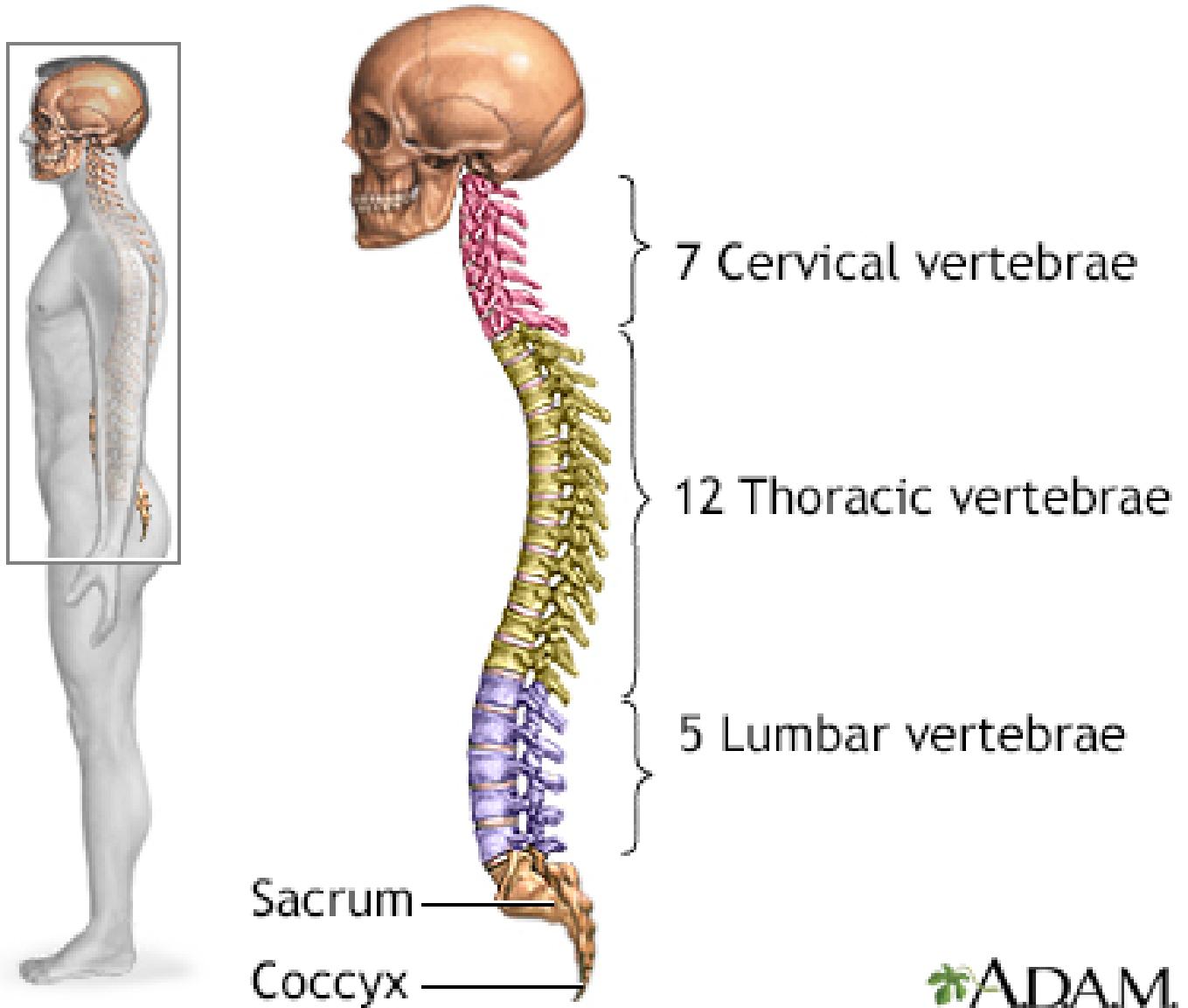
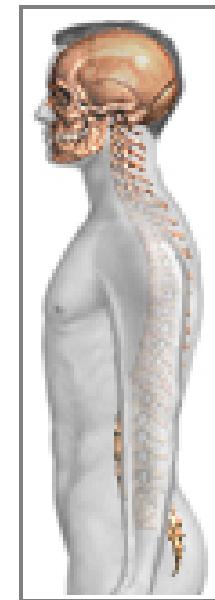




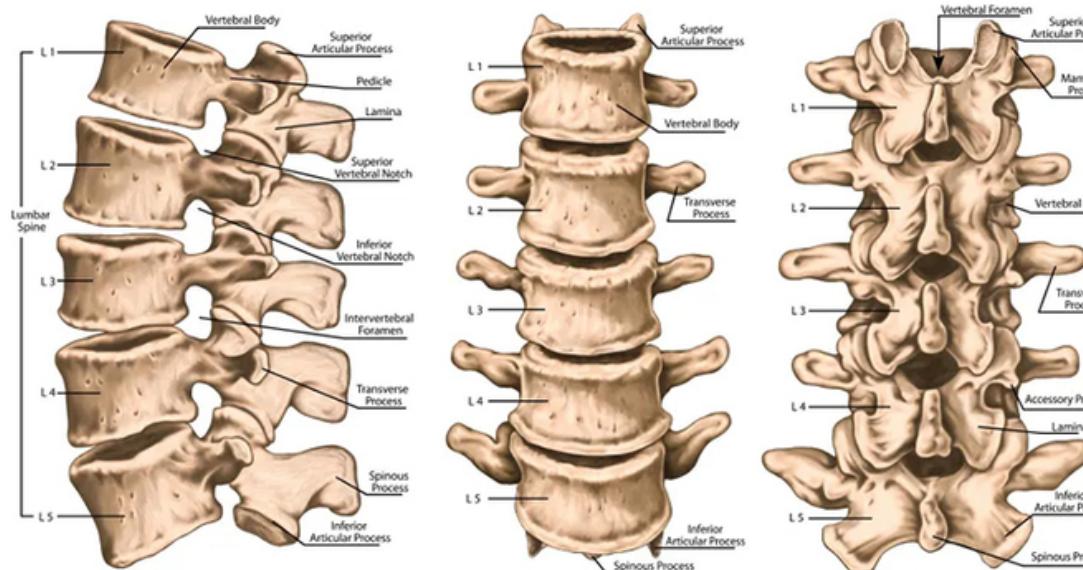
Hackathon Lumbar Spine



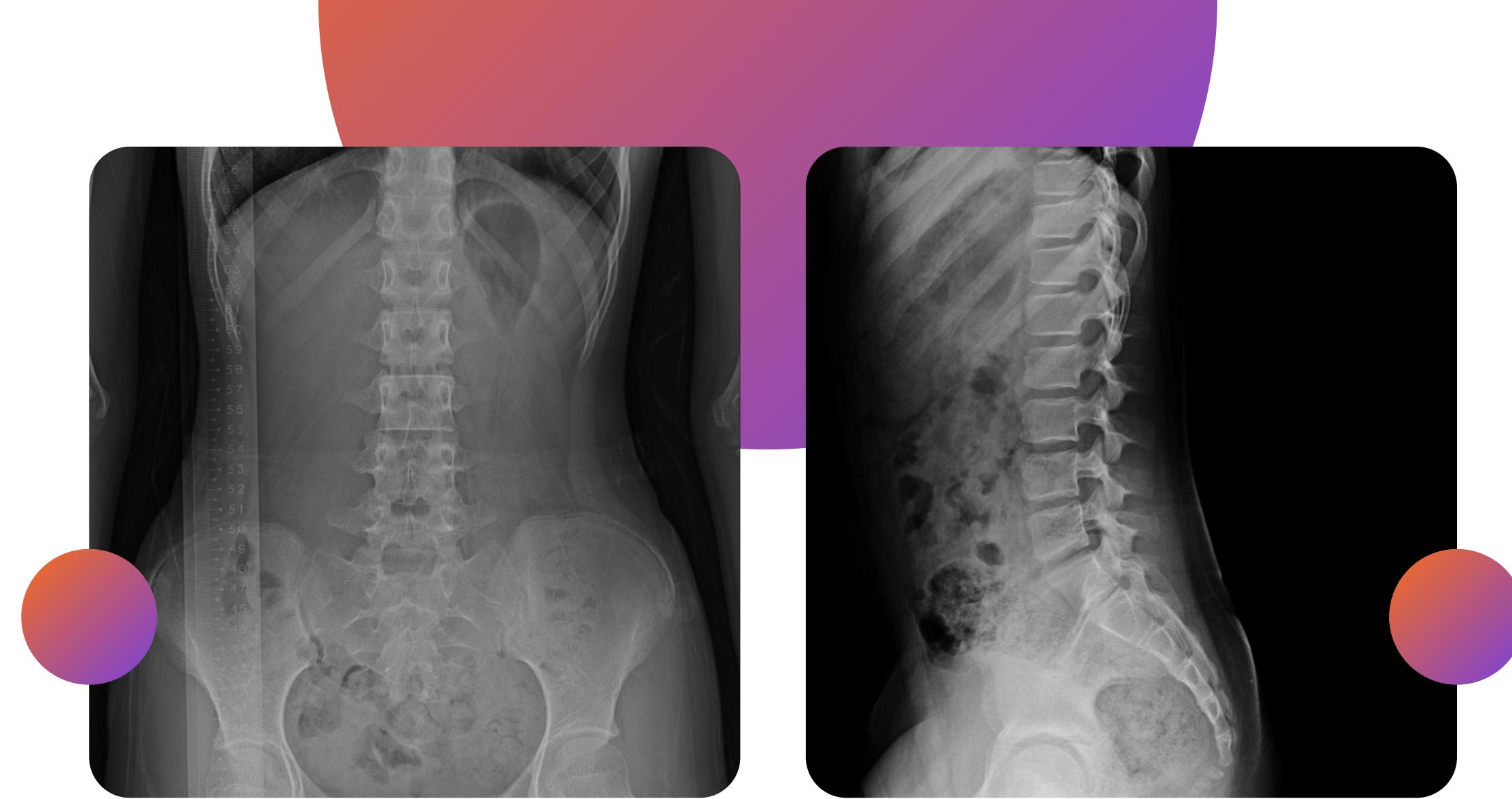
ADAM.

