一个通用框架，其中分类器和区域建议网络被视为两个独立的模块。因此，任何现有的骨干模型，如MobileNets,CondenseNets，ShuffleNets和EfficientNets，都可以部署为我们的特征提取器。这将我们的方法与early recurrent attention methods区分开来，后者采用纯复发性模型。

此外，我们专注于在自适应推理设置下提高计算效率，而现有的大多数工作都是在固定序列长度下提高精度。

论文背景

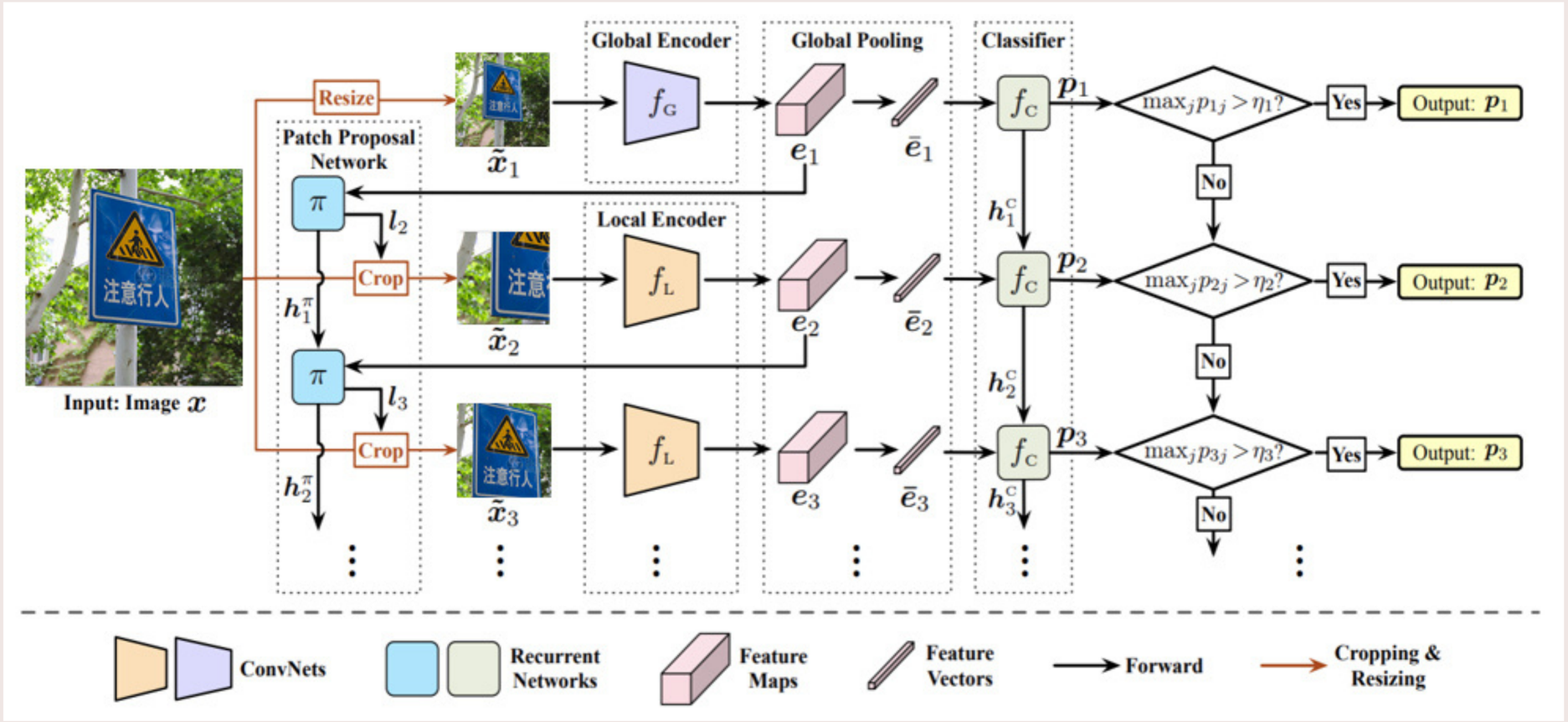


本文旨在从空间冗余的角度降低高分辨率视觉识别的计算成本。事实上，深度模型被证明能够准确地执行对象识别，只需要几个类别区分补丁，例如狗的头或鸟的翅膀。这些区域通常只占整个图像的一小部分，因此需要较少的计算资源来处理。因此，如果我们能够动态地识别每个图像的“类判别”区域，并仅对这些小的输入补丁执行有效的推理，那么在不牺牲准确性的情况下，空间上的计算冗余可以显著降低。

