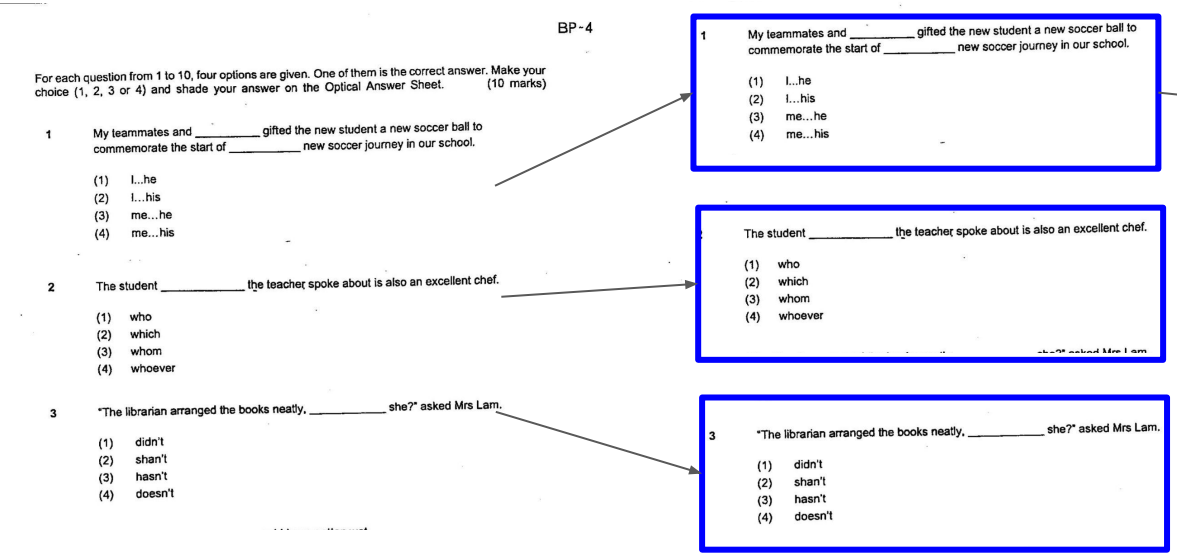
Yolo x OCR

to extract question information

19-4-2023

Targets



BP-4

For each question from 1 to 10, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4) and shade your answer on the Optical Answer Sheet. (10 marks)

1 My teammates and _____ gifted the new student a new soccer ball to commemorate the start of _____ new soccer journey in our school.

(1) I...he
(2) I...his
(3) me...he
(4) me...his

2 The student _____ the teacher spoke about is also an excellent chef.

(1) who
(2) which
(3) whom
(4) whoever

3 "The librarian arranged the books neatly, _____ she?" asked Mrs Lam.

(1) didn't
(2) shan't
(3) hasn't
(4) doesn't

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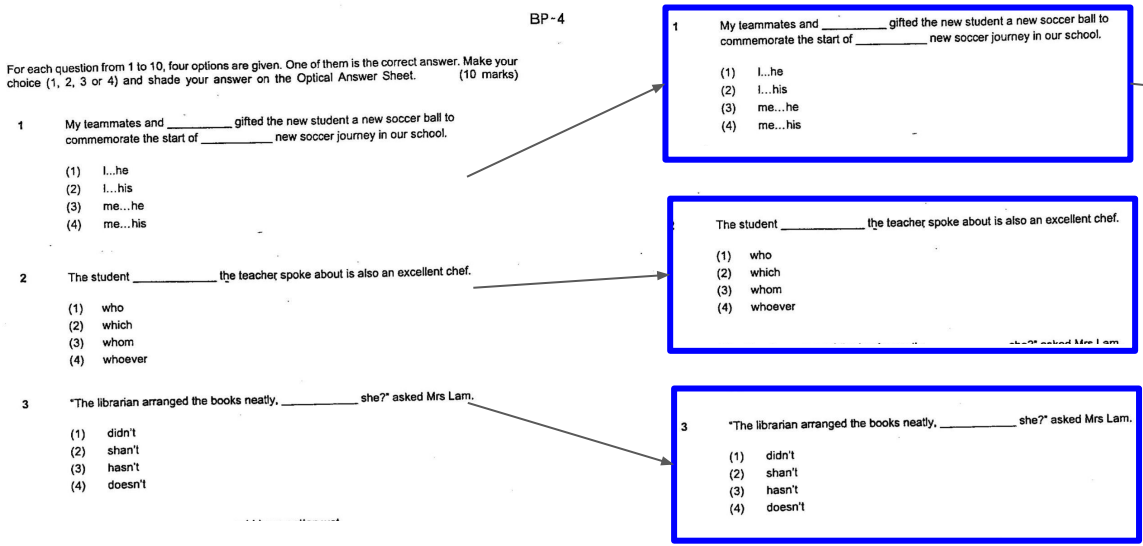
(3) hasn't
(4) doesn't