The lumbar spine refers to the lower part of the vertebral column or backbone. It is composed of five vertebrae labeled L1 to L5

LUMBAR SPINE



Hackathon Lumbar Spine



Lumbar Spine Gender

Using x-ray images to classify gender of patient

Vertebral positions

Detect 5 Lumbar Spines and locate Vertebral position which has 4 points for each Lumbar Spine

Spondylolisthesis

Classification Case of Lumbar Spine by using detection model from Vertebral positions.

gender classification



AP view



paper reviews
-cnn models
-cervical,lumbar

Gender Detection from Spine X-ray Images
Using Deep Learning

Zhiyun Xue, Sivaramakrishnan Rajaraman, Rodney Long, Sameer Antani, and George R. Thoma

Lister Hill National Center for Biomedical Communications
National Library of Medicine
Bethesda, USA

{xuez, sivaramakrishnan.rajaraman, rlong, santani, gthoma}@mail.nih.gov

gender classification

baaivision/EVA

EVA Series: Visual Representation Fantasies from
BAAI



8
Contributors

20
Issues

1k
Stars

94
Forks



**resize 448
stratified k fold 5 folds
model=eva02_large_patch14_448
train 5 epoch per fold
predict
mean(np.stack())
argmax()**

#	Team	Members	Score	Entries	Last	Solution
1	300190-กัญจน์	  	0.98743	1	17h	

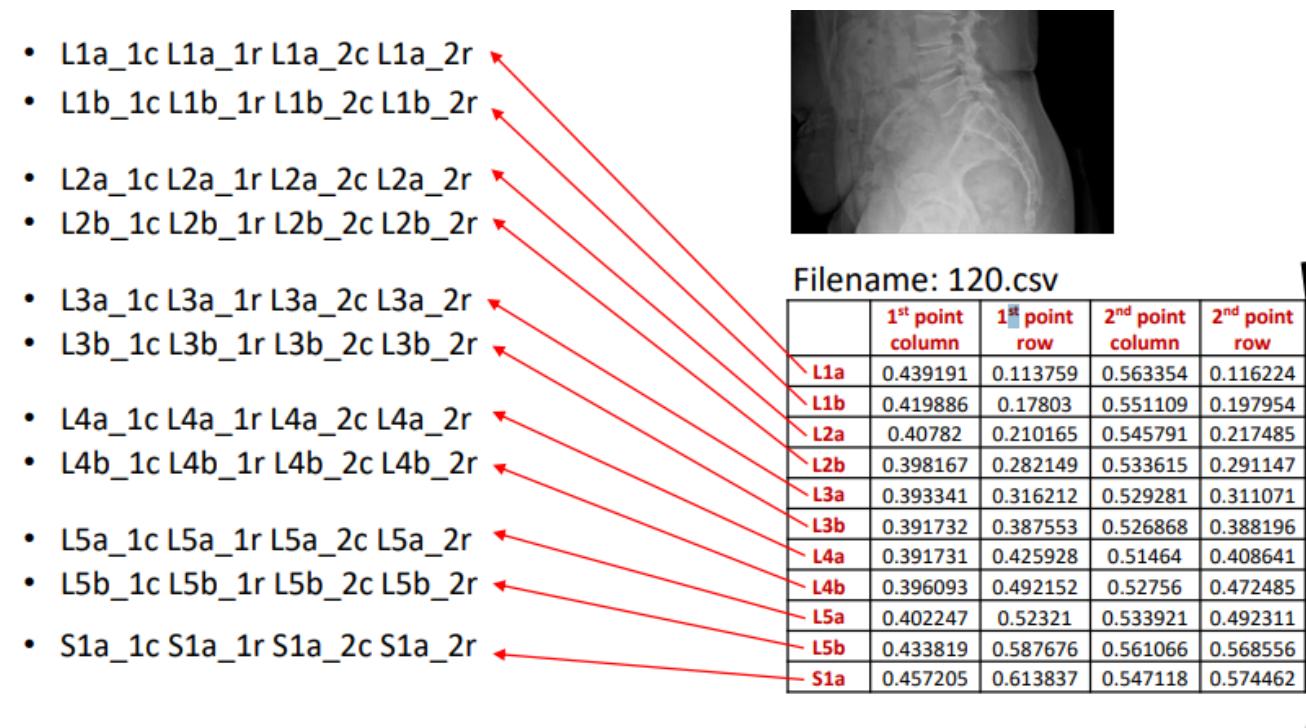
 Your First Entry!
Welcome to the leaderboard!

#	△	Team	Members	Score	Entries	Last	Solution
1	—	300190-กัญจน์	  	0.98756	1	17h	

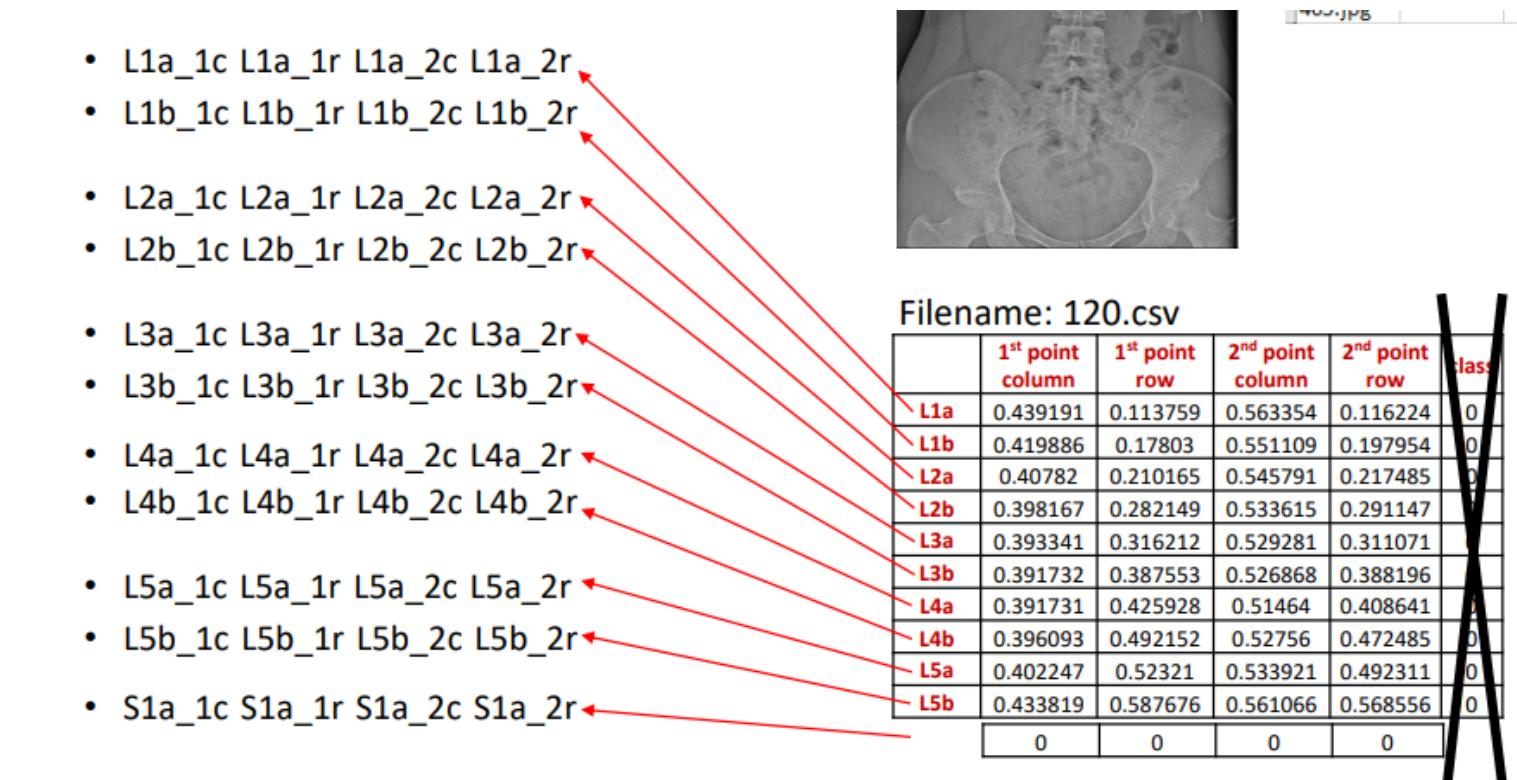
Vertebral positions

Detect 5 Lumbar Spines and locate Vertebral position
which has 4 points for each Lumbar Spine