02

算法分析

算法总览


Global Encoder
Global Pooling
Classifier
Resize
Patch Proposal Network
Local Encoder
Crop
Crop
Input: Image x
$\tilde{x}_1$
$\tilde{x}_2$
$\tilde{x}_3$
f_G
f_L
f_L
e_1
e_2
e_3
$\bar{e}_1$
$\bar{e}_2$
$\bar{e}_3$
f_C
f_C
f_C
p_1
p_2
p_3
h_1^C
h_2^C
h_3^C
π
π
l_2
l_3
h_1^π
h_2^π
$\max_j p_{1j} > \eta_1$?
$\max_j p_{2j} > \eta_2$?
$\max_j p_{3j} > \eta_3$?
Yes
Yes
Yes
No
No
No
Output: p_1
Output: p_2
Output: p_3
ConvNets
Recurrent Networks
Feature Maps
Feature Vectors
Forward
Cropping & Resizing

损失函数

交叉熵损失函数

预测	真实
0.3 0.3 0.4	0 0 1（禁止通行）
0.3 0.4 0.3	0 1 0（前方学校）
0.1 0.2 0.7	1 0 0（禁止鸣笛）

$$L = \frac{1}{N}\sum_{i} L_i = -\frac{1}{N}\sum_{i}\sum_{c=1}^{M} y_{ic}\log(p_{ic})$$

其中：

- M ——类别的数量
- y_{ic} ——符号函数（0 或 1），如果样本 i 的真实类别等于 c 取 1，否则取 0
- p_{ic} ——观测样本 i 属于类别 c 的预测概率

$$\text{sample 1 loss} = -(0 \times log0.3 + 0 \times log0.3 + 1 \times log0.4) = 0.91$$
$$\text{sample 2 loss} = -(0 \times log0.3 + 1 \times log0.4 + 0 \times log0.3) = 0.91$$
$$\text{sample 3 loss} = -(1 \times log0.1 + 0 \times log0.2 + 0 \times log0.7) = 2.30$$