Question: “My teammate…. and”
choice : [“i..he”, “I..his”, “me..he”, “me..he”]

Targets



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Question: “My teammate…. and”
choice : [“i..he”, “I..his”, “me..he”, “me..he”]

Phase I
Detect question fragments

Yolov8

Phase II

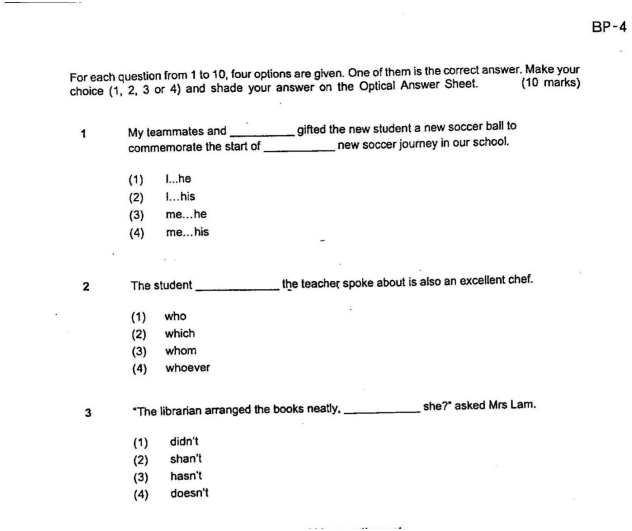
Convert image to text

mathpix OCR/ PPOCR,...

Label Convention for Labeling Dataset

I assume that a exam paper constructed by 8 main elements:

- Heading
- Question
- Auxiliary text
- Subquestion
- Blank field
- Choice
- Image
- Table



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(3) hasn't
(4) doesn't

Heading

↓ contain

Question

↓ contain

Subquestion

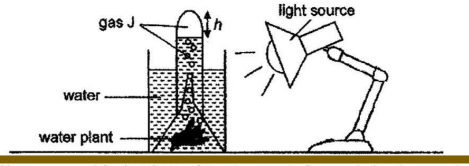
↓ contain

Auxiliary_text, blank, choice, image, table

Label Convention

1. Question
2. Auxiliary text
3. Subquestion
4. Blank field

34. Xiao Nan conducted an experiment to find out which coloured light allows the highest rate of photosynthesis to take place. He prepared three similar set-ups as shown. Each set-up was placed under different coloured lights.



Xiao Nan measured the height, *h*, of the air space before and after the experiment for each set-up and recorded the results in the table below. During the experiment, Xiao Nan noticed that the water plant was producing gas J.

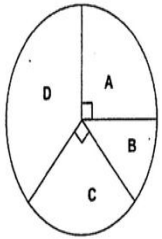
Colour of light	*h* (cm) before experiment	*h* (cm) after experiment
Red	3.0	3.5
Blue	3.0	4.0
Green	3.0	3.1

(a) Identify gas J. (1m)

(b) What conclusion could Xiao Nan make based on the results of his experiment? (1m)

(c) Xiao Nan conducted his experiment in a dark room. Explain how this had helped to ensure a fair test. (1m)

10. The pie chart shows the number of four types of buns sold by a shop in a day.



Which of the following tables below best represents the information in the pie chart?

1)

Types of buns	Number of buns sold
A	60
B	90
C	90
D	120

2)

Types of buns	Number of buns sold
A	90
B	120
C	90
D	60

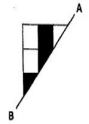
3)

Types of buns	Number of buns sold
A	80
B	40
C	80
D	70

4)

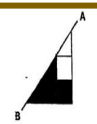
Types of buns	Number of buns sold
A	80
B	40
C	80
D	120

9.



Half of a symmetric figure is shown above. AB is the line of symmetry. Which of the following completes the symmetric figure?

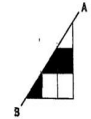
1)



2)

3)

4)



A5

Label Convention

4.Choice

5.Table

6.Image

7. Heading

Questions 1 to 10 carry 1 mark each. Questions 11 to 15 carry 2 marks each. For each question, four options are given. One of them is the correct answer. Make your choice. (1, 2, 3 or 4). Shade the correct oval (1, 2, 3, or 4) on the Optical Answer Sheet.

(20 marks)

1. What is the value of 4 hundreds, 9 tenths and 7 hundredths?

(1) 409.7
(2) 409.07
(3) 400.907
(4) 400.97

Which of the following tables below best represents the information in the pie chart?

1)

Types of buns	Number of buns sold
A	60
B	90
C	90
D	120

2)

Types of buns	Number of buns sold
A	90
B	120
C	90
D	60

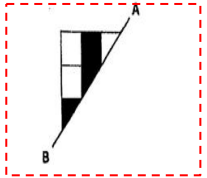
3)

Types of buns	Number of buns sold
A	80
B	40
C	80
D	70

4)

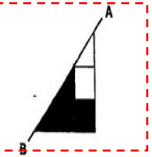
Types of buns	Number of buns sold
A	80
B	40
C	80
D	120

9.

