

AiCon

全球人工智能与机器学习技术大会

基于小猿搜题的视觉应用落地

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主办方  
极客邦科技

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场景

解决方案

再看一次场景

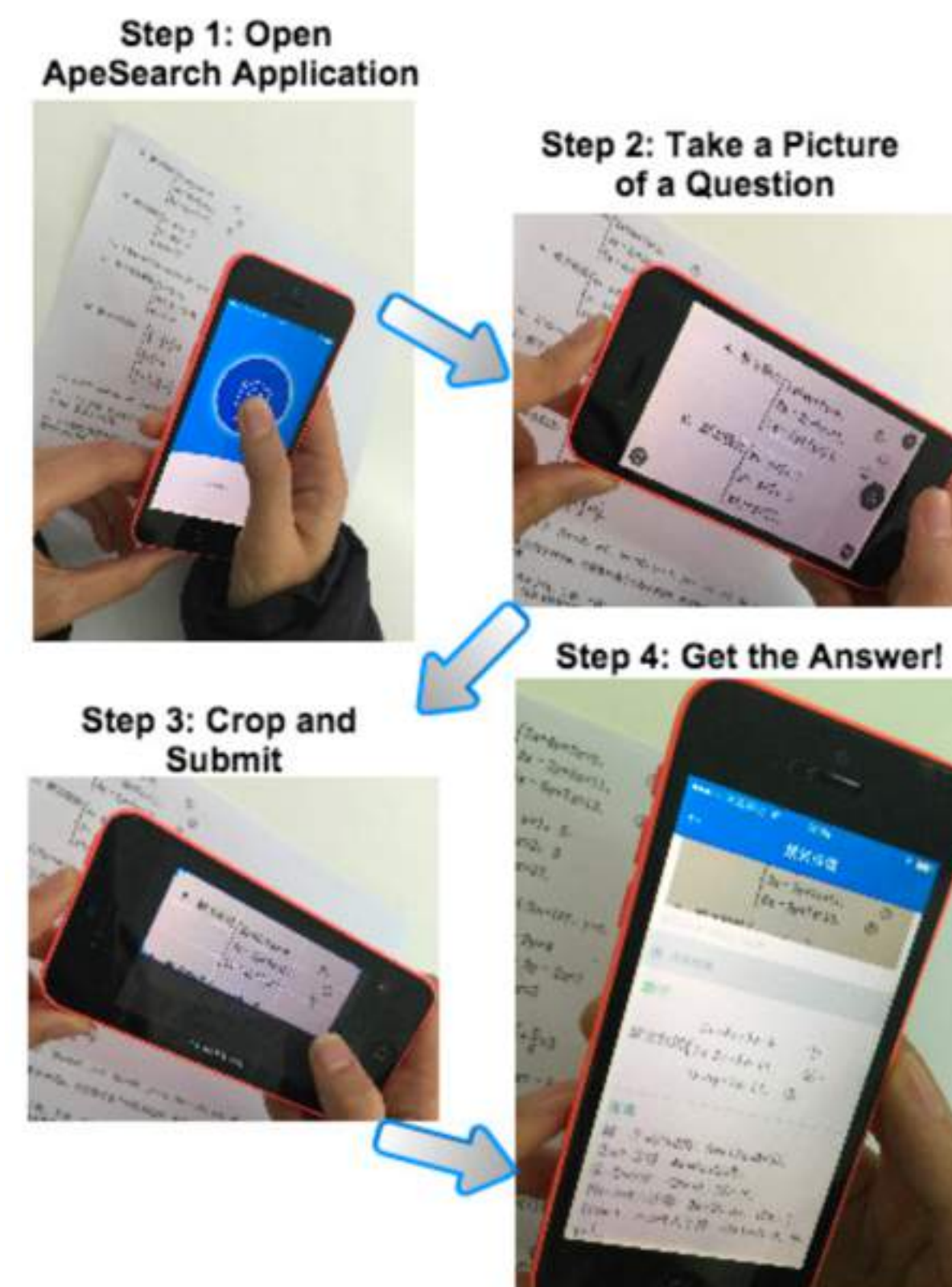
解决方案的落地

回顾

场景

- 小猿搜题

➔ 小猿搜题



场景

- 小猿搜题

- ➔ 小猿搜题

- ➔ 英语作文拍照批改

- ➔ 口算检查

- ➔ 古诗文背诵

- ➔

难点1: 手写英文作文的转化

拍照识别?

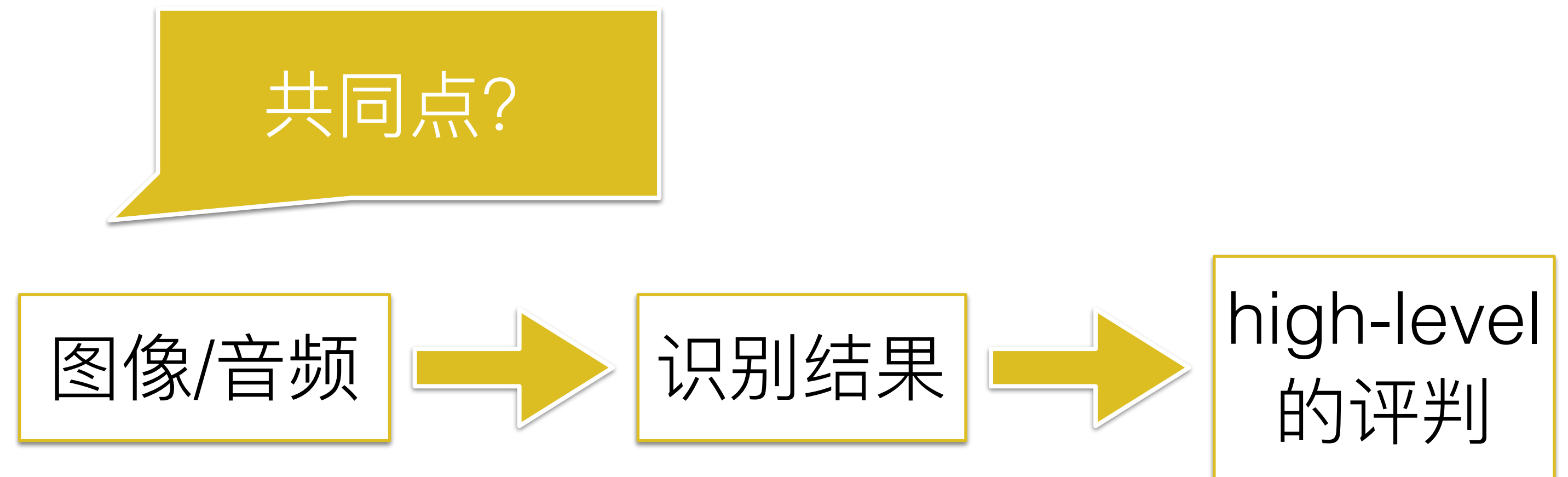
难点2: 批改打分的算法



场景

- 小猿搜题

- ➔ 小猿搜题
- ➔ 英语作文拍照批改
- ➔ 口算检查
- ➔ 古诗文背诵
- ➔



场景

- 小猿搜题

- ➔ 小猿搜题

- ➔ 英语作文拍照批改

← 今天的落地实例!

- ➔ 口算检查

- ➔ 古诗文背诵

- ➔

图像/音频

识别结果

high-level
的评判

英语作文拍照批改

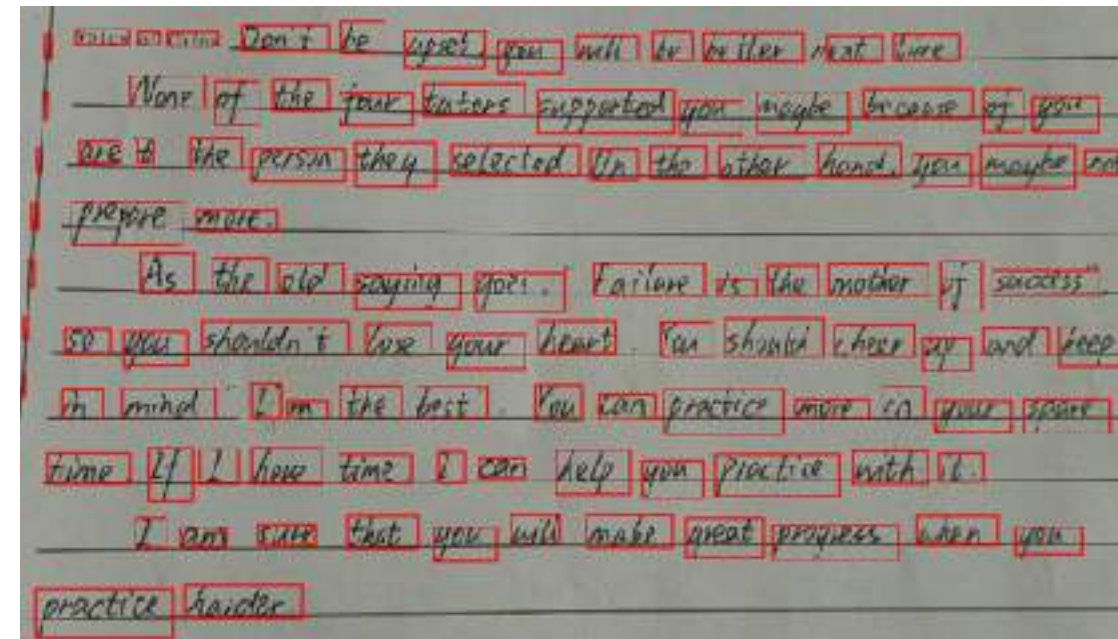
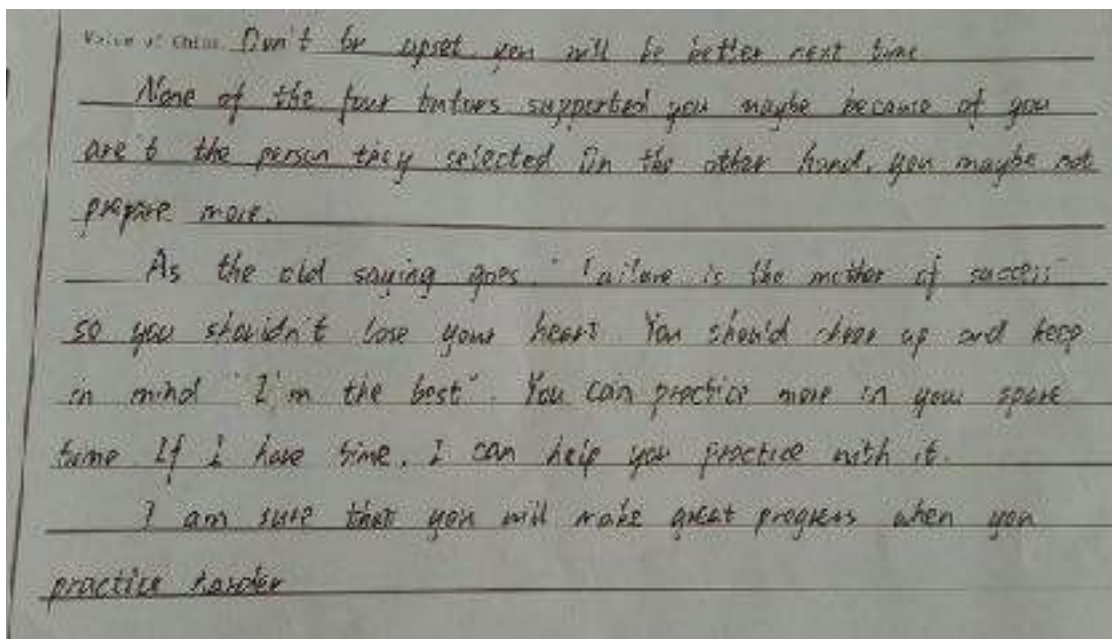
清晰整洁的图片