对所有样本的loss求平均：

$$L = \frac{0.91 + 0.91 + 2.3}{3} = 1.37$$

强化学习

奖励函数

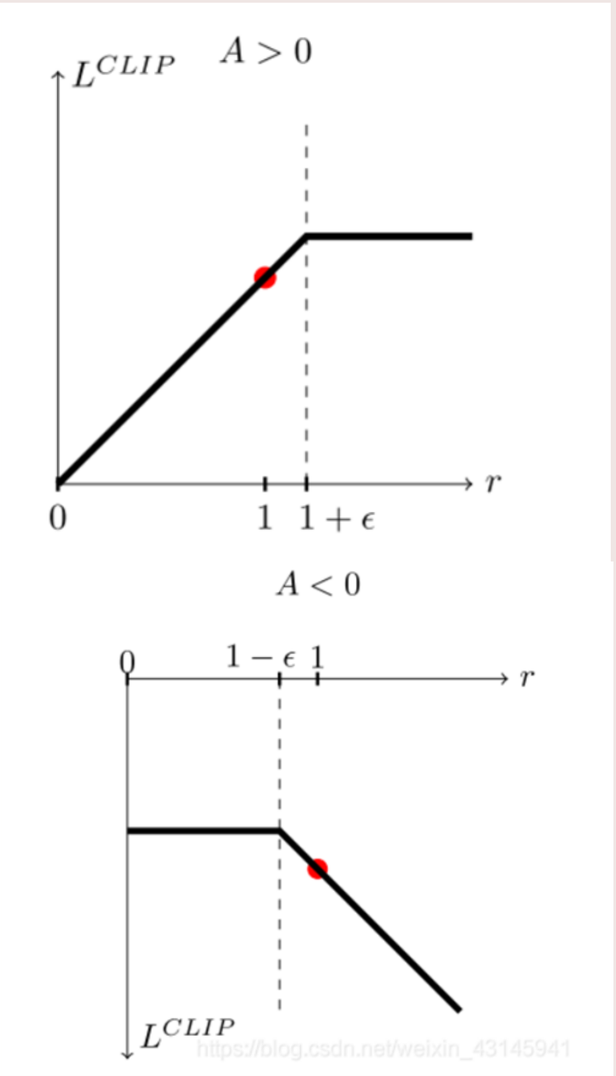
用于衡量智能体在环境中采取某个动作后所获得的奖励

actor-critic

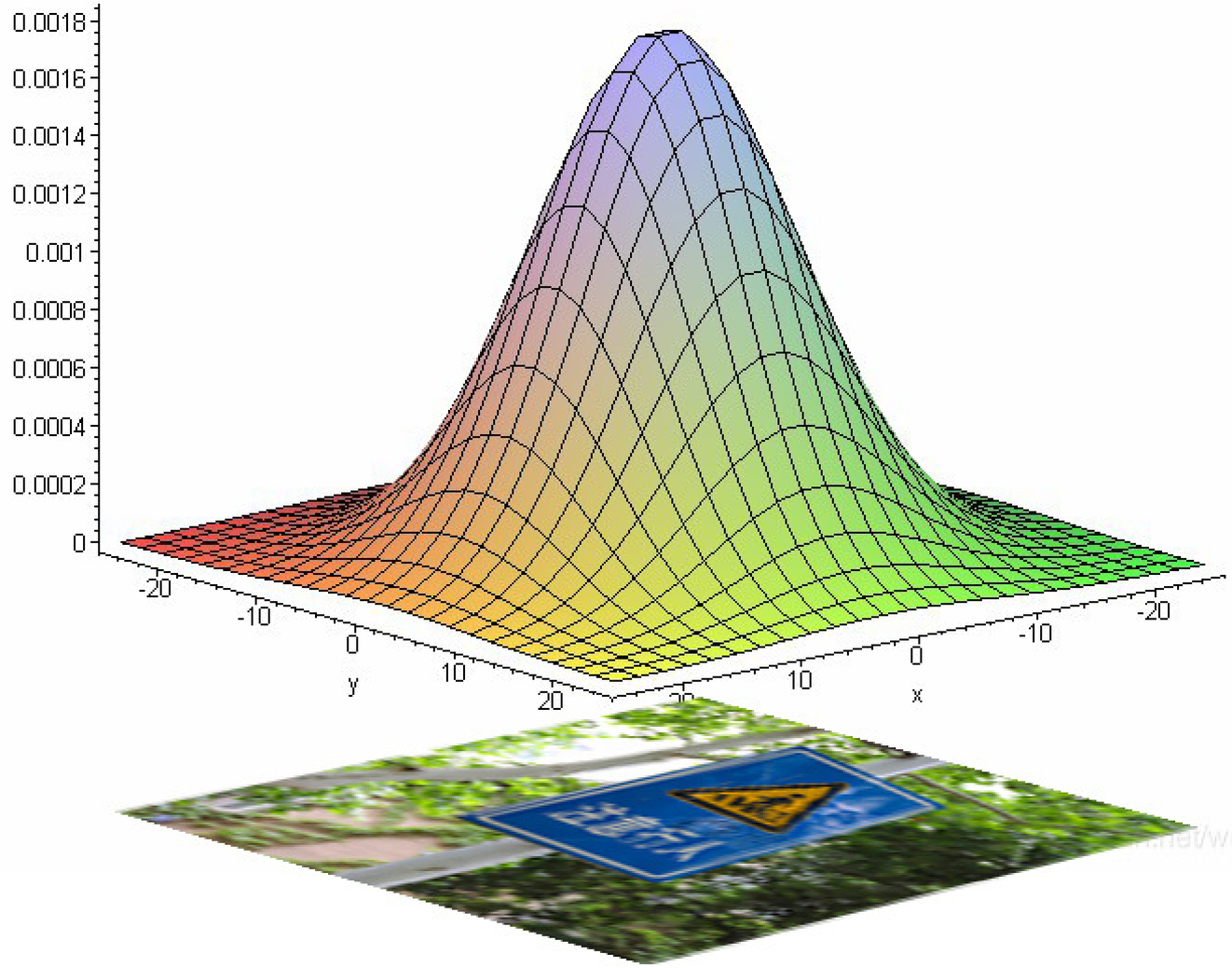
Actor是指策略函数，即学习一个策略来得到尽量高的回报。critic是指评价函数，评价actor所做决策的好坏