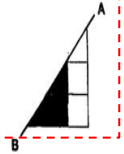


Half of a symmetric figure is shown above. AB is the line of symmetry. Which of the following completes the symmetric figure?

1)

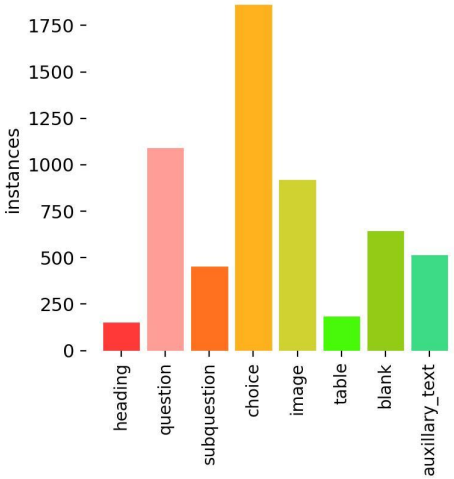


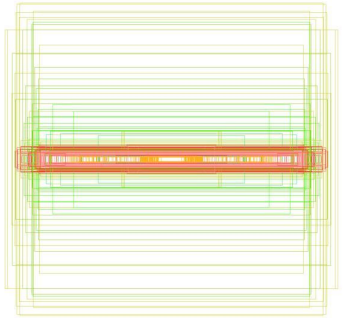
2)

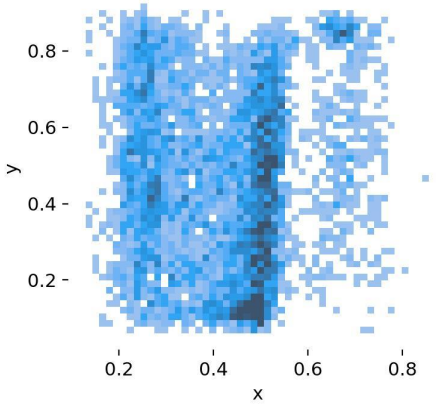


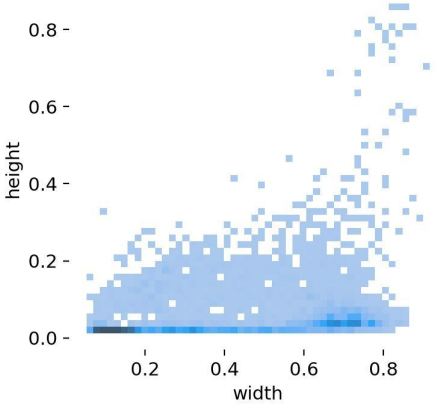
Labeling data

- I used **PPOCRLabelv2** tool,
- 1000 image(pdf page)
- 800 image for training
- 86 image for validation
- 86 image for testing



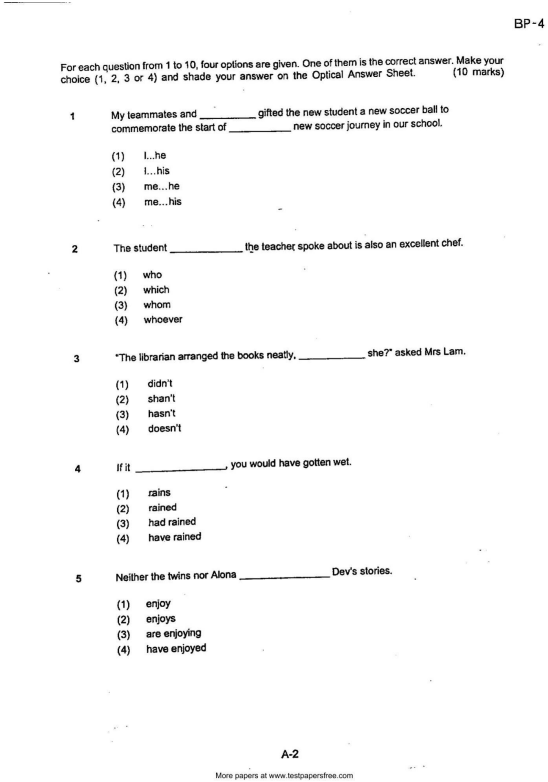






Section Detection/Segmentation

- I trained Yolov8m (medium size) on 800 image(pdf page) manually labeled.
- code
- Consumption:
  - 5 hours on CPU
  - 15G Ram (for input 600 x 800)



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(2) which
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(4) whoever

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4 If it _____, you would have gotten wet.