AP



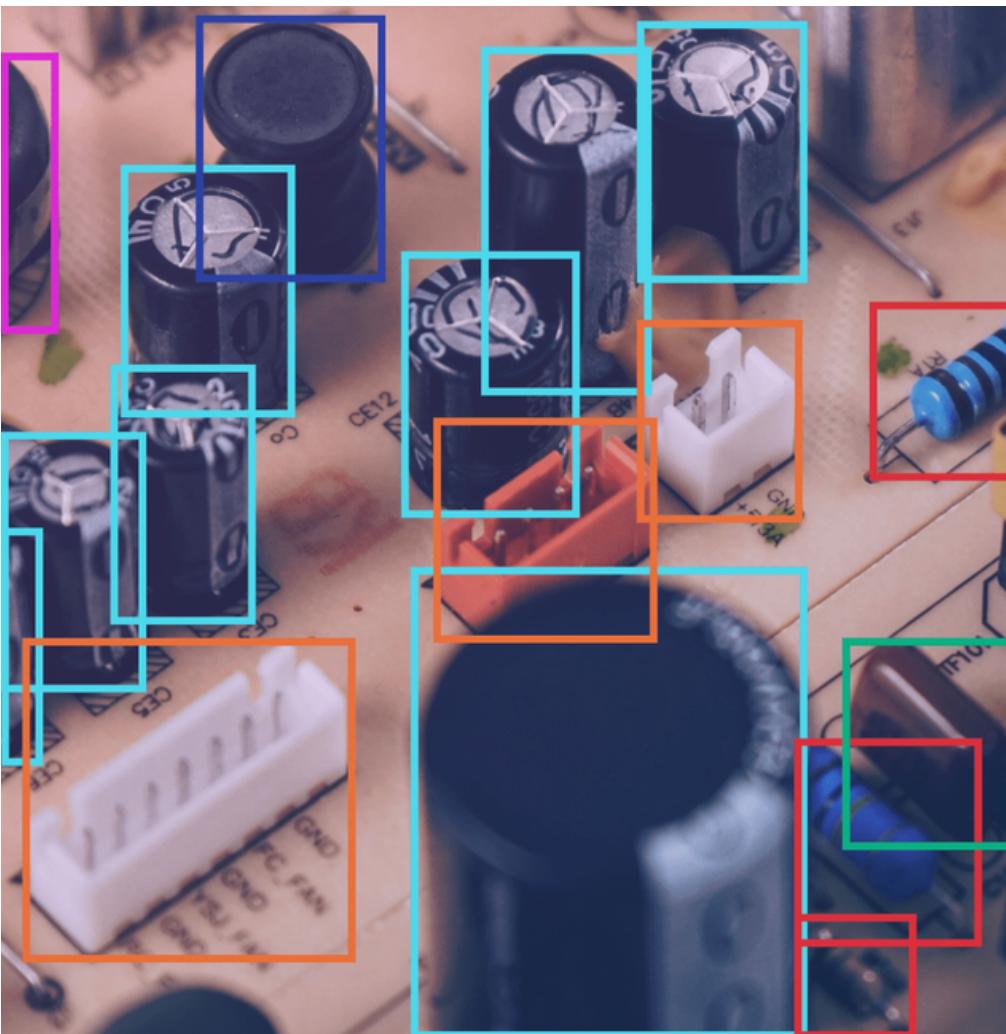
LA



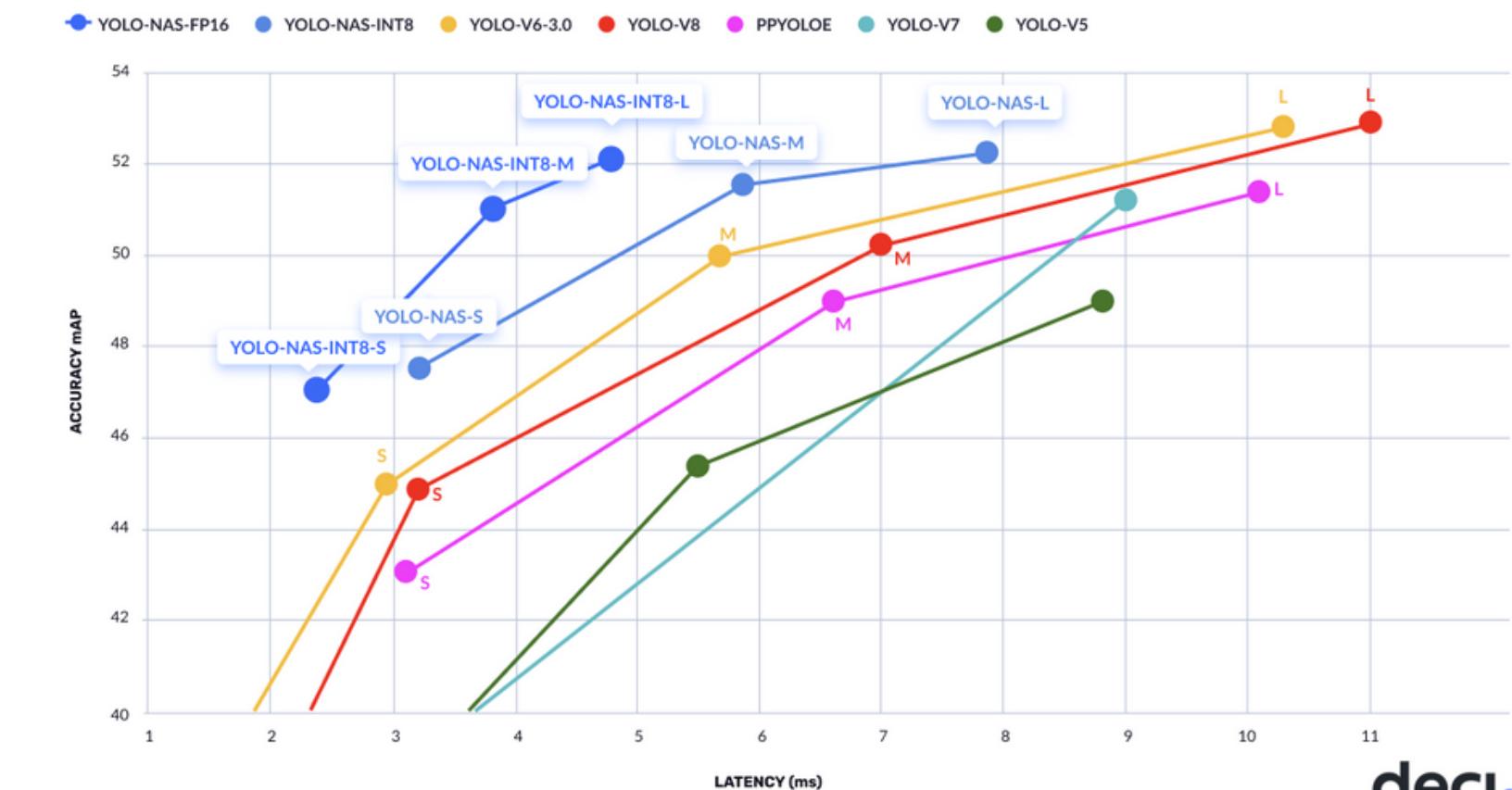
Detection model

- Yolov8 Detection
- Yolo-nas
- OpenMMLab rotated object detection, YOLOv5 Oriented Bounding Boxes
- Yolo-seg, SAM

Yolov8 Detection,Yolo-nas



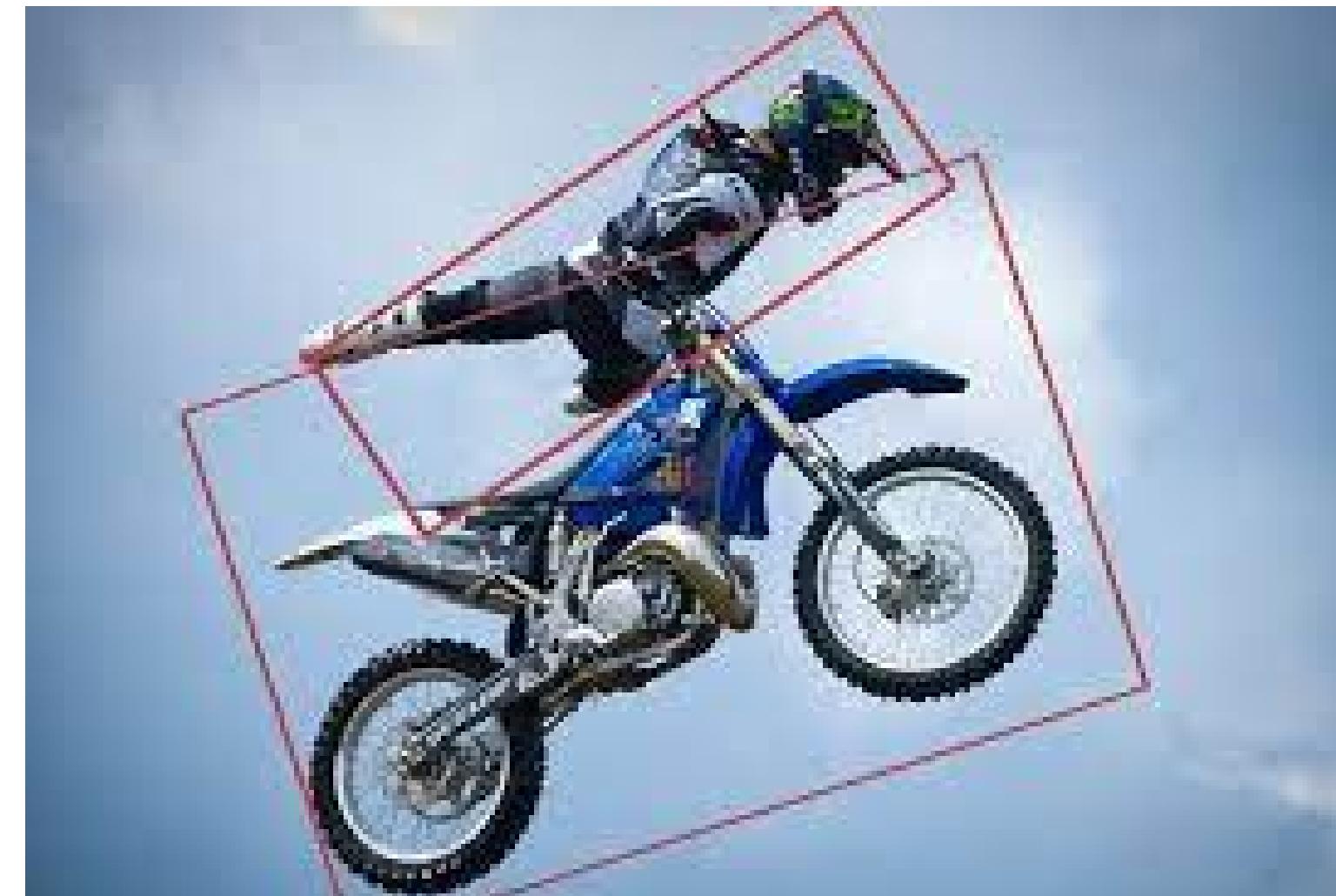
Efficient Frontier of Object Detection on COCO, Measured on NVIDIA T4