clip操作

为参数更新的幅度设置上限



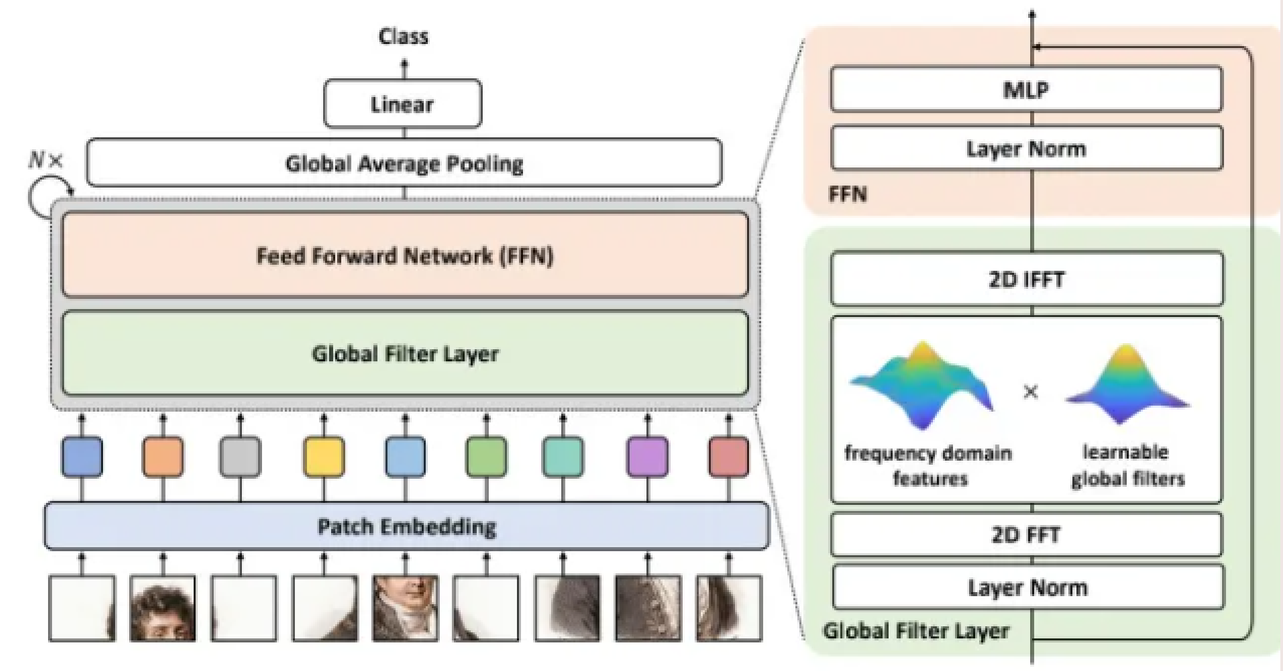
强化学习


0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
-20
-10
0
10
20
y
10
0
-10
-20
x

03

开发过程

模型分析



上图给出了本文所提方案整体架构示意图，它是一种类似ViT、DeiT的架构，即仅通过PatchEmbedding进行空间尺寸下降，然后通过多个核心模块进行处理，最后后接线性分类层进行分类。

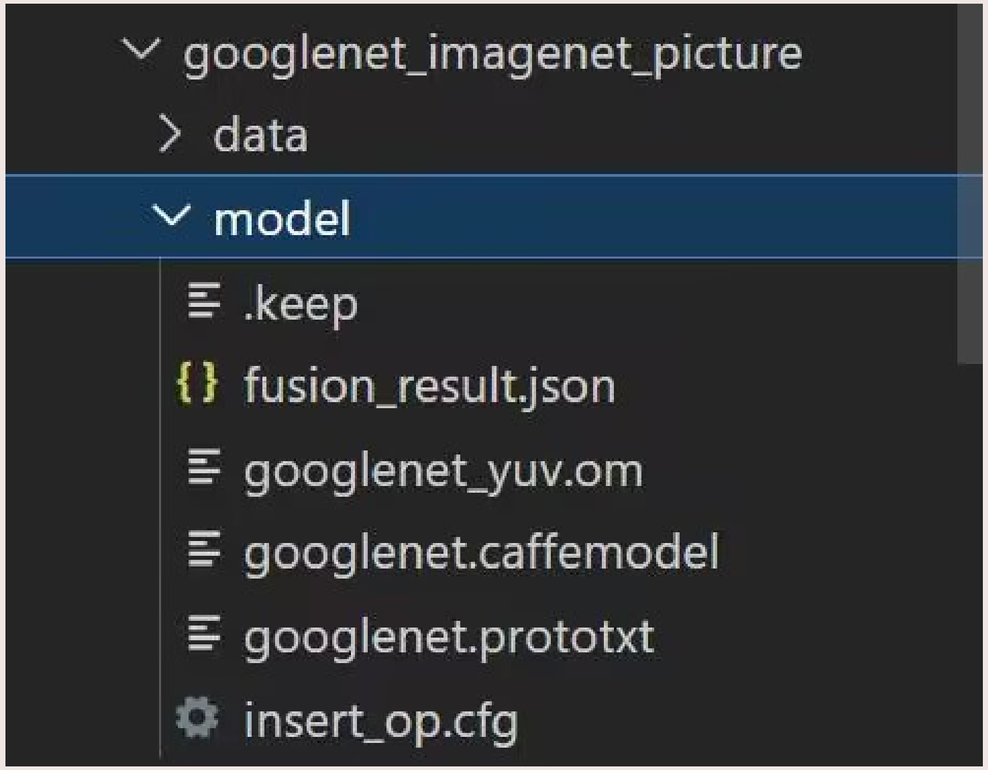
所提方案的输入尺寸为H×W并进行非重叠块拆分与线性投影得到维度D的词。GFNet的的核心模块包含两部分：