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(2) rained
(3) had rained
(4) have rained

5 Neither the twins nor Alona _____ Dev's stories.

(1) enjoy
(2) enjoys
(3) are enjoying
(4) have enjoyed

A-2

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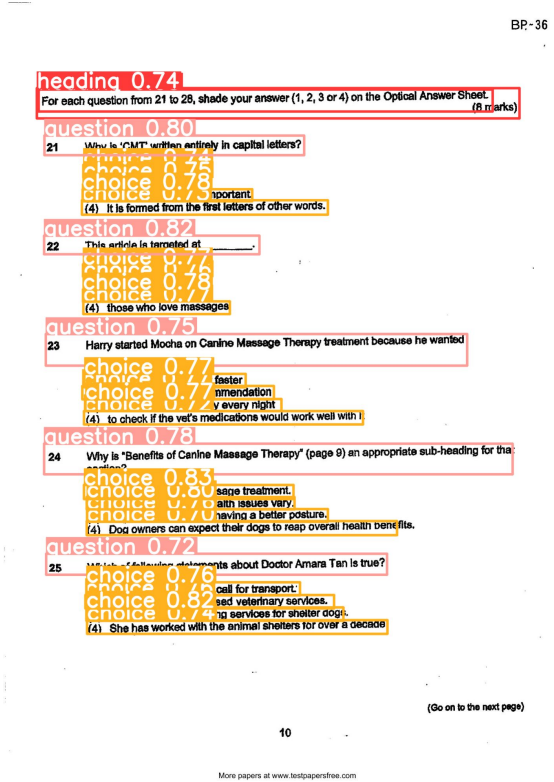

BP-36

For each question from 21 to 28, shade your answer (1, 2, 3 or 4) on the Optical Answer Sheet. (8 marks)

21 Why is 'CMT' written entirely in capital letters?
(4) It is formed from the first letters of other words.

22 This article is targeted at _____.
(4) those who love massages

23 Harry started Mocha on Canine Massage Therapy treatment because he wanted
(4) to check if the vet's medications would work well with t

24 Why is "Benefits of Canine Massage Therapy" (page 9) an appropriate sub-heading for tha
(4) Dog owners can expect their dogs to reap overall health benefits.

25 [illegible] about Doctor Amara Tan is true?
(4) She has worked with the animal shelters for over a decade

(Go on to the next page)