deci^o

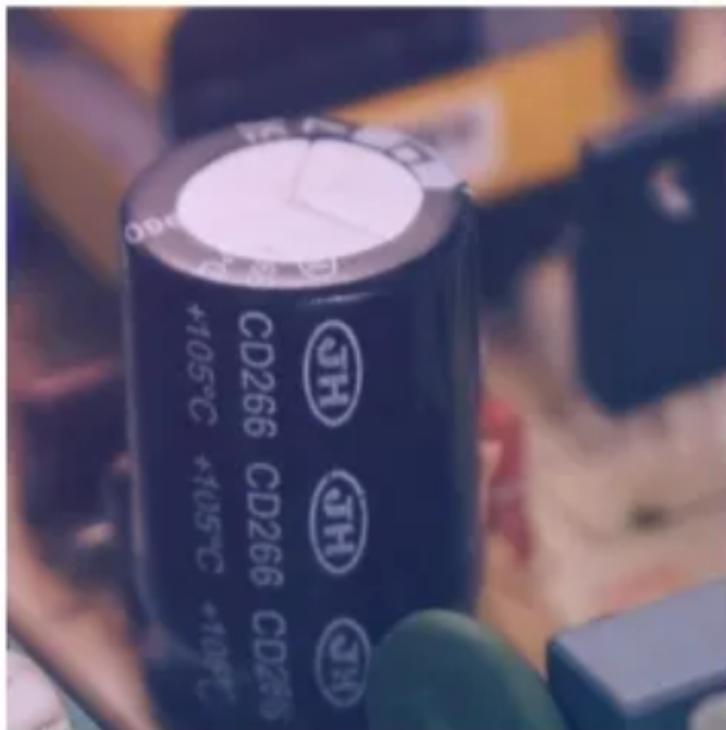
OpenMMLab rotated object detection

YOLOv5 Oriented Bounding Boxes



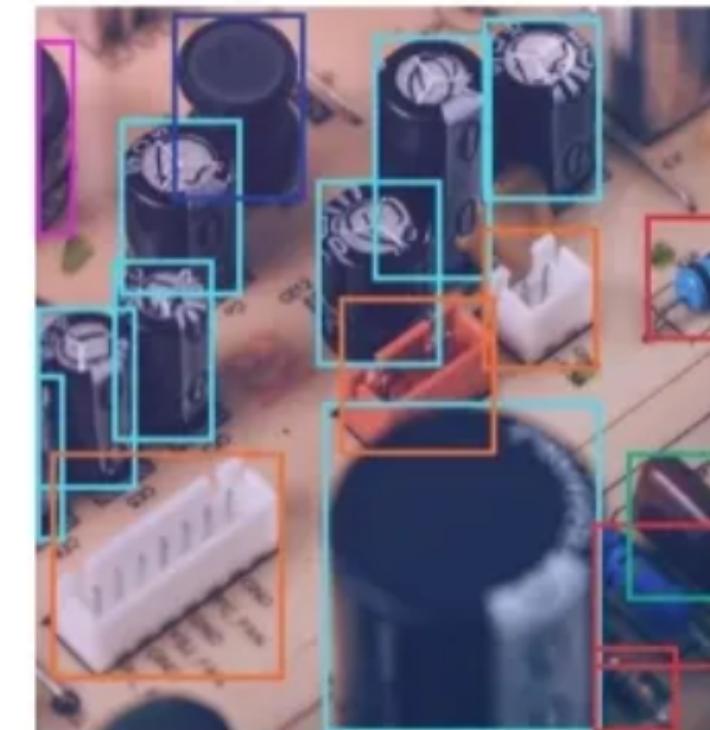
Yolo-seg

Classification



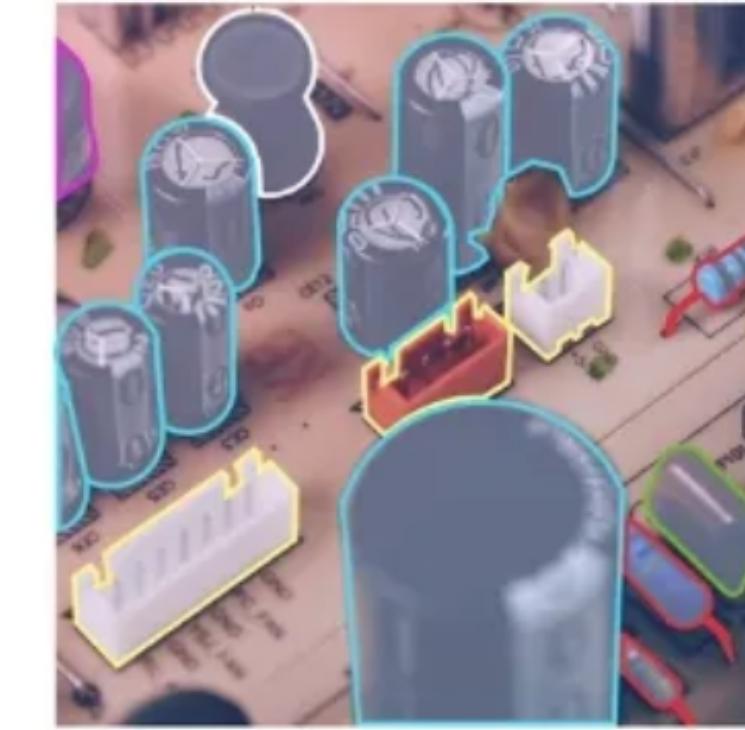
Capacitor

Object Detection



Capacitor, Resistor, Transformer,
Connector, Inductor, Polyester Capacitor

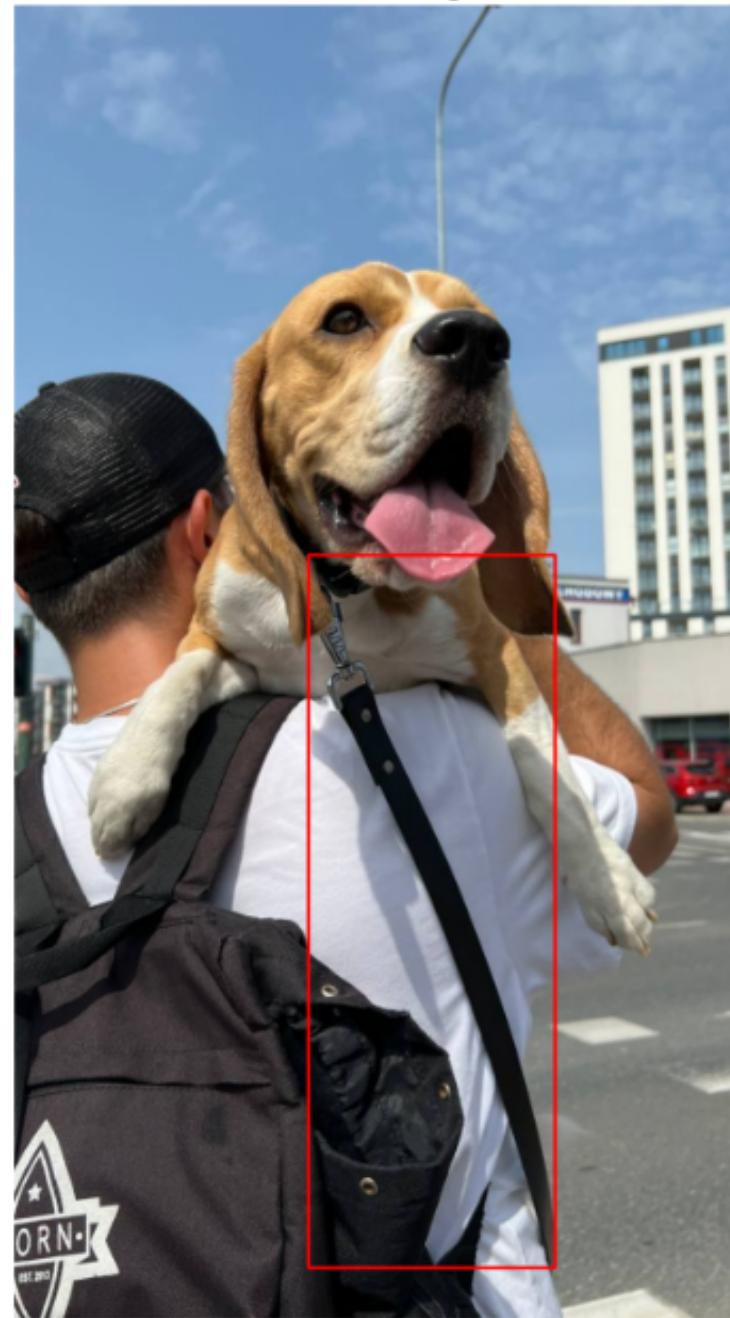
Segmentation



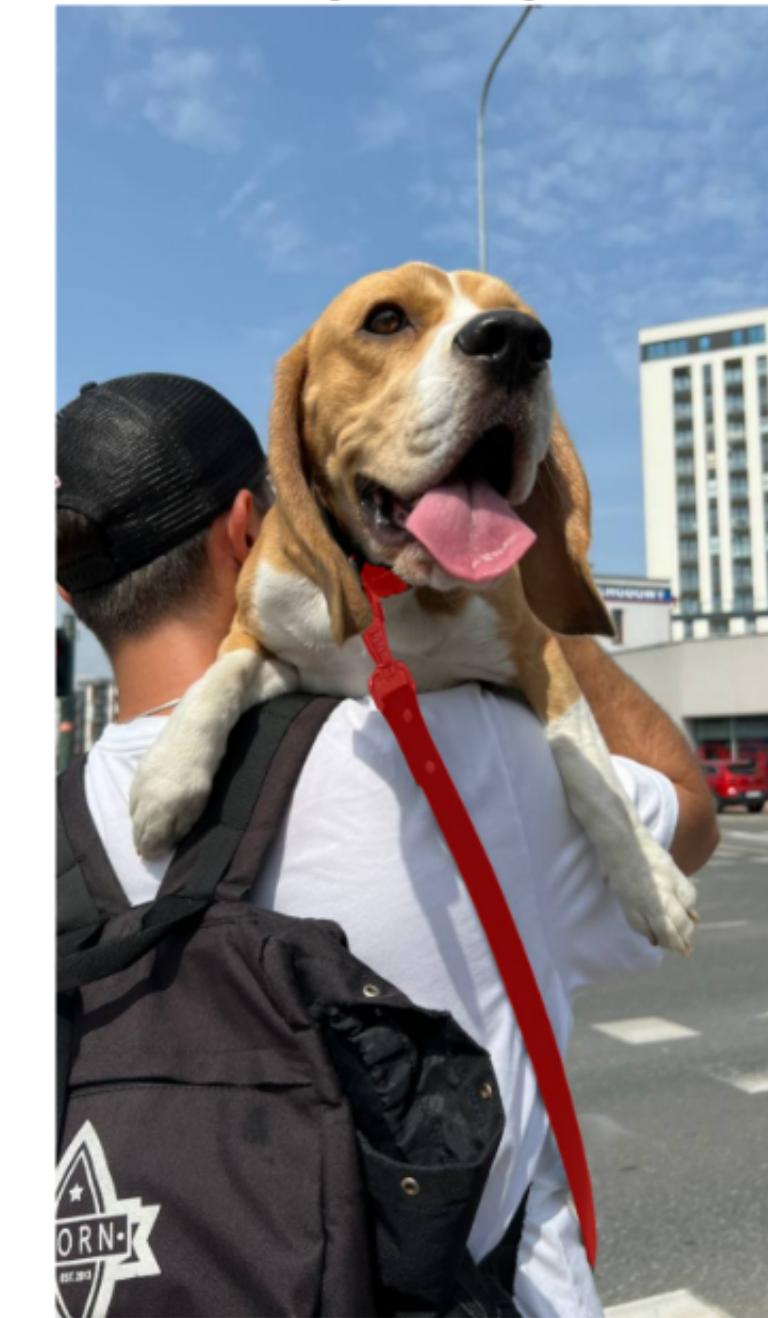
Capacitor, Resistor, Transformer,
Connector, Inductor, Polyester Capacitor