全局滤波器层，它用于进行空间信息交换；

前馈网络，即MLP部分。

模型训练

```
Class 16|Number of extra imgs3676
Class 17|Number of extra imgs3112
Class 18|Number of extra imgs3031
Class 19|Number of extra imgs3831
Class 20|Number of extra imgs3711
Class 21|Number of extra imgs3729
Class 22|Number of extra imgs3684
Class 23|Number of extra imgs3586
Class 24|Number of extra imgs3786
Class 25|Number of extra imgs2826
Class 26|Number of extra imgs3507
Class 27|Number of extra imgs3804
Class 28|Number of extra imgs3574
Class 29|Number of extra imgs3777
Class 30|Number of extra imgs3653
Class 31|Number of extra imgs3383
Class 32|Number of extra imgs3800
Class 33|Number of extra imgs3453
Class 34|Number of extra imgs3665
Class 35|Number of extra imgs3039
Class 36|Number of extra imgs3691
Class 37|Number of extra imgs3825
Class 38|Number of extra imgs2353
Class 39|Number of extra imgs3761
Class 40|Number of extra imgs3708
Class 41|Number of extra imgs3812
Class 42|Number of extra imgs3804
```



模型部署


Traffic-sign-classification
请上传
Choose File
No file chosen
上传
© 2023 落尘


Traffic-sign-classification
wood rabbit, cottontail, cottontail rabbit
Choose File
No file chosen
上传
© 2023 落尘