10

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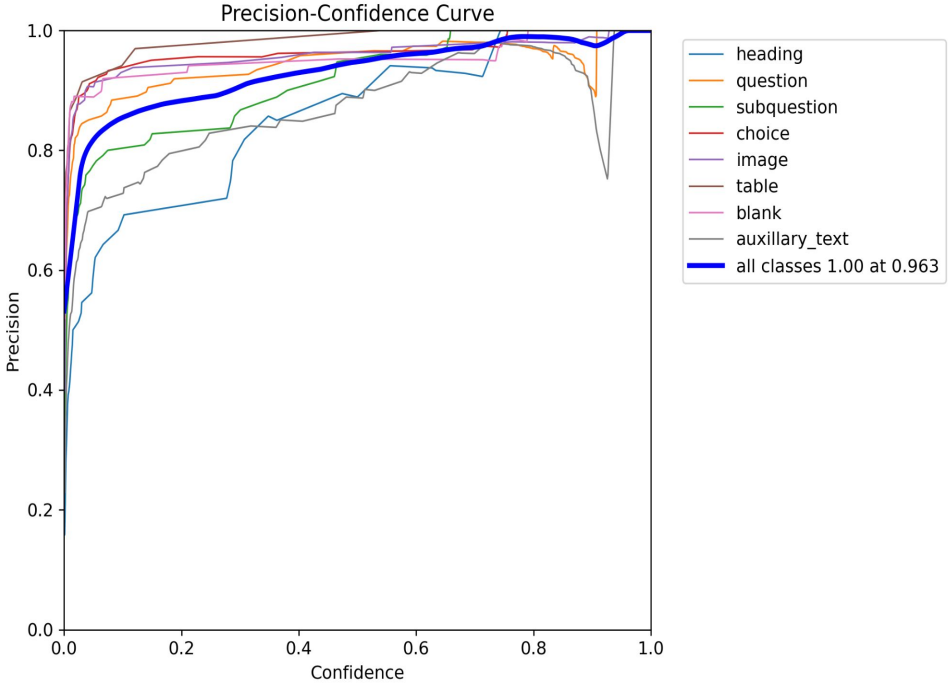
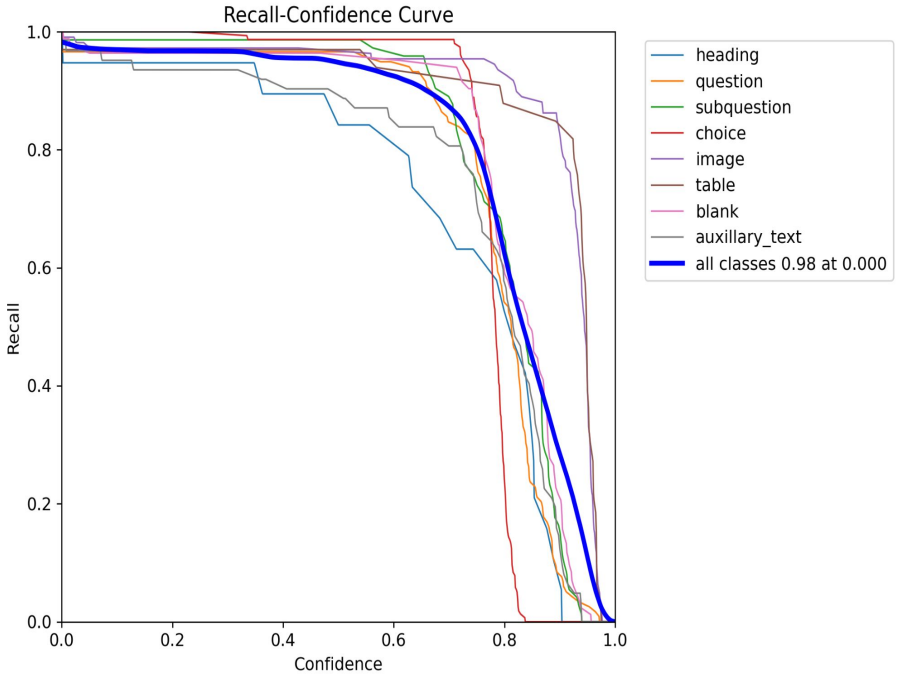
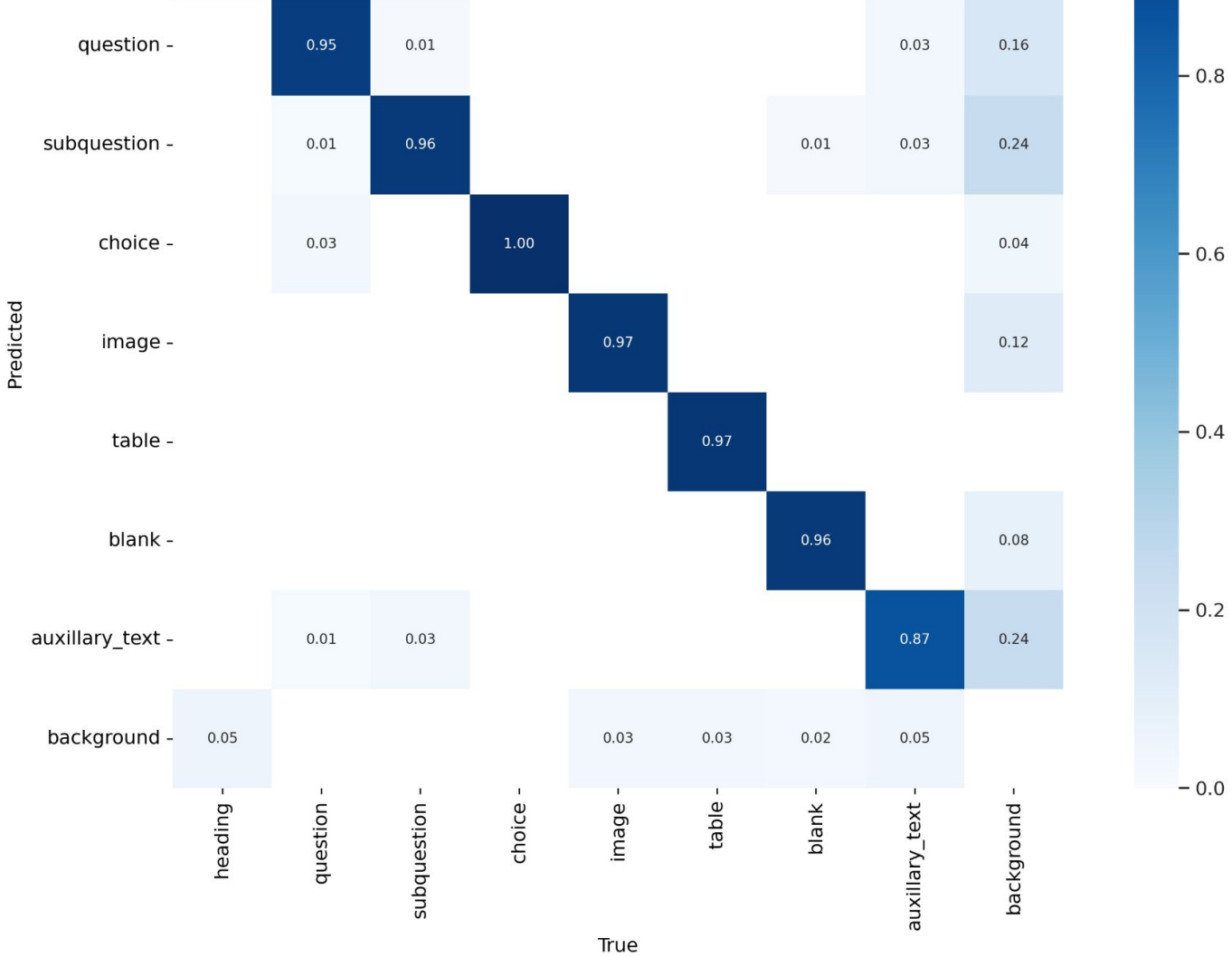
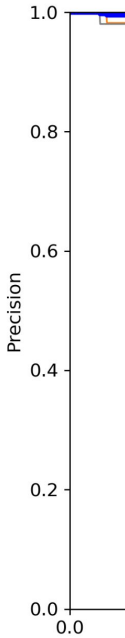
Section Detection/Segmentation