SAM

source image

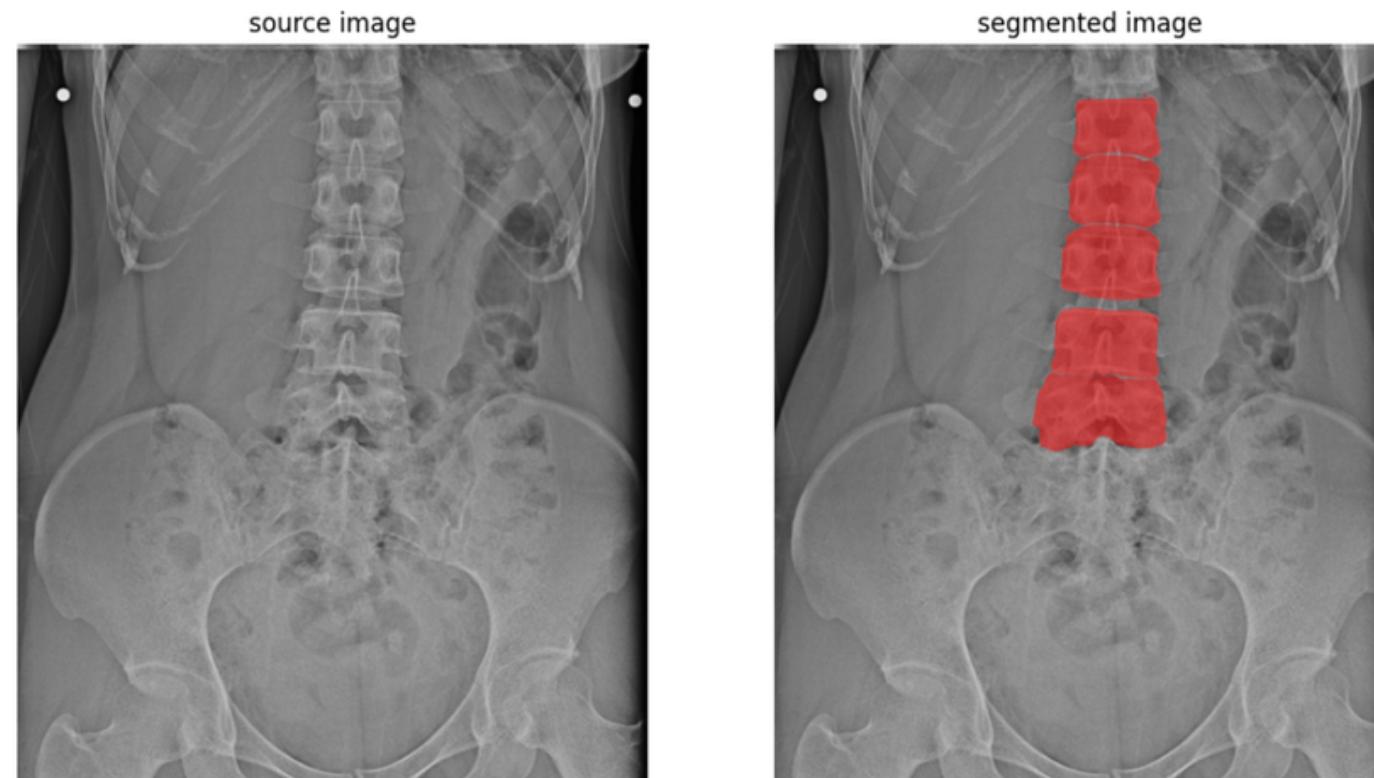


segmented image



SAM(segment everything)

- SAM at labels object to create segmentation datasets
- Use result of object detection to create mask

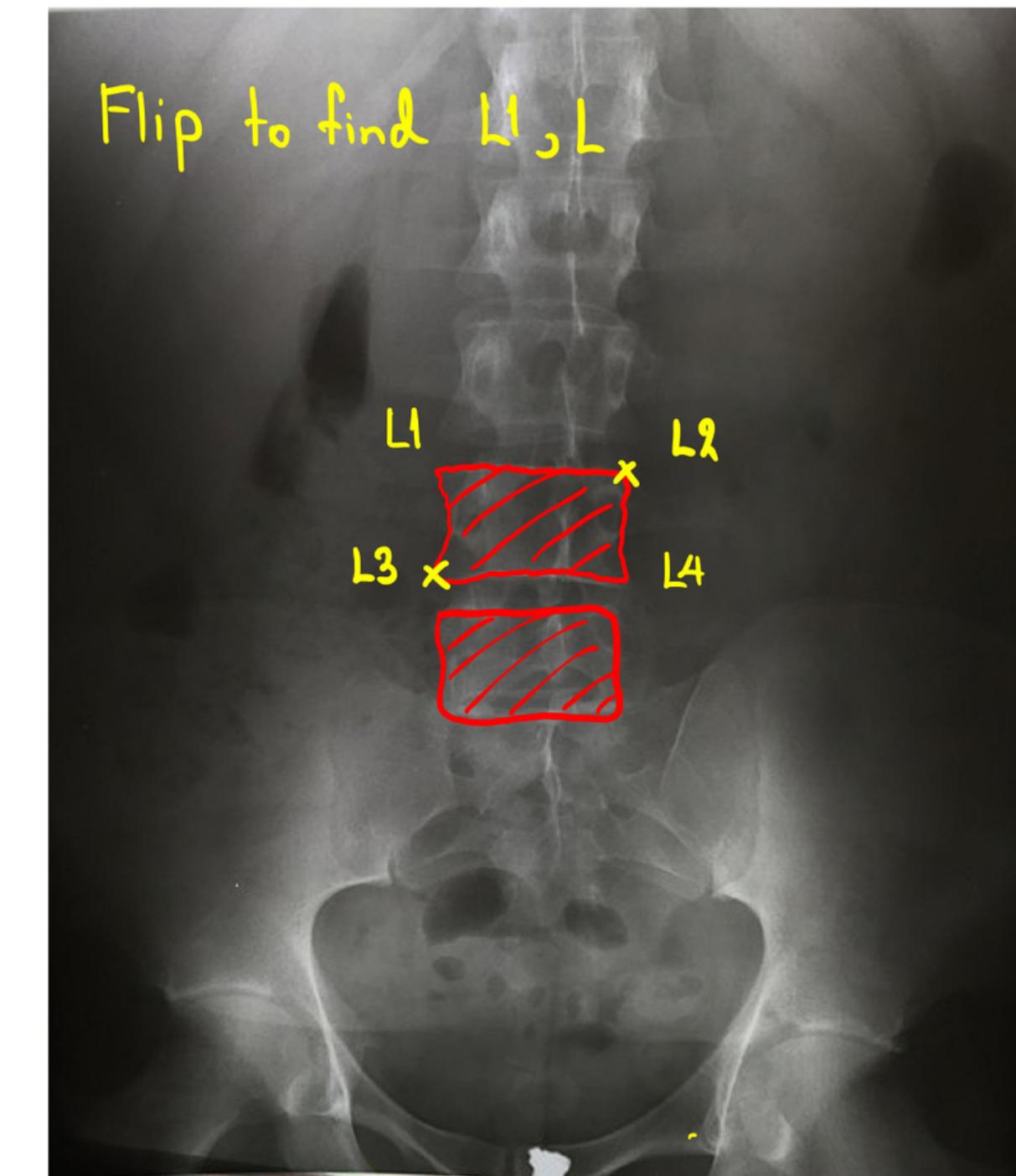
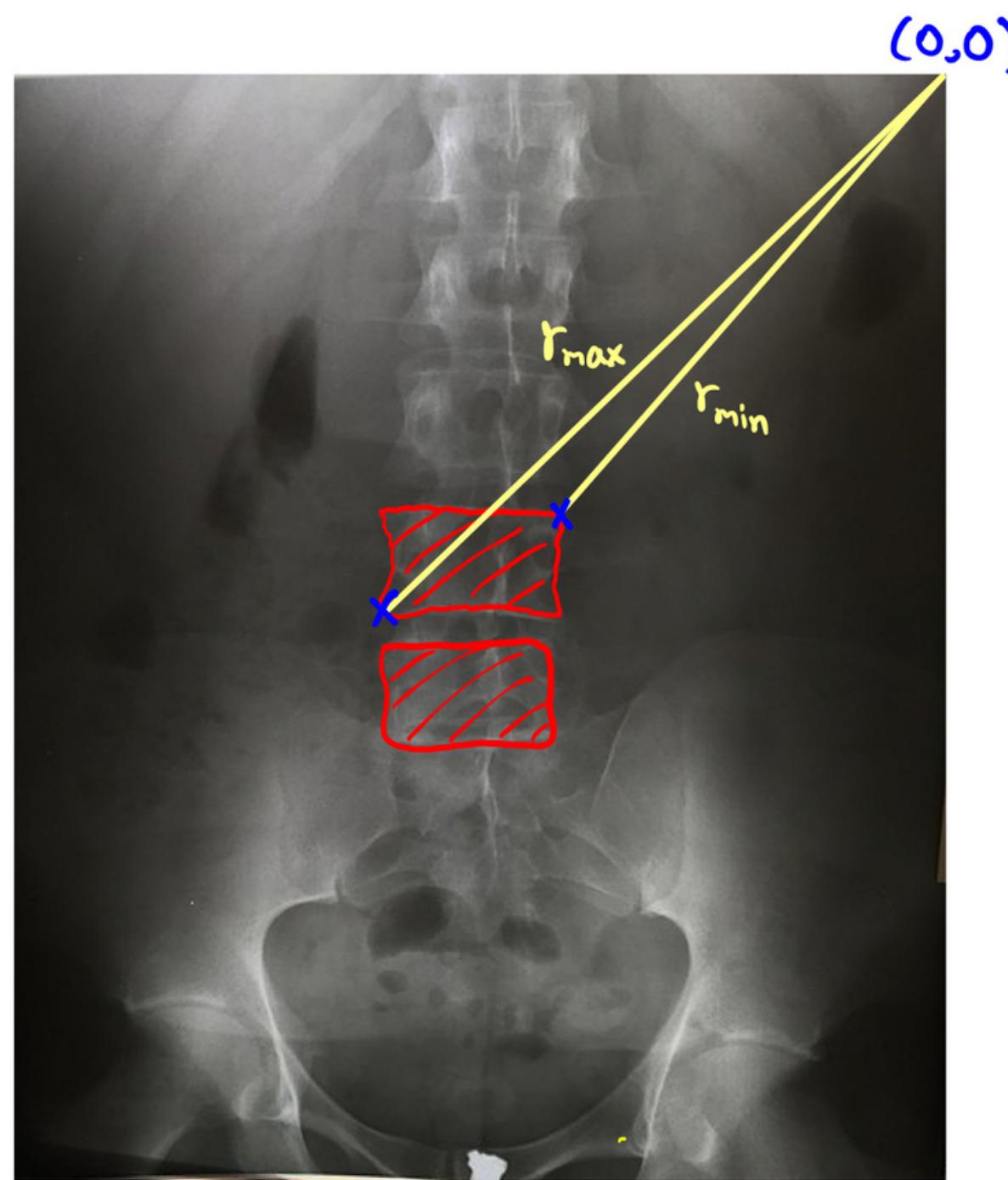