准确的单词切分

英文字符识别

批改

- ◆ 单词拼写纠错
- ◆ 单词搭配纠错
- ◆ 语法纠错
- ◆ 高级用法加分
- ◆ 评分



Don't be
upset, you
will be better
next time.
.....

评分: **67.4**

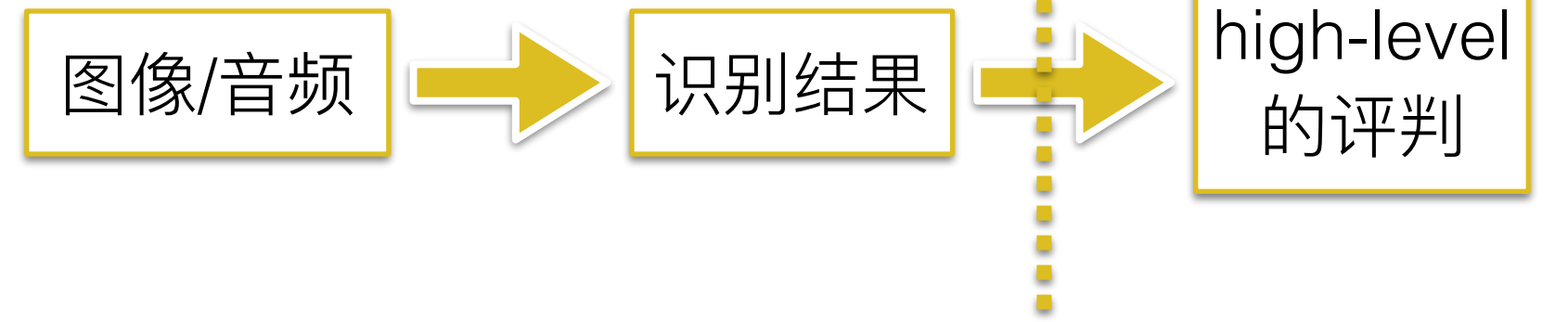
评语: 全文结构较为严谨, 再增加词汇量积累就更好了, 高级词汇使用不是很多, 建议增加衔接词汇的积累, 注意不要过多使用简单句。
Do not be upset, you will be better next time. None of the four tutors supported you maybe **because of you are** not the person they selected. On the other hand, you maybe not prepare more.

[语法错误]: because后面跟句子不需要加of.

As the old saying goes, failure is the mother of success so you should not lose your heart. You should cheer up and keep in mind, I am the best. You can practice more in your spare time. If I have time, I can help you practice with it. I am sure that you will make great progress when you practice harder.

“机器学习落地” ==> “机器学习（中的深度学习）落地”

场景



What is your solution?

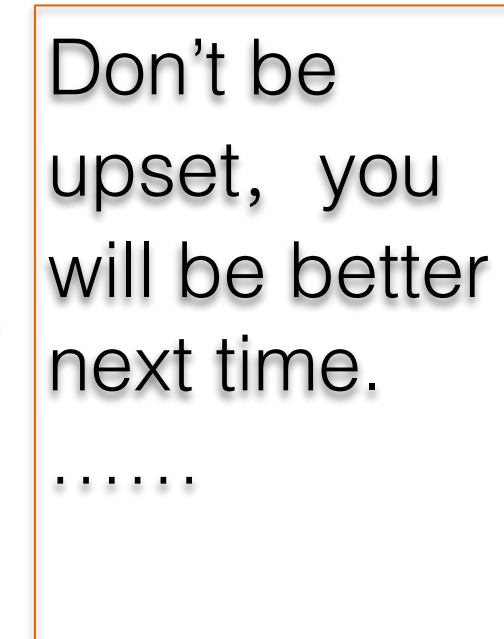
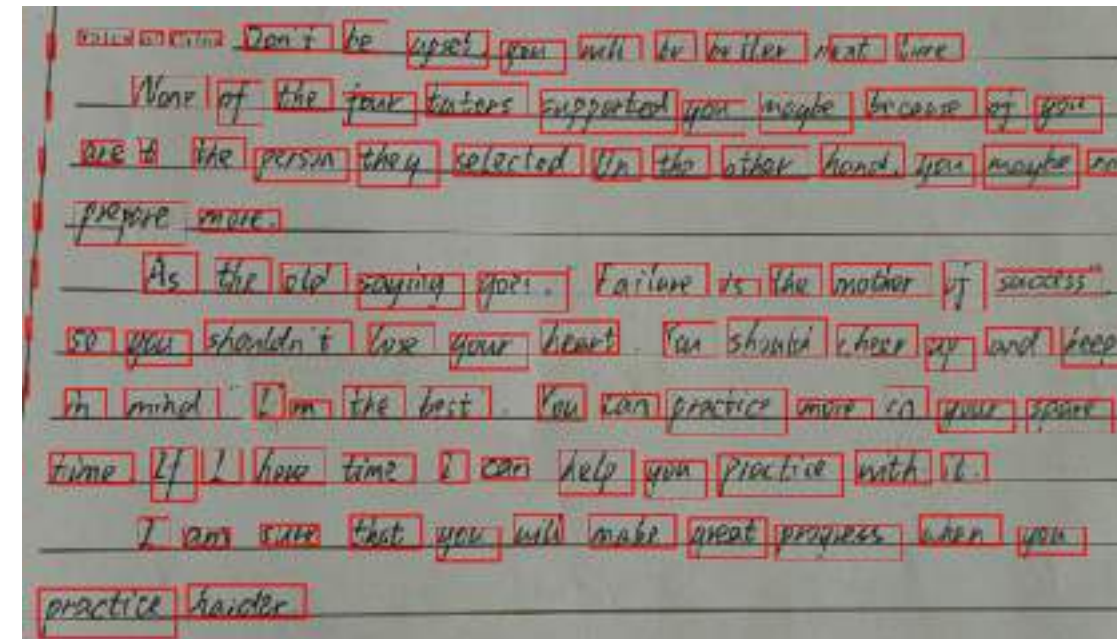
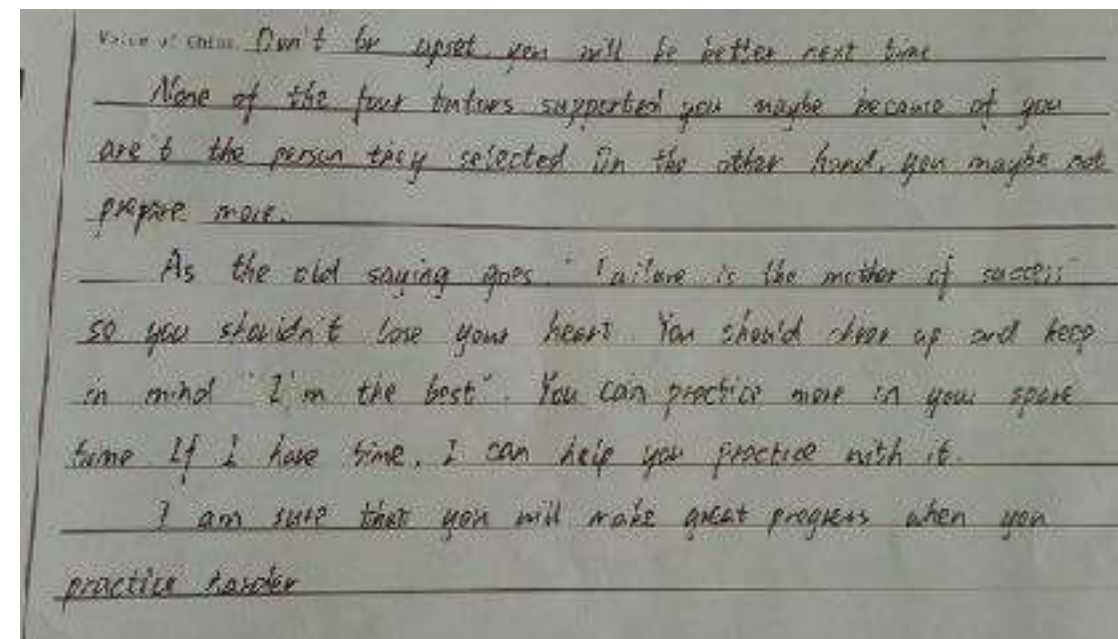