Performance



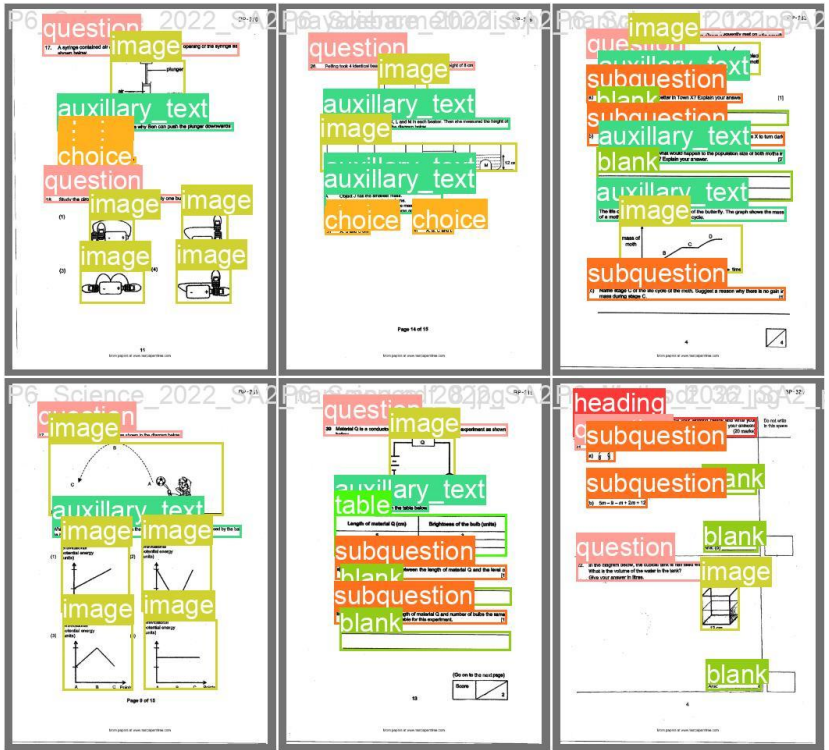



Predicted
True
question
subquestion
choice
image
table
blank
auxillary_text
background
heading
0.95 0.01 0.03 0.16
0.01 0.96 0.01 0.03 0.24
0.03 1.00 0.04
0.97 0.12
0.97
0.96 0.08
0.01 0.03 0.87 0.24
0.05 0.03 0.03 0.02 0.05
0.0 0.2 0.4 0.6 0.8