Yolo-seg

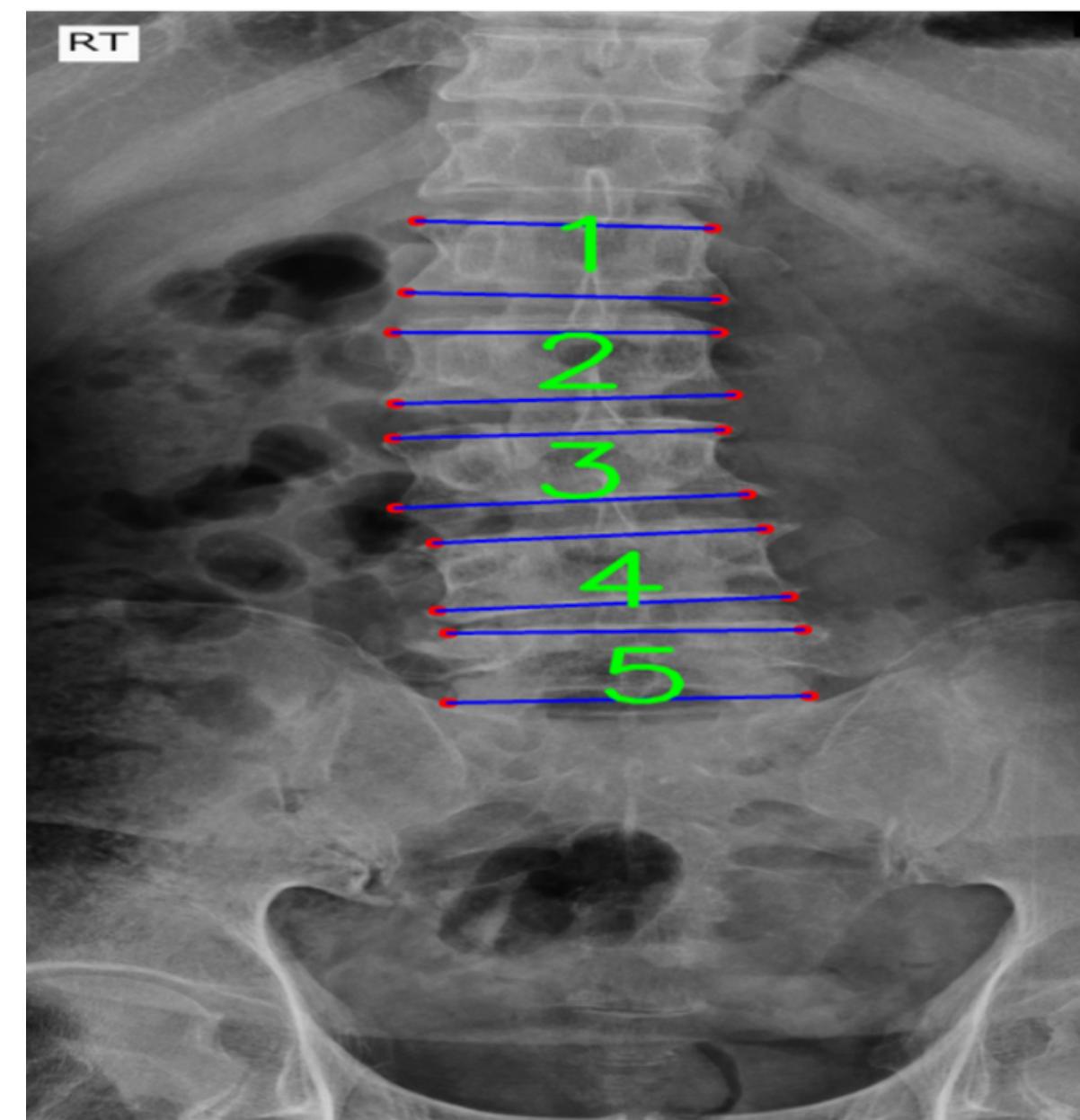
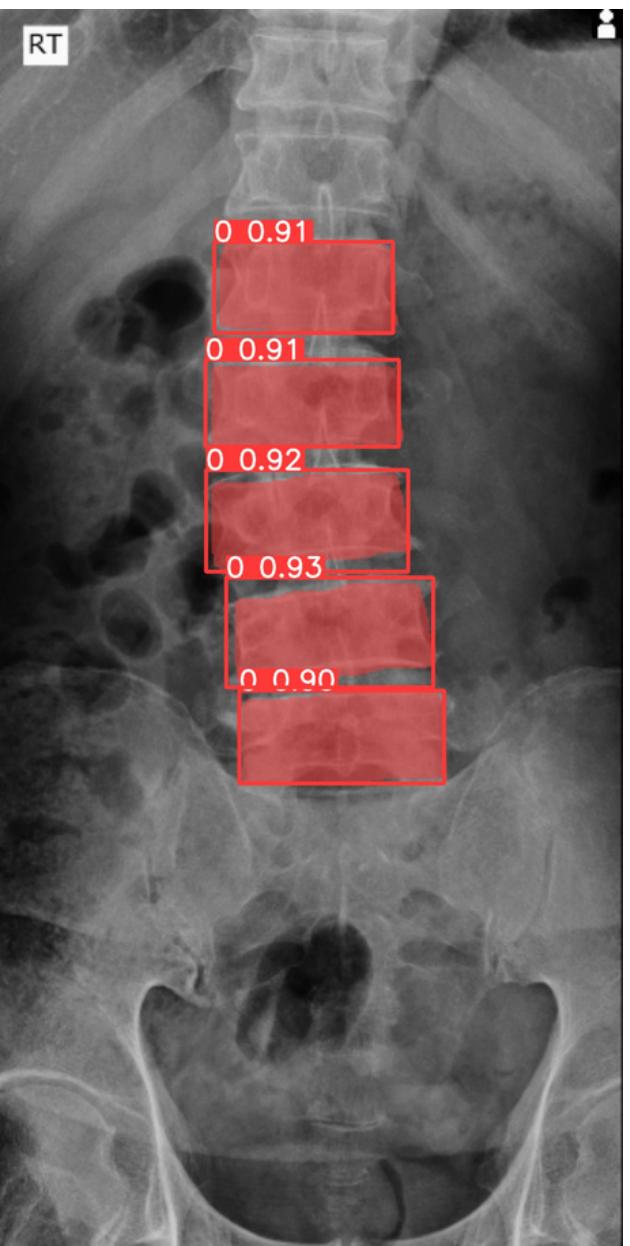
Labels format

- 0 0.6812 0.48541 0.67 0.4875 0.67656 0.487 0.675 0.489
- Class x1 y1 x2 y2 x3 y3 x4 y4