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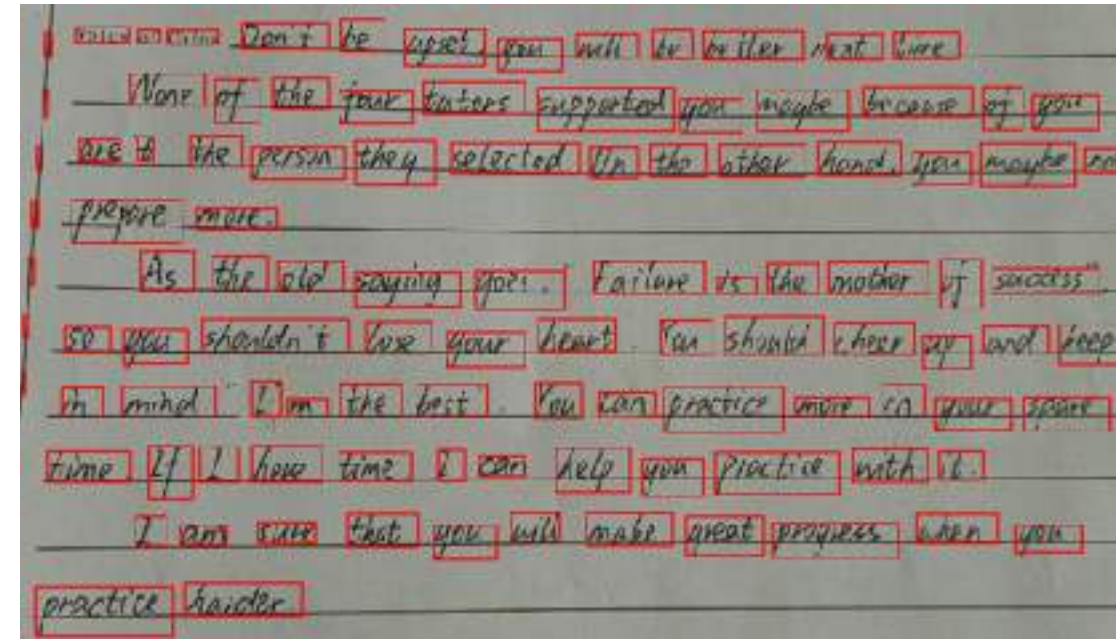
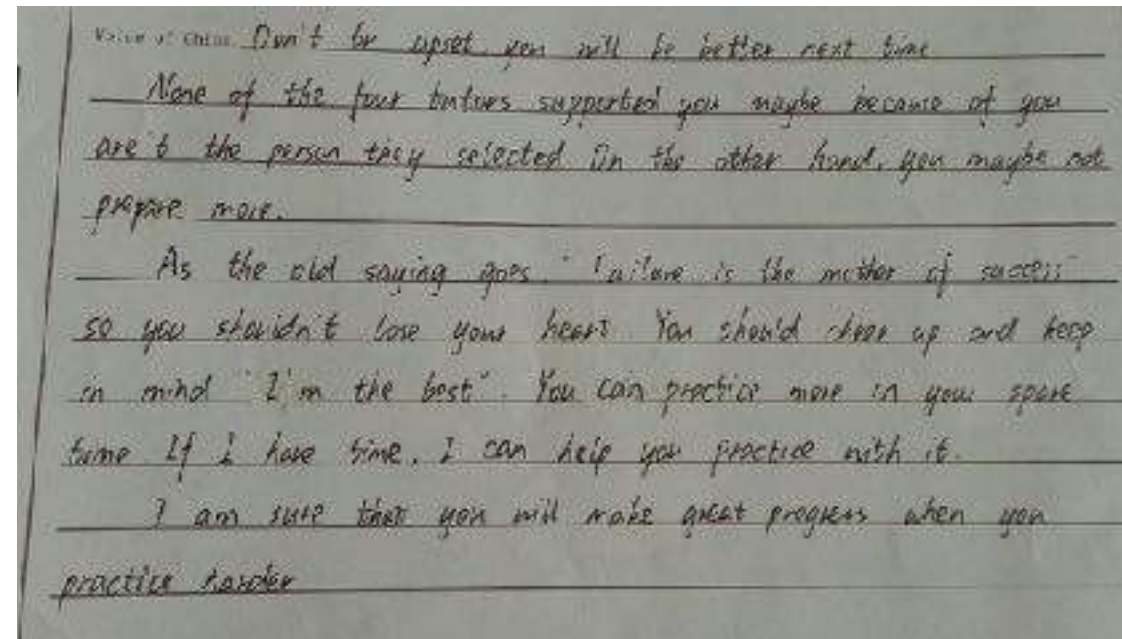
解决方案

再看一次场景

解决方案的落地

回顾

解决方案



充分的单词框标注数据

+

detection模型

??

?

充分的字符标注数据

+

识别模型 (CNN, RNN, CNN+RNN, ...)

?



解决方案

为了能快速落地...

传统方法:

1. 规则模型 (如, 对于图像来说基于连通域的规则)
2. 人工提取feature的判别模型
3.



解决方案

最后的模型很可能是

传统方法 ⊕ DL模型 ⊕ 传统方法补刀 ⊕ DL模型 ⊕ ...

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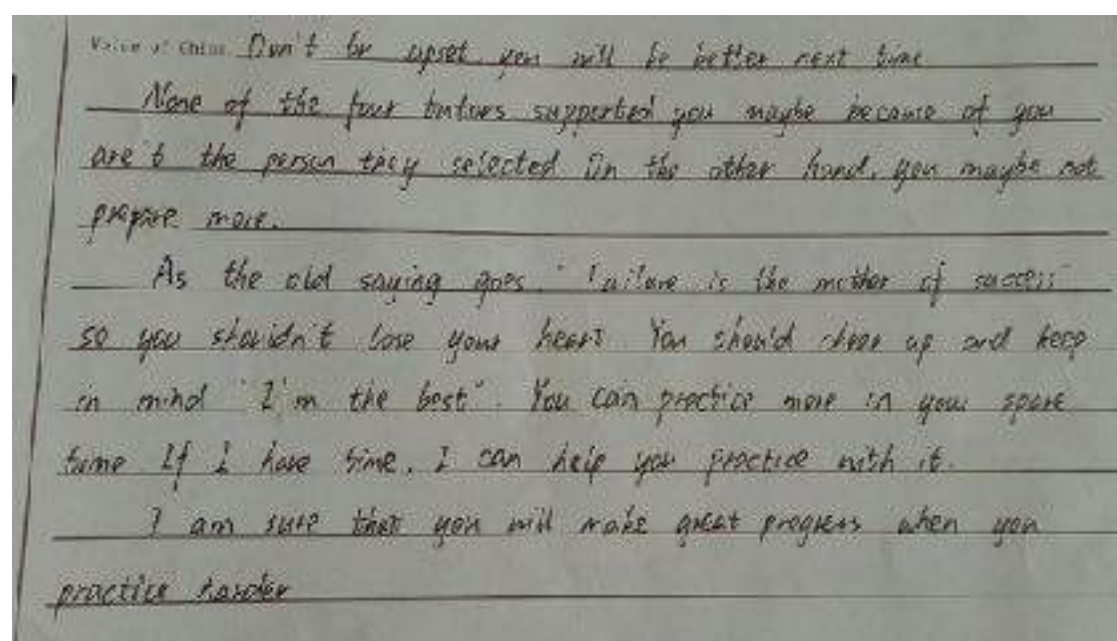
再看一次场景

解决方案的落地

回顾

再看一次场景

难点!



- +光照影响
- +模糊
- +倾斜



常见的真实
图片状况

- +印刷体的干扰 (印刷体应不参与评分)
- +批改笔记的干扰
- +删除字符



英语批改任务
相关的干扰项

- (+横格线的干扰)
- (+串行对顺序的干扰)

(注意: 文章中不能出现考生的真实姓名、校名和老师名, 否则不评分)

81. 本周末, 北京友谊商店正在做优惠促销活动, 请根据下面的商品信息为该商店写一则广告, 介绍店内的商品名称及价格。

- 男孩的运动鞋每双 20 元, 有各种颜色;
- 绿色短裙每件 14 元;
- 黄色运动袜每双 5 元;
- 白色衬衣每件 20 元, 购三件每件 18 元。

Beijing Friendship Store Sale!

This weekend, our store will have a sale activity. The pair of boy's sports shoes is 20 yuan. It has kinds of color. The green skirts is 14 yuan. The yellow sports socks are 5 yuan. The white shirt is 20 yuan. If you buy three shirts the price is 18 yuan. Welcome to our store.

难点!

第四步: 整理成文 (总分: 10 分)

Learning English is hard. I'm glad to know, student Learning English is well. Practise English everyday is important, and in class listen carefully and take note is homework is also important to study English. In addition, listen English program, read newspaper or story are helpful your reading ability. Keep diary in English everyday to is improved your English and some helpful to your time.

My Learning English deficiencies is: composition is not good. Because, I don't take too much time in it. however, I should more read and write to improved the English level.

Learning English is very important. Good luck!

Share and write about your last weekend with your partners. (与同伴分享你上周末的事, 并写下来。)

Last Weekend

Last weekend. I was at home. It was sunny. First, I had fun with friends. Next, I watched TV. After that, I ate some cotton candy. I was really happy.