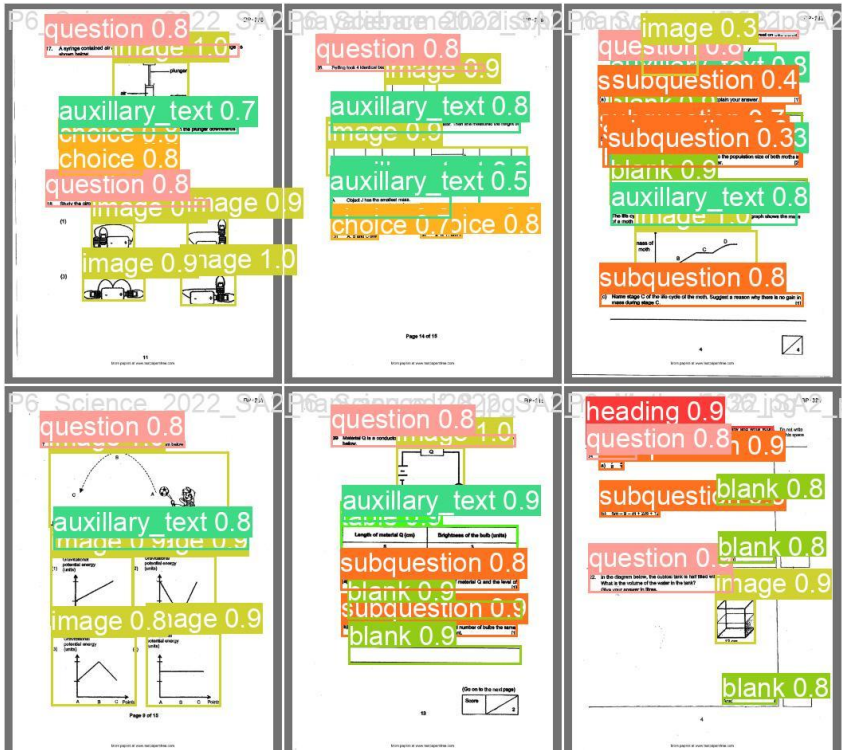

Precision
0.0 0.2 0.4 0.6 0.8 1.0
0.0

Section Detection/Segmentation

Ground Truth



Prediction



Grouping elements

Heading = 3

↓

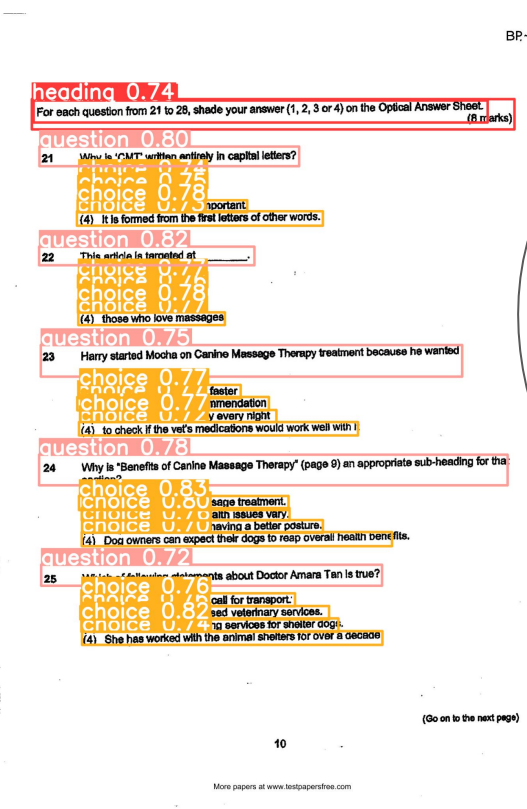
Question = 2

↓

Subquestion = 1

↓

Auxiliary_text, blank, choice, image, table = 0



[3, 2, 0, 0, 0, 2, 0, 0, 0, 0, 2, 0, 0, 0]

↓

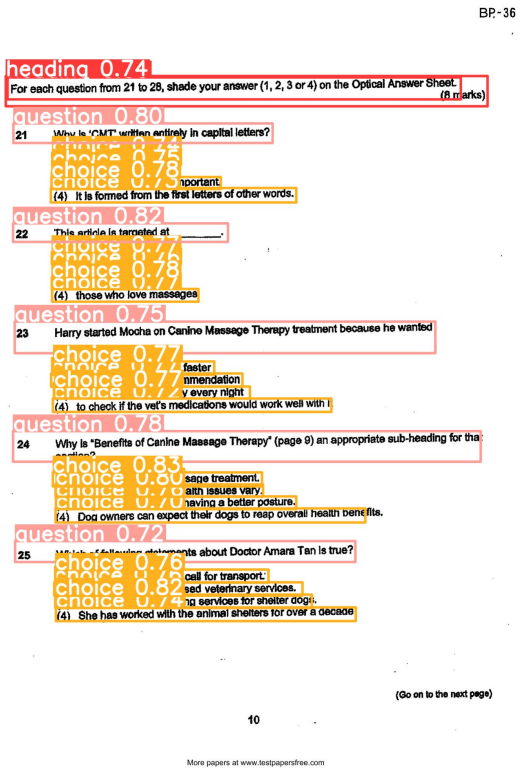
[3, 2, [0, 0, 0], 2, [0, 0, 0, 0], 2, [0, 0, 0]]

↓

[3, 2, 2, 2,]

loop until only heading in list

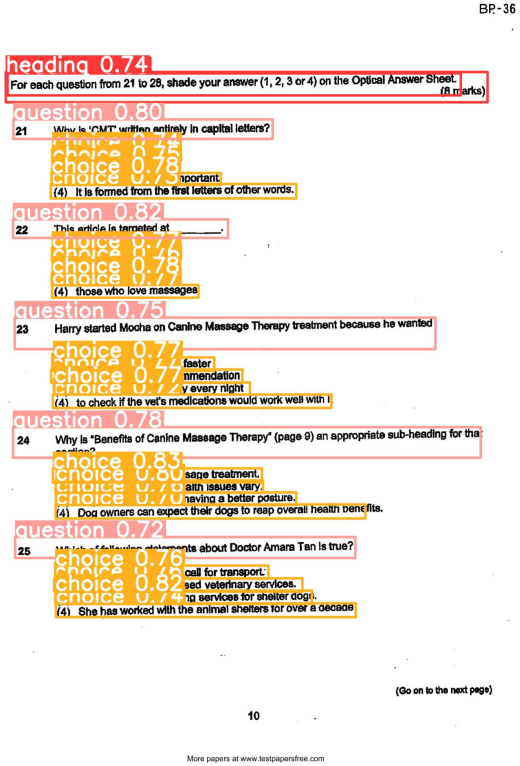
Grouping elements




```
[{type="heading",
  text = …
  childs = [
        {type=questions,
        text=....,
        childs = [
              {choice 1}, {choice 2},
              {image}, {...}
              ]},
        {type=questions,
        text=....,
        childs = [
              {choice 1}, {choice 2},
              {image}, {...}
              ]}

        ]
]
```