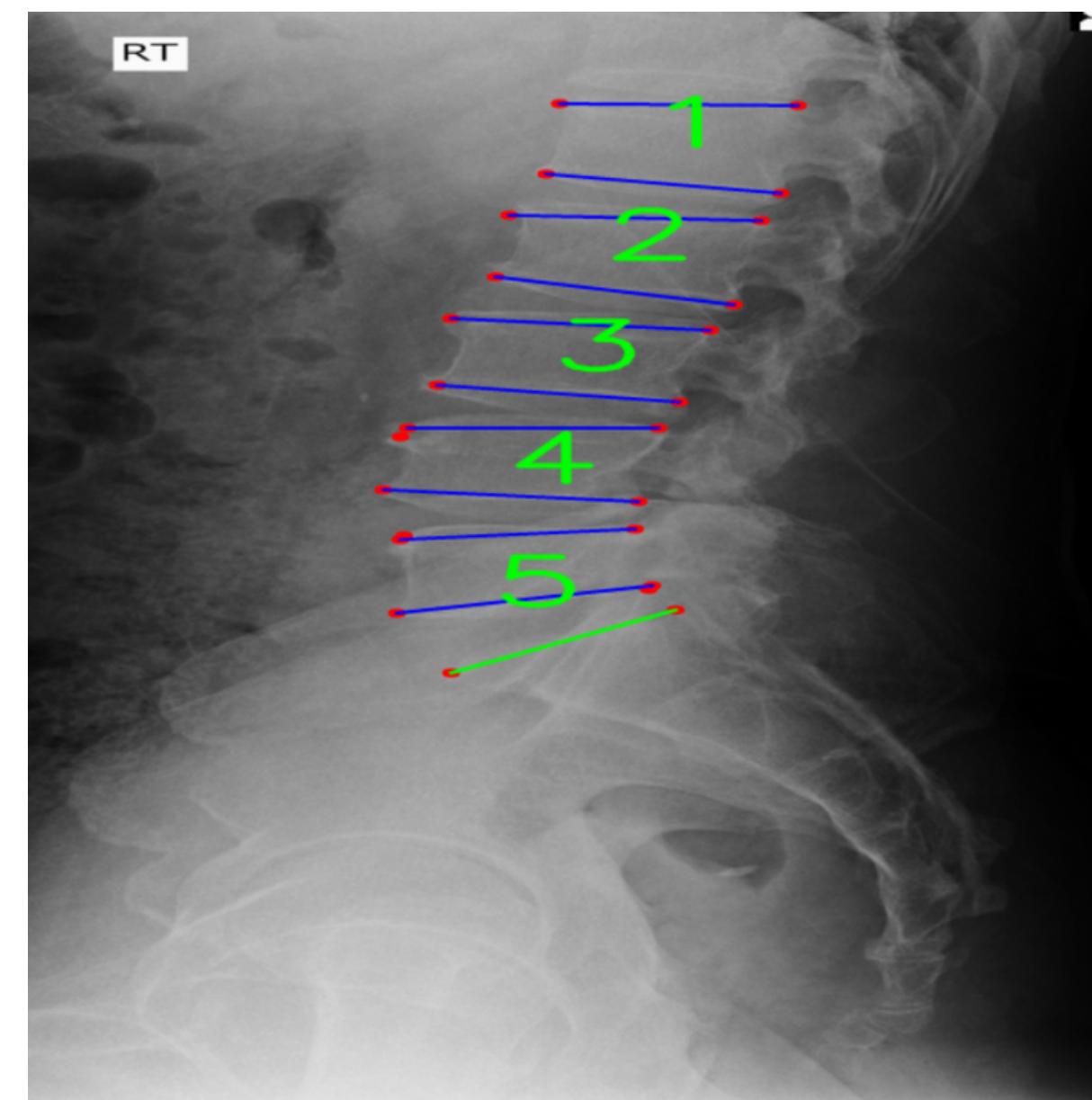
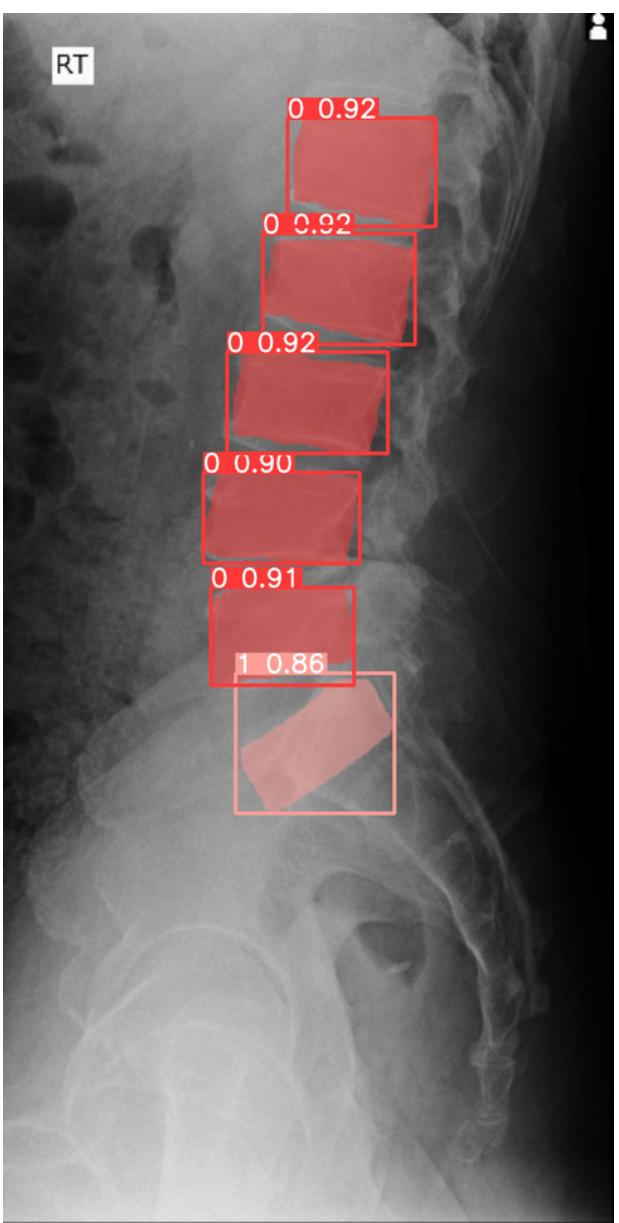
Point Selection



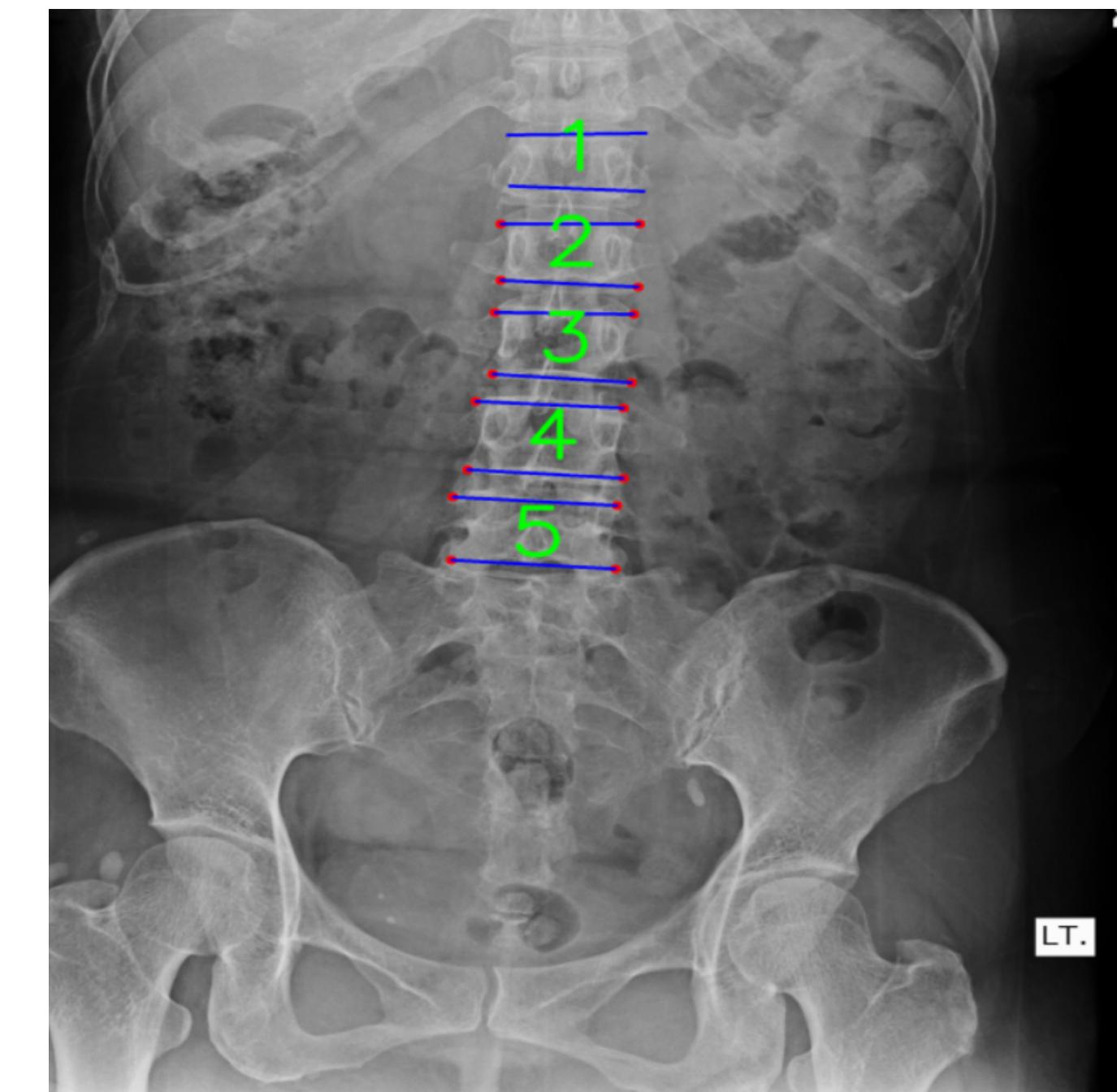
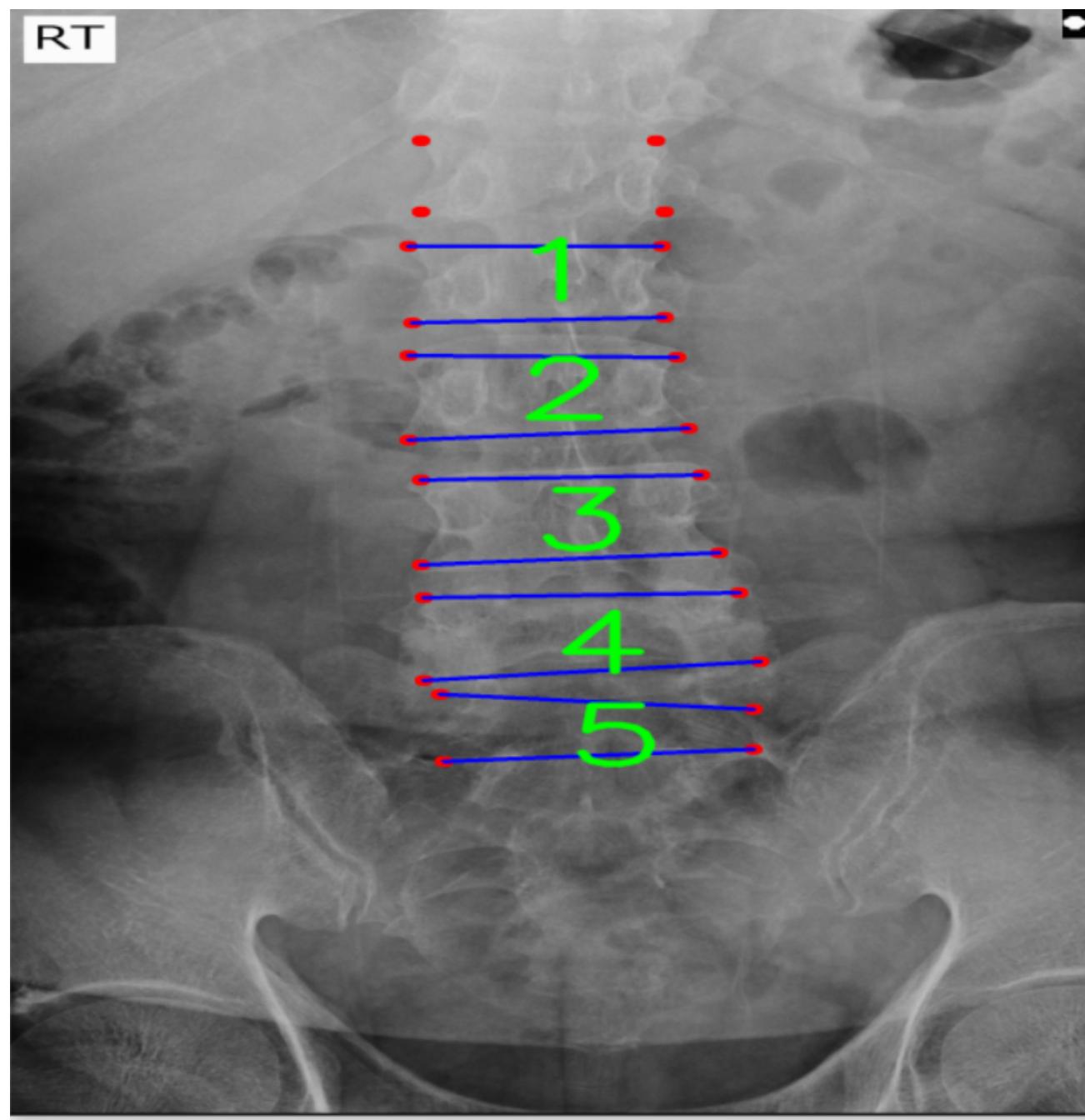
AL