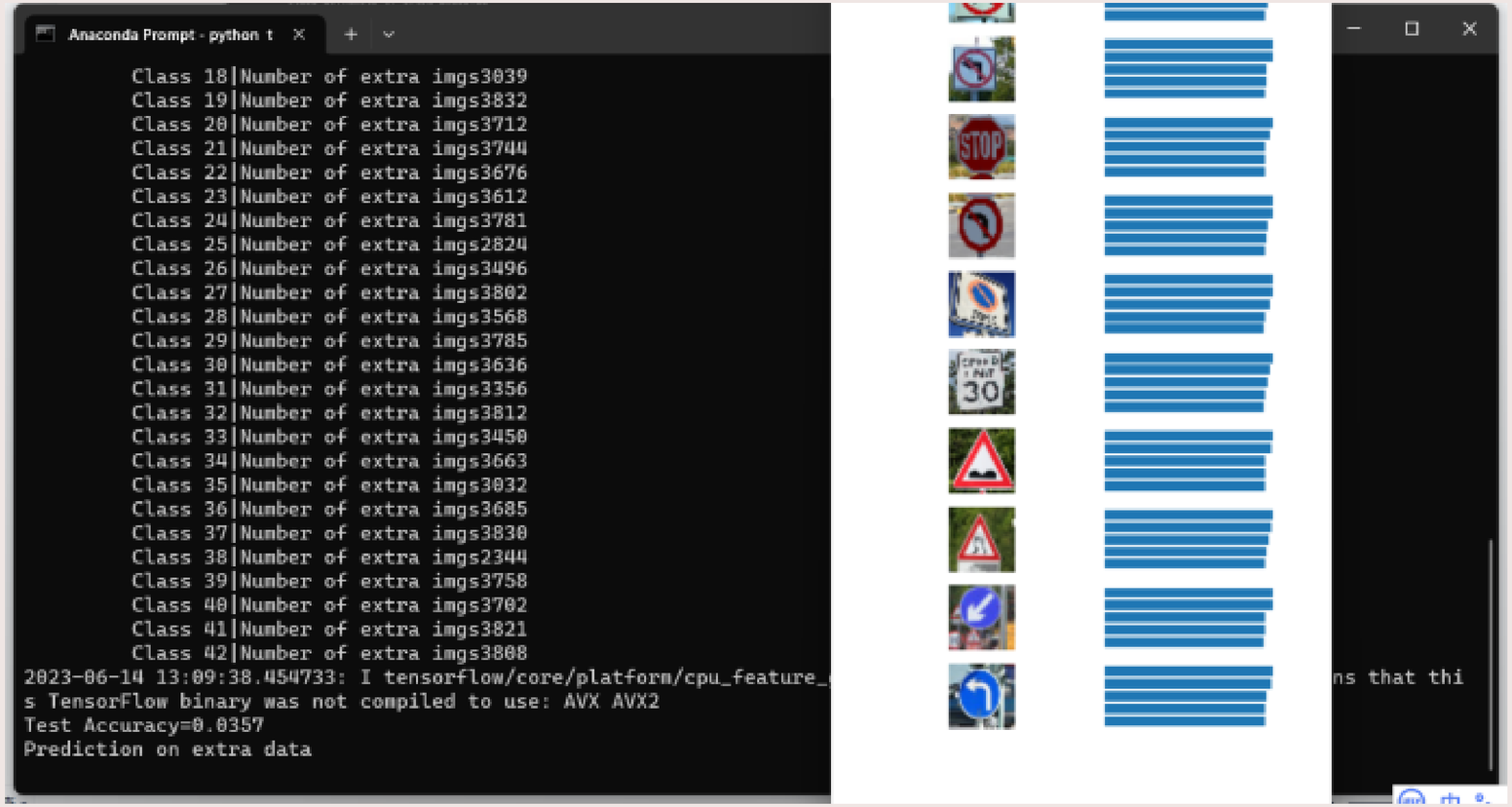
04

项目演示

训练效果


Anaconda Prompt - python t
Class 18|Number of extra imgs3039
Class 19|Number of extra imgs3832
Class 20|Number of extra imgs3712
Class 21|Number of extra imgs3744
Class 22|Number of extra imgs3676
Class 23|Number of extra imgs3612
Class 24|Number of extra imgs3781
Class 25|Number of extra imgs2824
Class 26|Number of extra imgs3496
Class 27|Number of extra imgs3802
Class 28|Number of extra imgs3568
Class 29|Number of extra imgs3785
Class 30|Number of extra imgs3636
Class 31|Number of extra imgs3356
Class 32|Number of extra imgs3812
Class 33|Number of extra imgs3450
Class 34|Number of extra imgs3663
Class 35|Number of extra imgs3032
Class 36|Number of extra imgs3685
Class 37|Number of extra imgs3830
Class 38|Number of extra imgs2344
Class 39|Number of extra imgs3758
Class 40|Number of extra imgs3702
Class 41|Number of extra imgs3821
Class 42|Number of extra imgs3808
2023-06-14 13:09:38.454733: I tensorflow/core/platform/cpu_feature_guard.cc:140] Your CPU supports instructions that thi
s TensorFlow binary was not compiled to use: AVX AVX2
Test Accuracy=0.0357
Prediction on extra data
Figure 1

展示效果


Anaconda Prompt - python t
Class 18|Number of extra imgs3039
Class 19|Number of extra imgs3832
Class 20|Number of extra imgs3712
Class 21|Number of extra imgs3744
Class 22|Number of extra imgs3676
Class 23|Number of extra imgs3612
Class 24|Number of extra imgs3781
Class 25|Number of extra imgs2824
Class 26|Number of extra imgs3496
Class 27|Number of extra imgs3802
Class 28|Number of extra imgs3568
Class 29|Number of extra imgs3785
Class 30|Number of extra imgs3636
Class 31|Number of extra imgs3356
Class 32|Number of extra imgs3812
Class 33|Number of extra imgs3450
Class 34|Number of extra imgs3663
Class 35|Number of extra imgs3032
Class 36|Number of extra imgs3685
Class 37|Number of extra imgs3830
Class 38|Number of extra imgs2344
Class 39|Number of extra imgs3758
Class 40|Number of extra imgs3702
Class 41|Number of extra imgs3821
Class 42|Number of extra imgs3808
2023-06-14 13:09:38.454733: I tensorflow/core/platform/cpu_feature_
s TensorFlow binary was not compiled to use: AVX AVX2
Test Accuracy=0.0357
Prediction on extra data
STOP
30
ns that thi

THANK YOU

2023/12/2