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解决方案

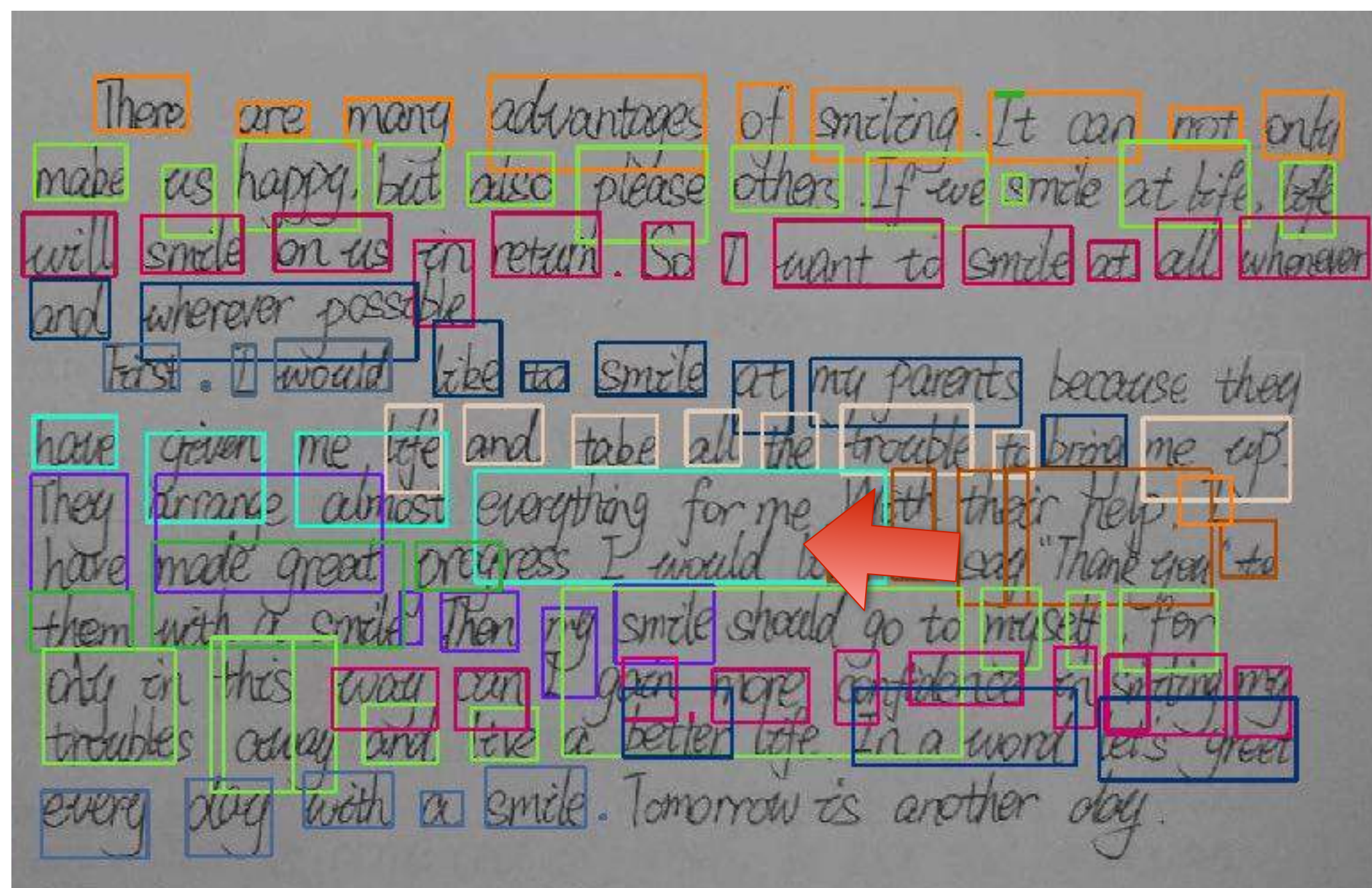
再看一次场景

解决方案的落地

回顾

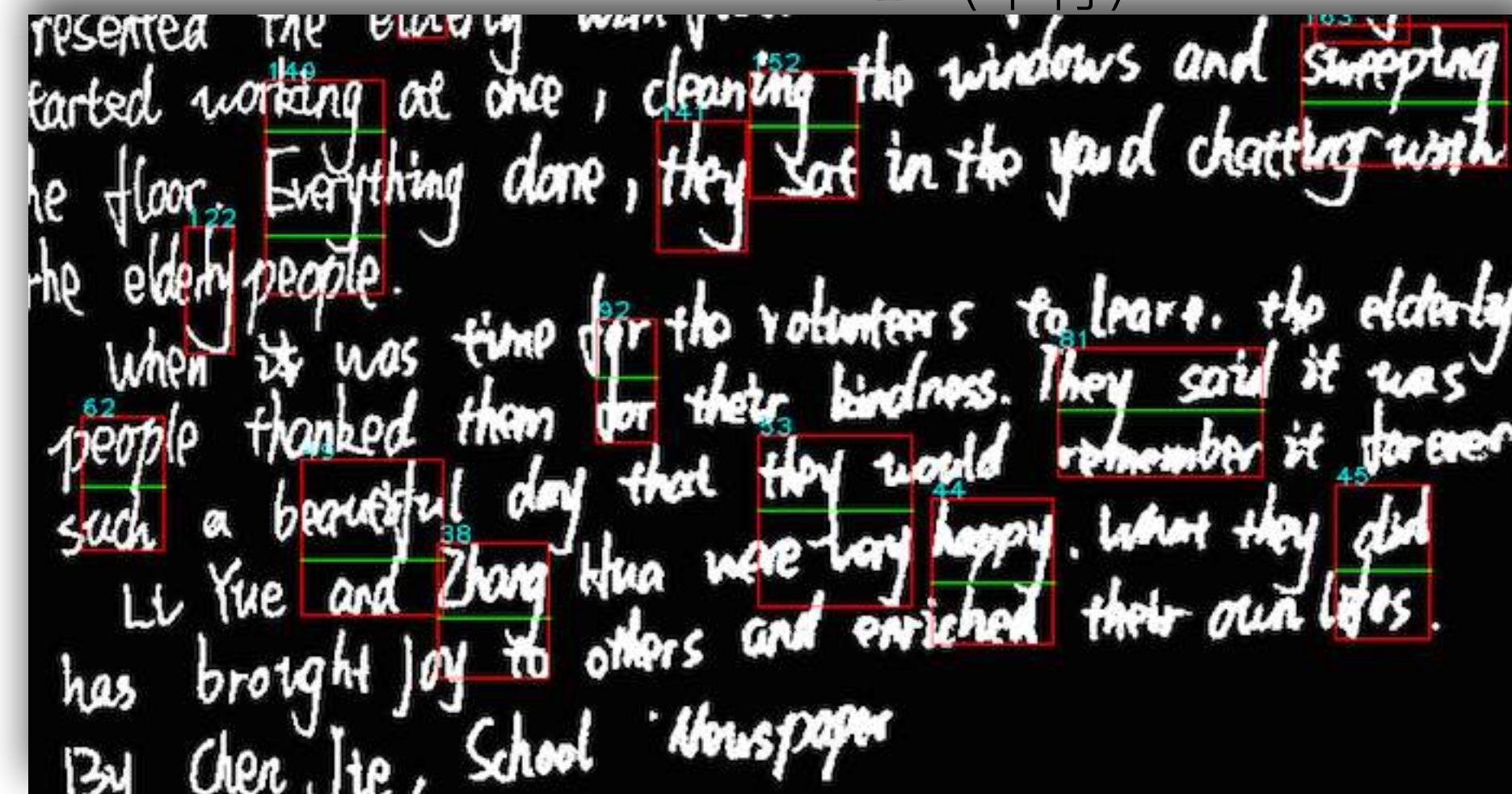
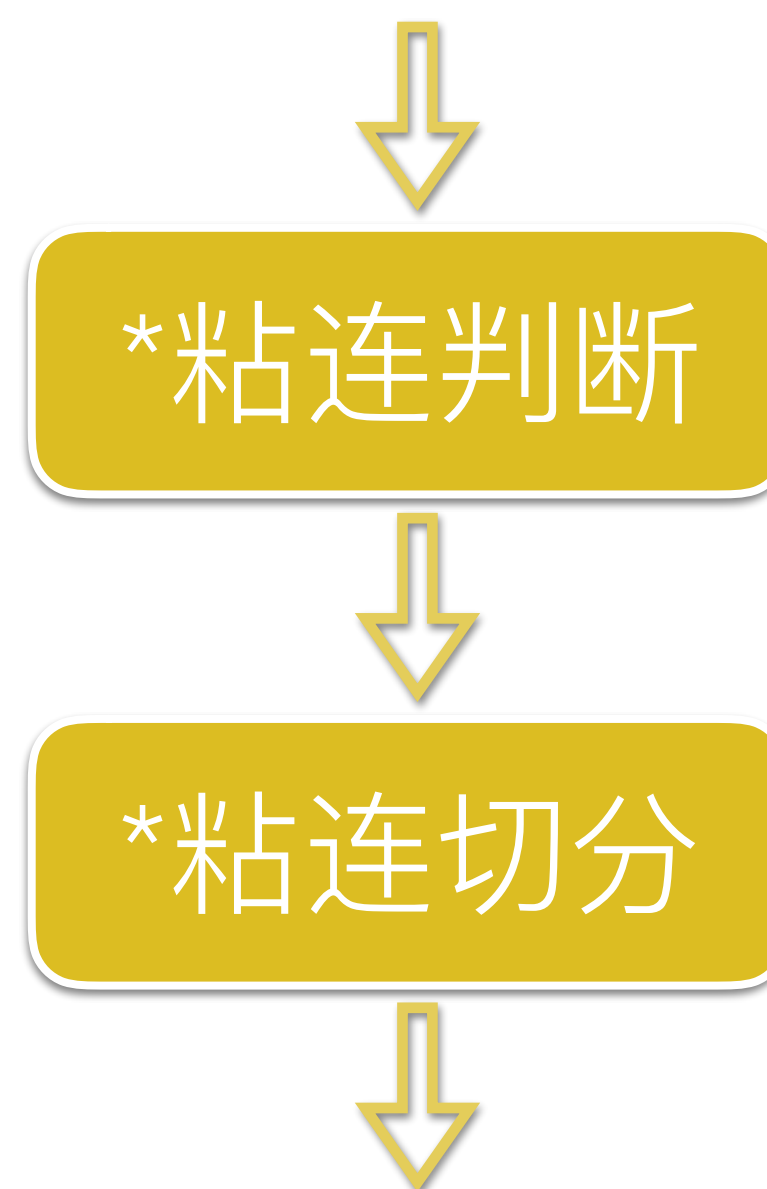
传统方法baseline

- 光照影响
- 模糊
- 倾斜
- 印刷体的干扰
- 批改笔迹的干扰
- 删除字符
- (横格线的干扰)
- (串行)



传统方法baseline

- 光照影响
- 模糊
- 倾斜
- 印刷体的干扰
- 批改笔迹的干扰
- 删除字符
- (横格线的干扰)
- (串行)



传统方法baseline

- ☑ 光照影响
- ☑ 模糊
- ☑ 倾斜
- ☑ 印刷体的干扰
- ☑ 批改笔迹的干扰
- ☑ 删除字符
- ☑ (横格线的干扰)
- ☑ (串行)