Grouping elements



Code


```
{'name': 'heading',
 'cls': 0,
 'child': [{'name': 'question',
   'cls': 1,
   'child': [{'name': 'choice',
     'cls': 3,
     'child': [],
     'idx': (0, 473)},
    {'name': 'choice',
     'cls': 3,
     'child': [],
     'idx': (0, 511)},
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     'cls': 3,
     'child': [],
     'idx': (0, 544)},
    {'name': 'choice',
     'cls': 3,
     'child': [],
     'idx': (0, 576)}],
   'idx': (0, 388)},
  {'name': 'question',
   'cls': 1,
   'child': [{'name': 'choice',
     'cls': 3,
     'child': [],
     'idx': (0, 762)},
    {'name': 'choice',
     'cls': 3,
     'box': array([     234.16,      799.96,      473.83,
     'child': [],
```
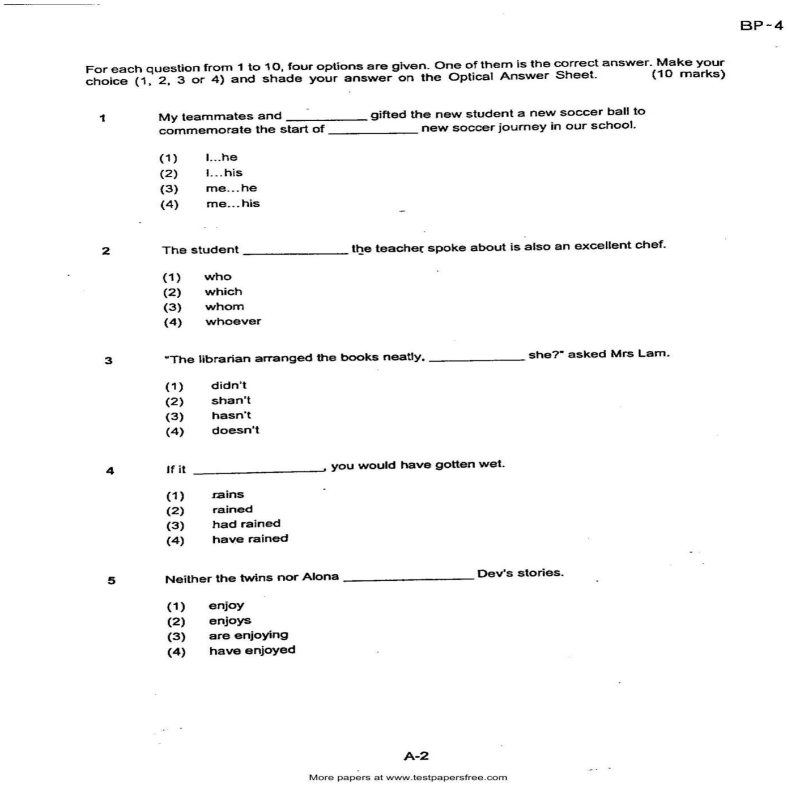

OCR

(in next week)



BP-4

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5 Neither the twins nor Alona _____ Dev's stories.

(1) enjoy
(2) enjoys
(3) are enjoying
(4) have enjoyed

A-2

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```
[ ] from easy_paddle_ocr import TextRecognizer
    import time
    import cv2

    text_recognizer = TextRecognizer() # for custom weights do TextRecognizer(weights='folder_path')
```

```
detection_results[0].boxes[0]
```

```
img = detection_results[0].orig_img
for i in detection_results[0].boxes:
    xyxy = i.xyxy[0]
    cropped_img = img[int(xyxy[1]):int(xyxy[3]), int(xyxy[0]):int(xyxy[2])]
    prediction = text_recognizer.read(cropped_img)
    print(f'¥n[+] type: [reverse_map[int(i.cls)]]')
    print(f'[+] text: {prediction["text"]}')
```

```
[+] type: choice
[+] text: (1)CMT is an intense massage treatment.

[+] type: question
[+] text: 2This arcee targeted a

[+] type: choice
[+] text: 3Sheprovidecounsellngseviforheterdog

[+] type: question
[+] text: 2My isCMTtenntr n aptaer?

[+] type: choice
[+] text: Every dogs exting heath issuevary.
```