- Class 1: 印刷体区域
- Class 2: 删除区域
- Class 3: 批改区域
- Class 4: 常规英文手写区域

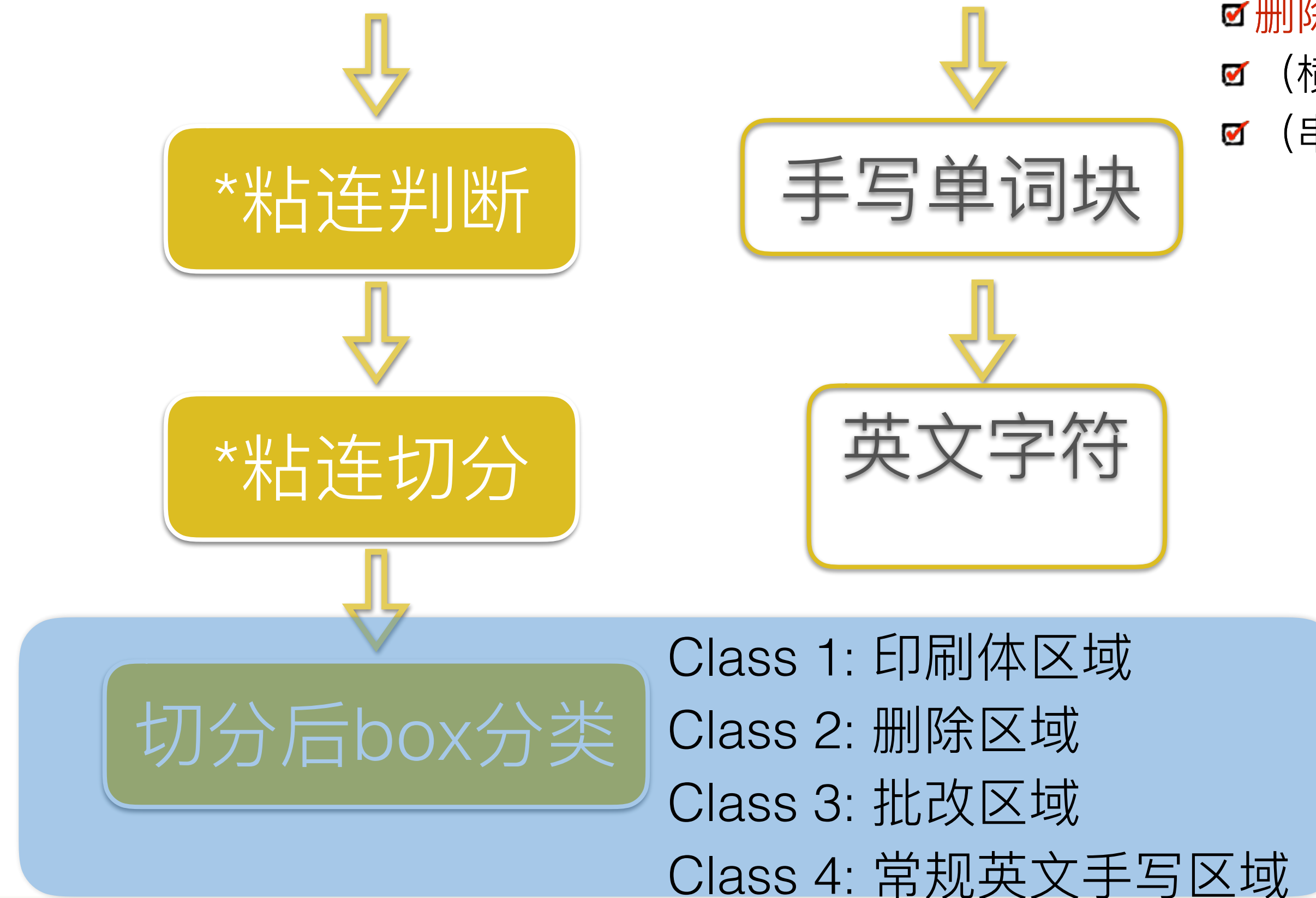
从何处推进DL模型的落地?

传统模型不够简洁优美? 实用性上考虑!



传统方法baseline

- ☑ 光照影响
- ☑ 模糊
- ☑ 倾斜
- ☑ 印刷体的干扰
- ☑ 批改笔迹的干扰
- ☑ 删除字符
- ☑ (横格线的干扰)
- ☑ (串行)

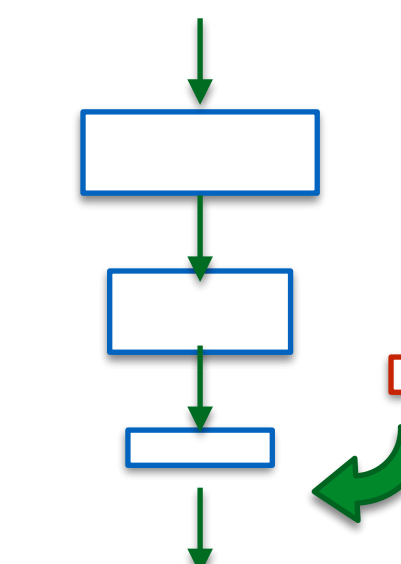
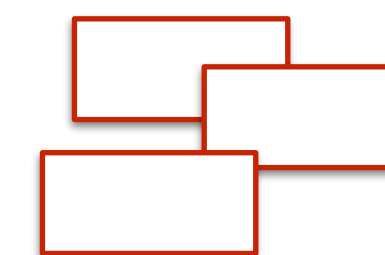
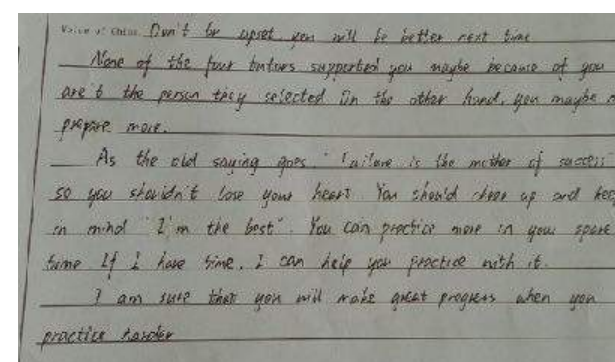


DL模型替代

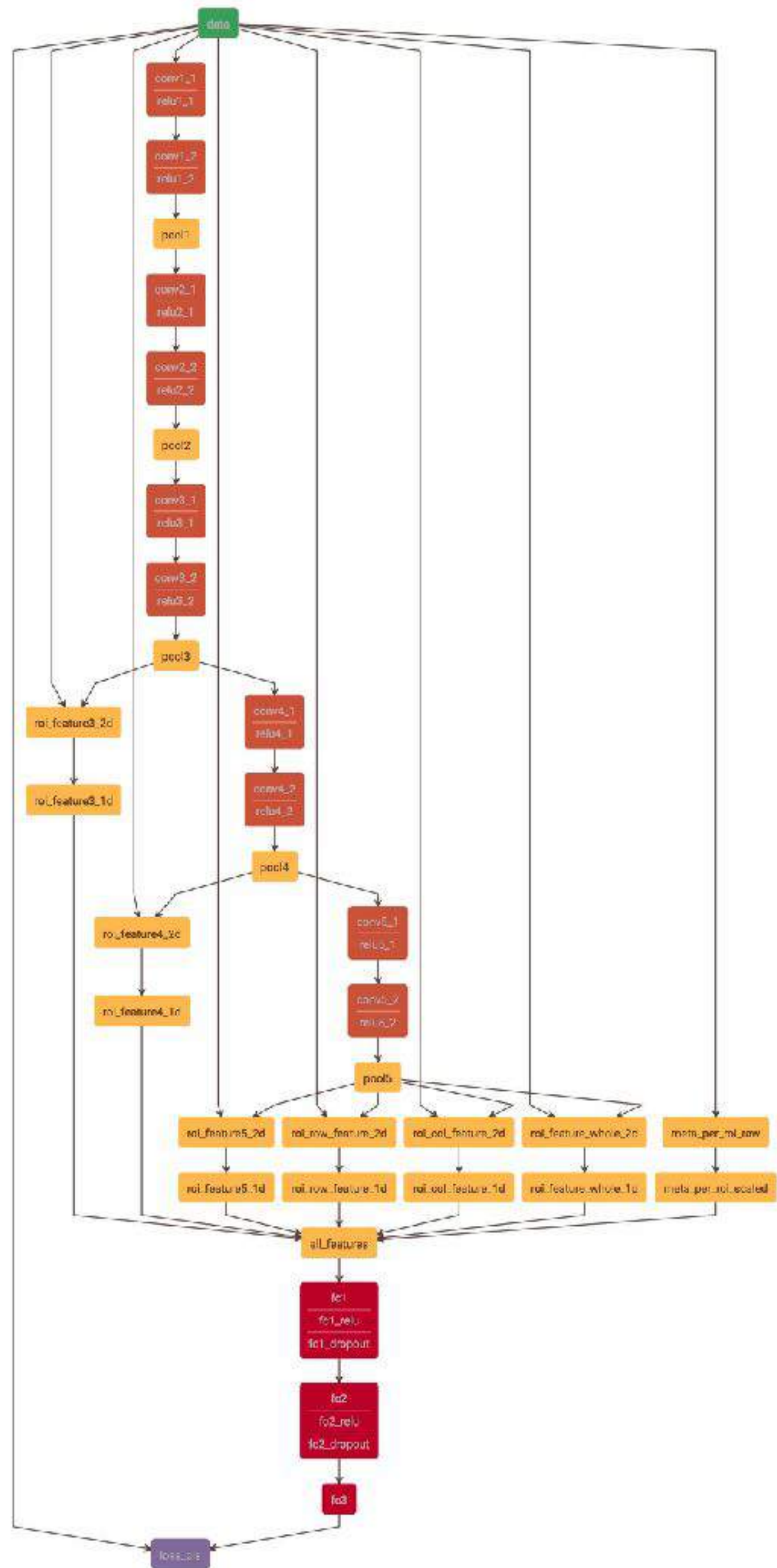
切分后box分类

- Class 1: 印刷体区域
- Class 2: 删除区域
- Class 3: 批改区域
- Class 4: 常规英文手写区域

手写单词



多类别分类



Dear Jack,

You have three ways to get to Xinhua Cinema. You can go there on foot. It takes you 40 minutes. You also can go by taxi. It takes 10 minutes, and you should pay 15 yuan. You can go to the cinema by bus. It takes you 20 minutes, you should pay 1 yuan. Then you should walk about 3 minutes. Which one do you think is the best?

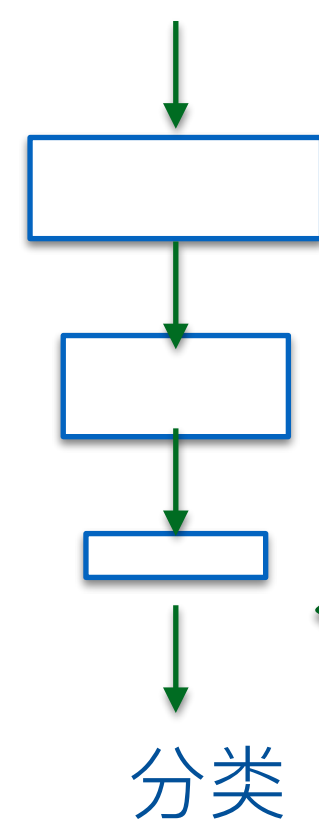
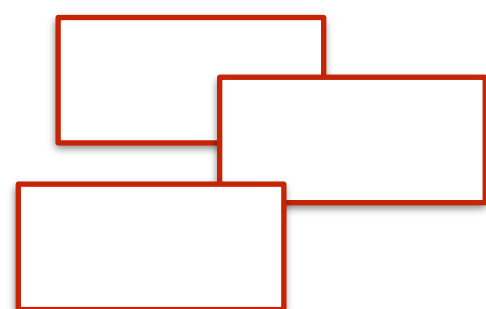
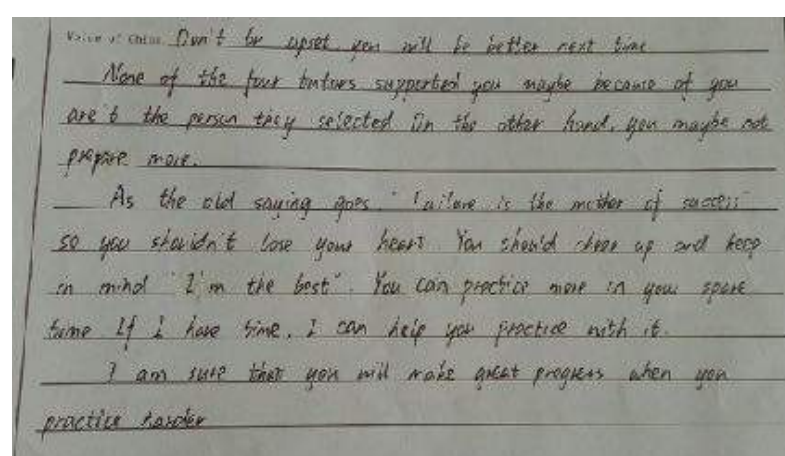
Yours,
Li Hua

DL模型替代

- ☑ 光照影响
- ☑ 模糊
- ☑ 倾斜
- ☑ 印刷体的干扰
- ☑ 批改笔迹的干扰
- ☑ 删除字符
- ☑ (横格线的干扰)
- ☑ (串行)

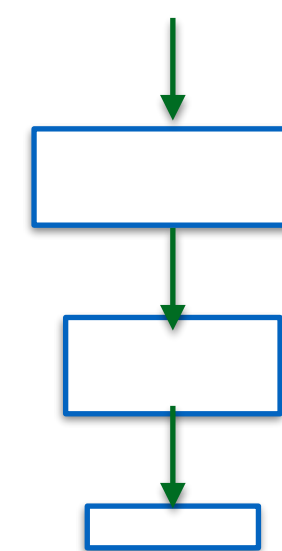
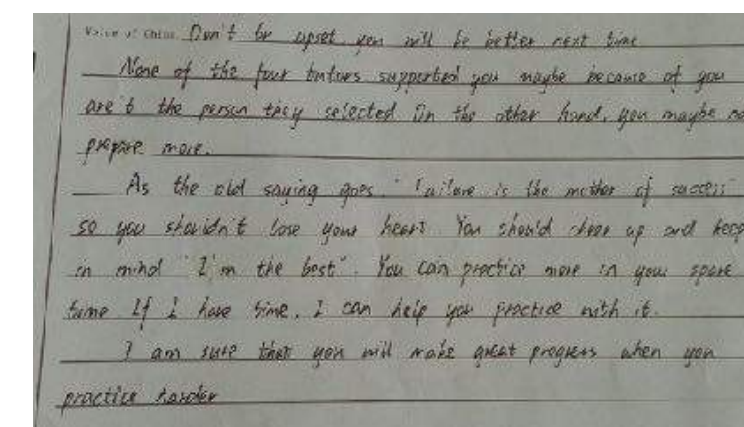


DL的推进



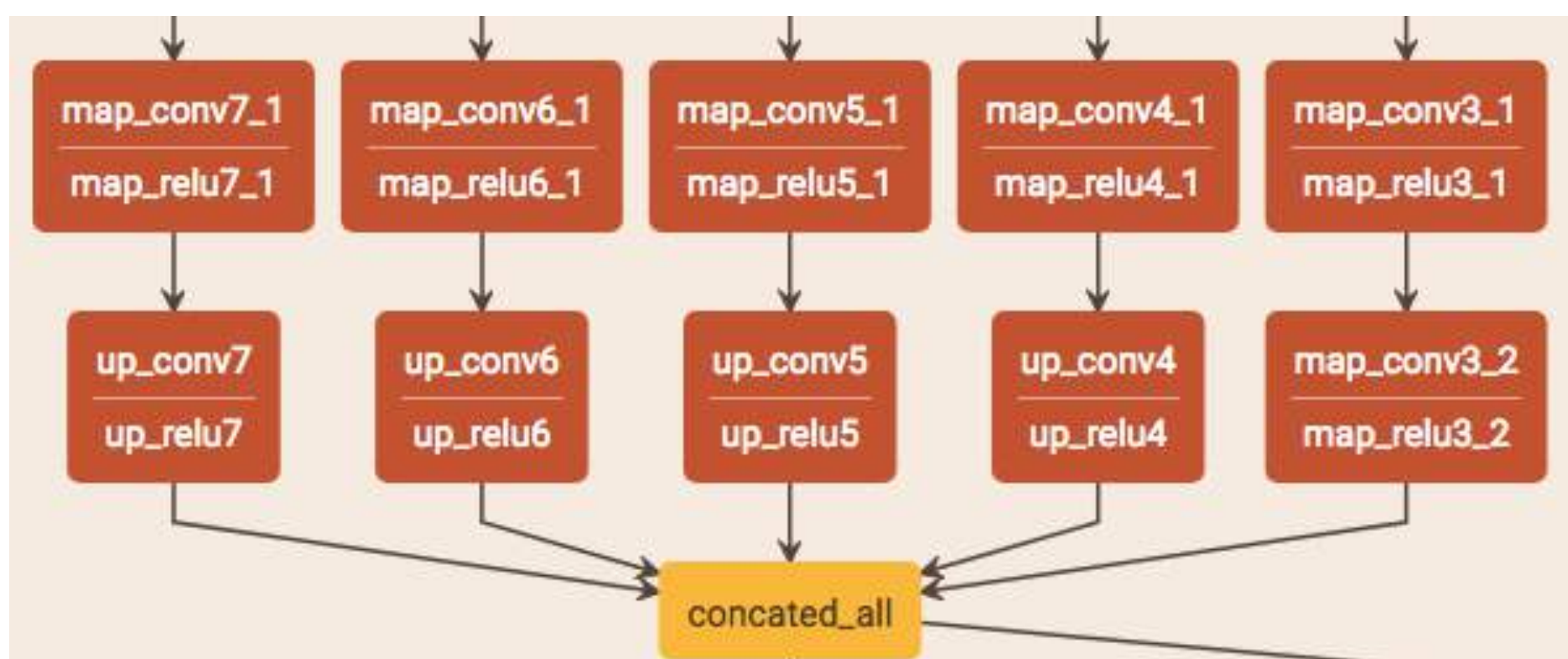
对象：每个
现有框

标注数据集



feature map上每一点
(原图8x8区域)的
“是/不是英文手写”的
分类

对象：原图每8x8
像素块



```

# Mapping 7
n.map_conv7_1, n.map_relu7_1 = conv_relu(n.pool7, num_output=512)
n.up_conv7, n.up_relu7 = deconv_relu(n.map_relu7_1, num_output=512,
    kernel_size=16, stride=16)

# Mapping 6
n.map_conv6_1, n.map_relu6_1 = conv_relu(n.pool6, num_output=512)
n.up_conv6, n.up_relu6 = deconv_relu(n.map_relu6_1, num_output=512,
    kernel_size=8, stride=8)

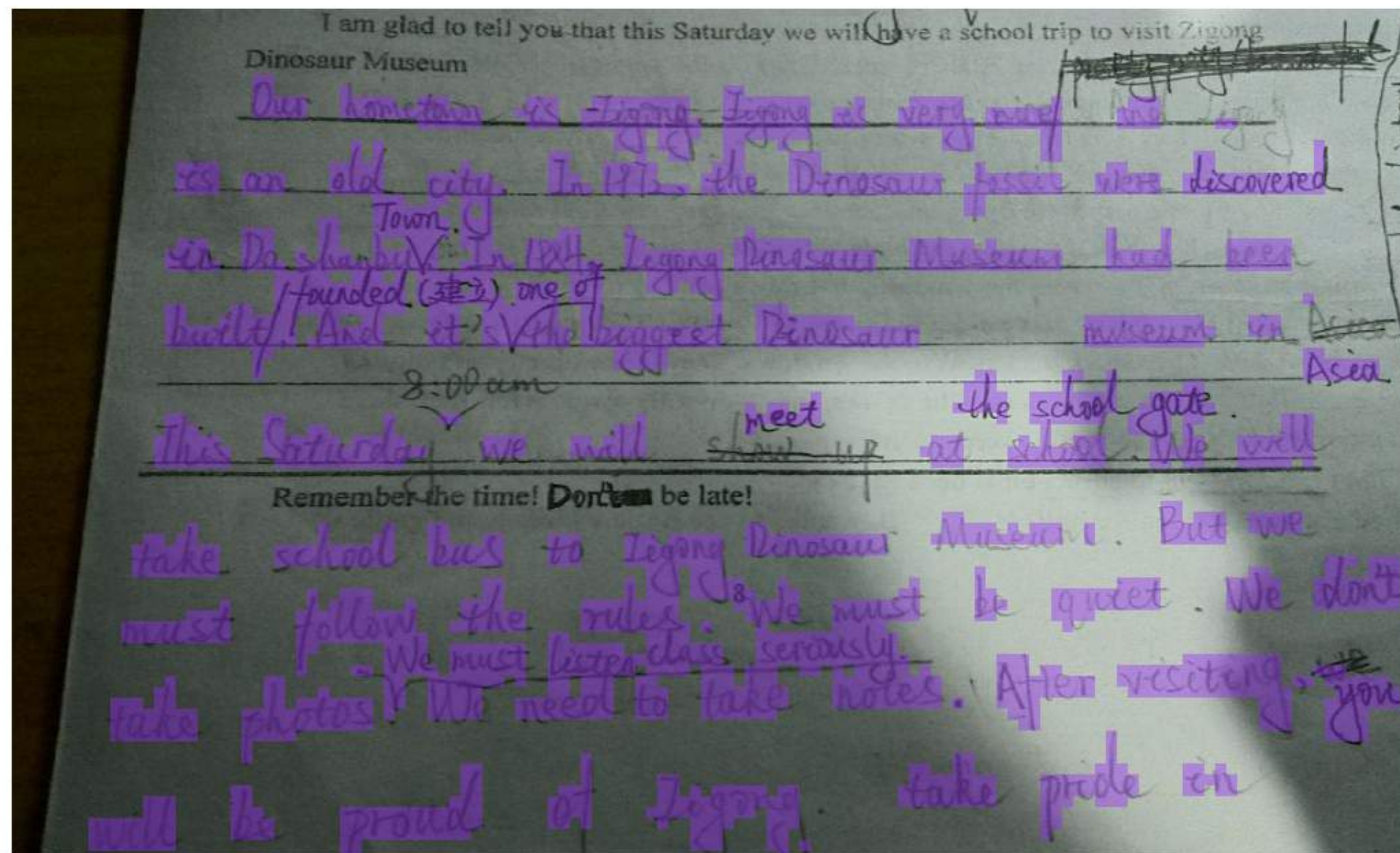
# Mapping 5
n.map_conv5_1, n.map_relu5_1 = conv_relu(n.pool5, num_output=512)
n.up_conv5, n.up_relu5 = deconv_relu(n.map_relu5_1, num_output=512,
    kernel_size=4, stride=4)

# Mapping 4
n.map_conv4_1, n.map_relu4_1 = conv_relu(n.pool4, num_output=256)
n.up_conv4, n.up_relu4 = deconv_relu(n.map_relu4_1, num_output=256)

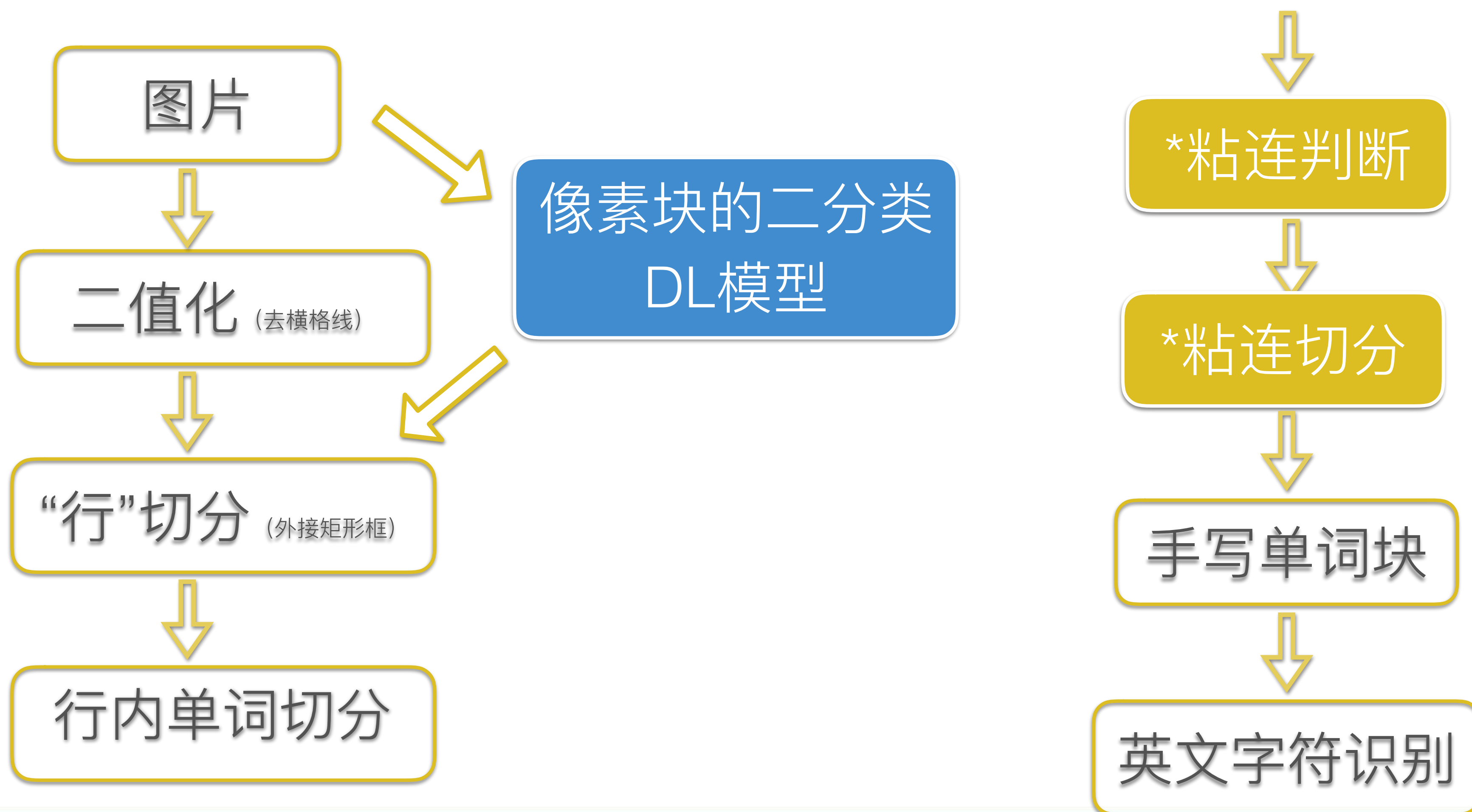
# Mapping 3
n.map_conv3_1, n.map_relu3_1 = conv_relu(n.pool3, num_output=128)
n.map_conv3_2, n.map_relu3_2 = conv_relu(n.map_relu3_1, num_output=128)
n.concated_all = L.Concat(n.map_relu3_2, n.up_relu4, n.up_relu5, n.up_relu6, n.up_relu7)

# fc 1
n.fc_conv1_1, n.fc_relu1_1 = conv_relu(n.concated_all, num_output=1024)
n.fc_conv1_2, n.fc_relu1_2 = conv_relu(n.fc_relu1_1, num_output=1024)
n.fc_conv1_3, n.fc_relu1_3 = conv_relu(n.fc_relu1_2, num_output=4)

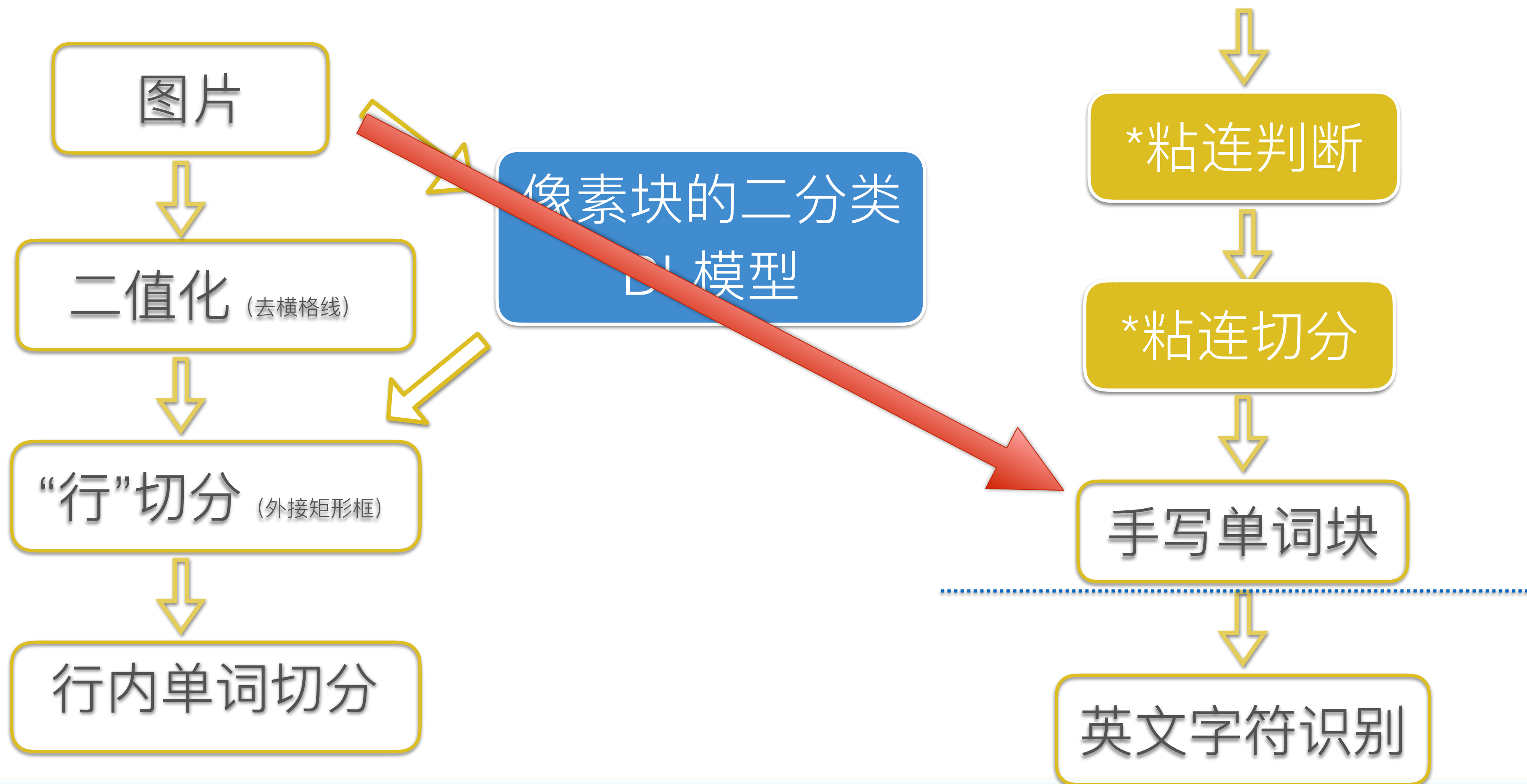
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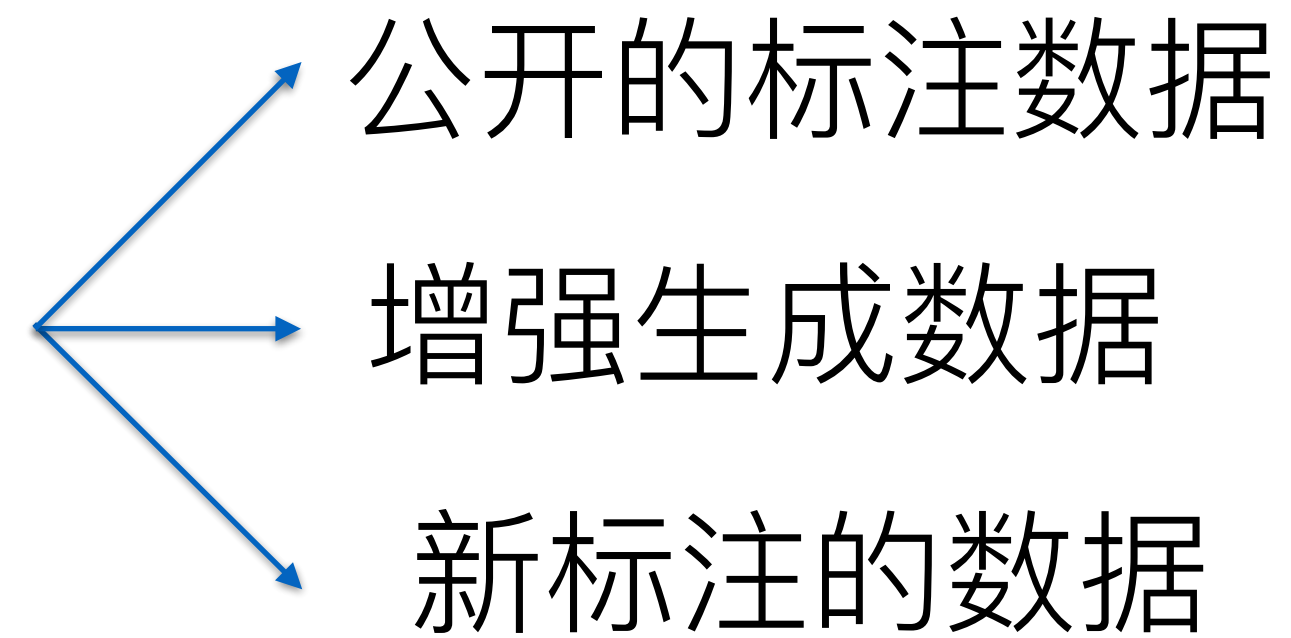
DL的推进



进一步推进?



DL识别模型



中国学生的英文手写vs.
外国人手写
【要符合你面对的真实数据的
特点和分布】

- CNN
- RNN
- CNN+RNN
- CNN+RNN+CTC
-

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场景

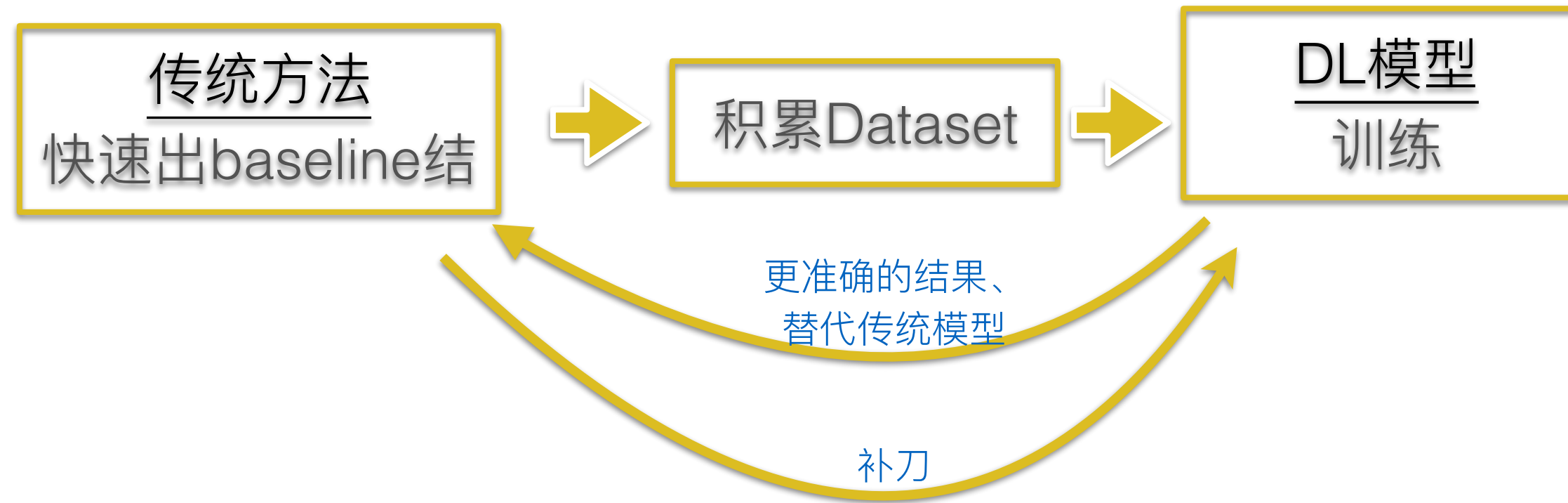
解决方案

再看一次场景

解决方案的落地

回顾

回顾



从何处推进DL模型的落地？传统模型不够简洁优美？实用性上考虑！

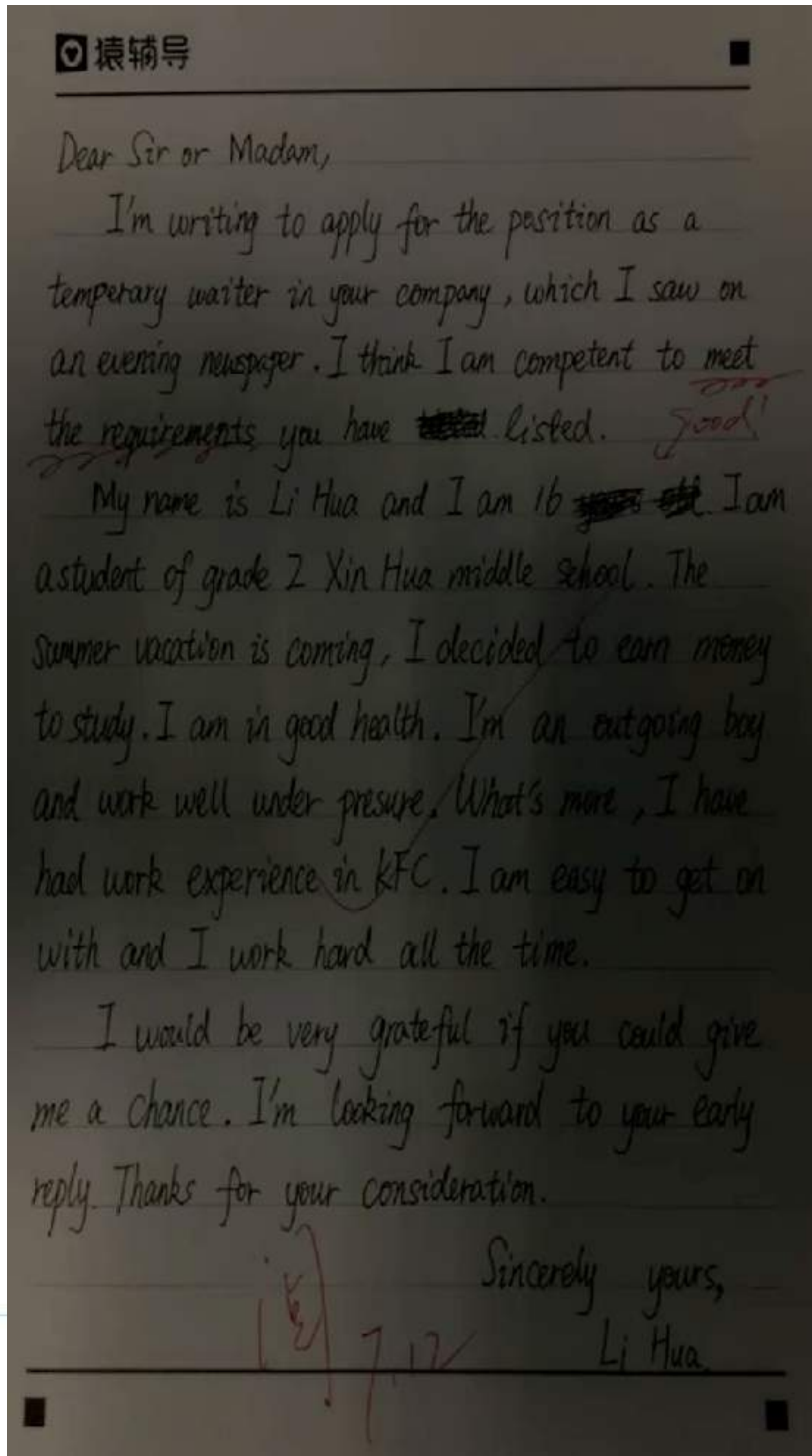


(传统方法) ⊕ DL模型 ⊕ (传统方法补刀) ⊕ DL模型 ⊕ ...

落地



欢迎大家的
提问和交流!



落地



Thanks!