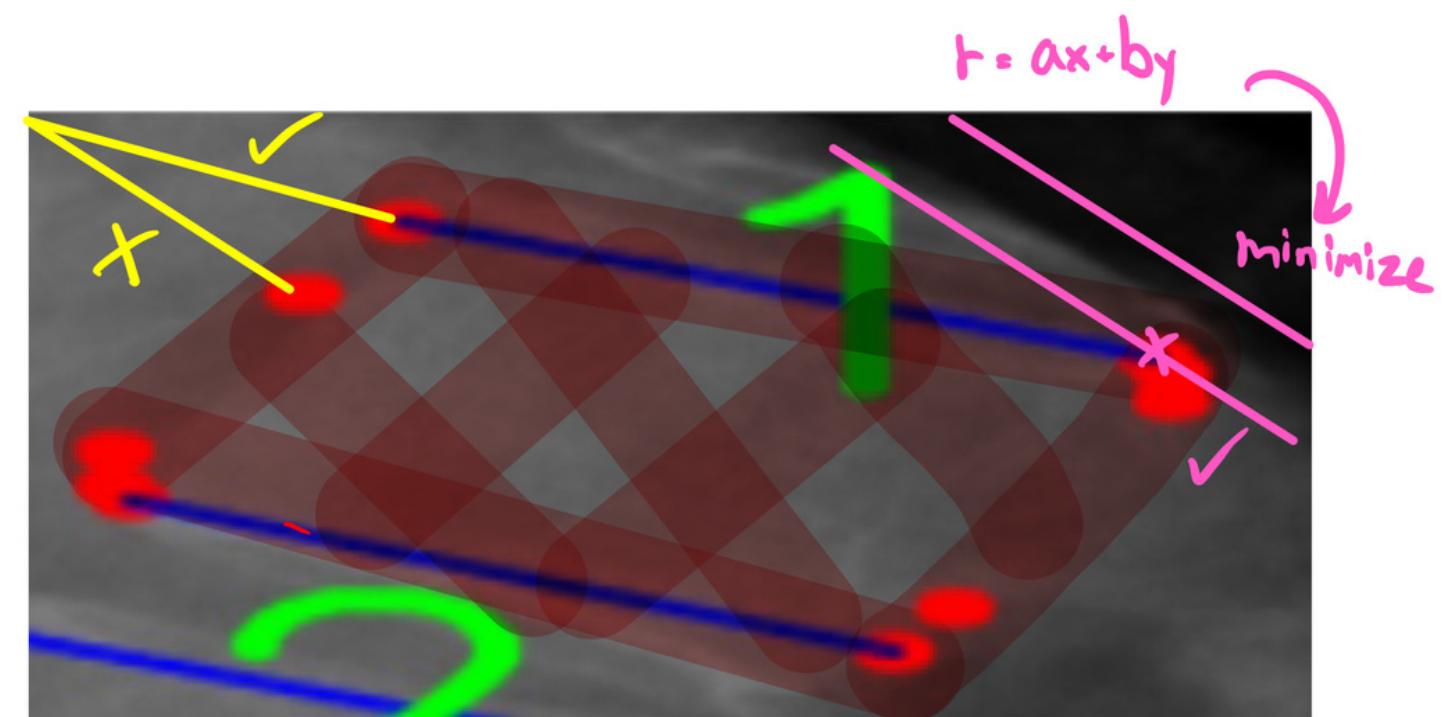
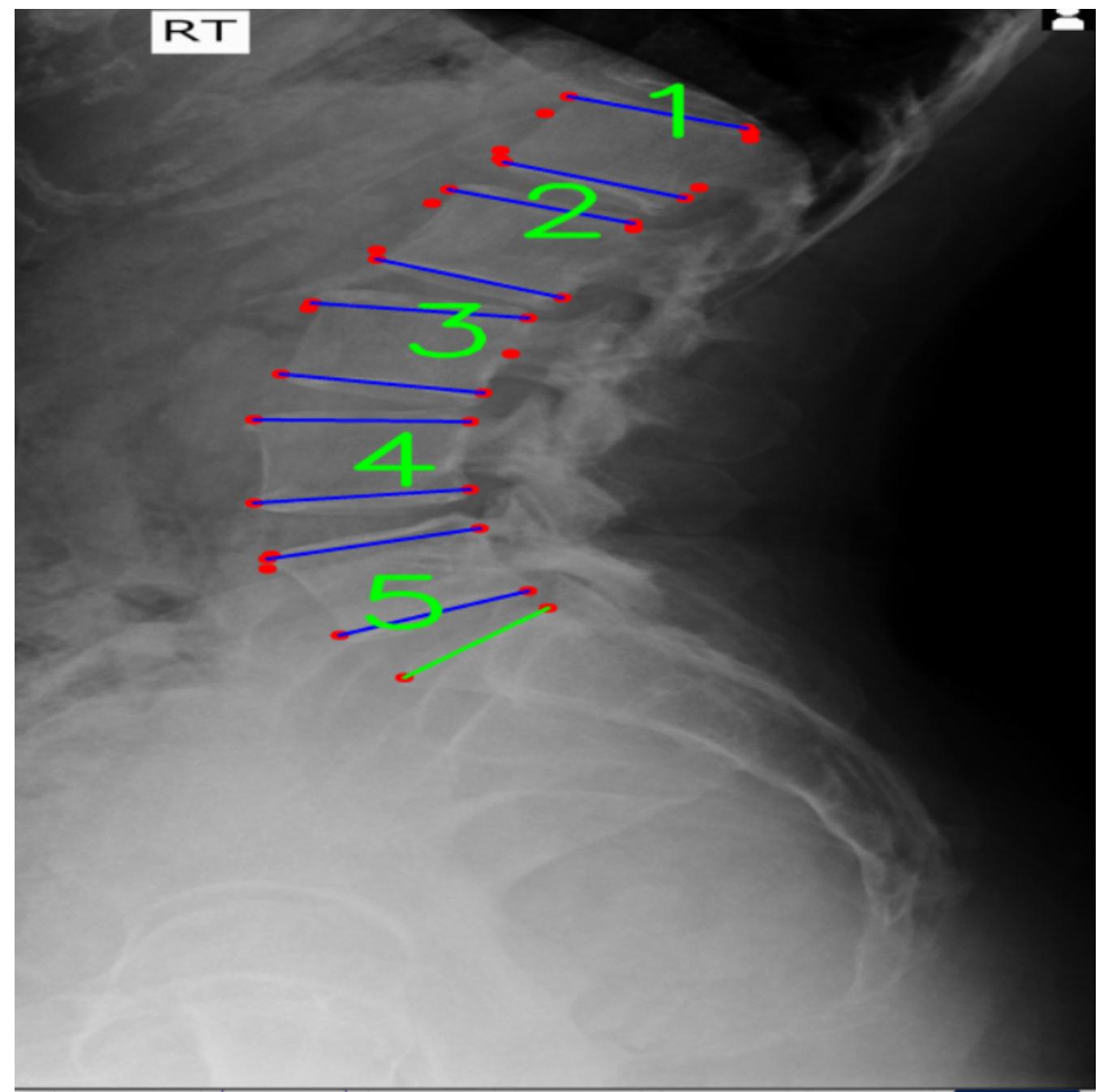
LA



Miss and Over Detection



Curve slope



1	302123-ສຣຍທະ		0.00028	1	19h
2	301158-ຮ້ຽນພິສີ່ຫຼົງ		0.00028	2	10h

3	300190-ກໍ່ມູຈນ		0.00029	3	11h
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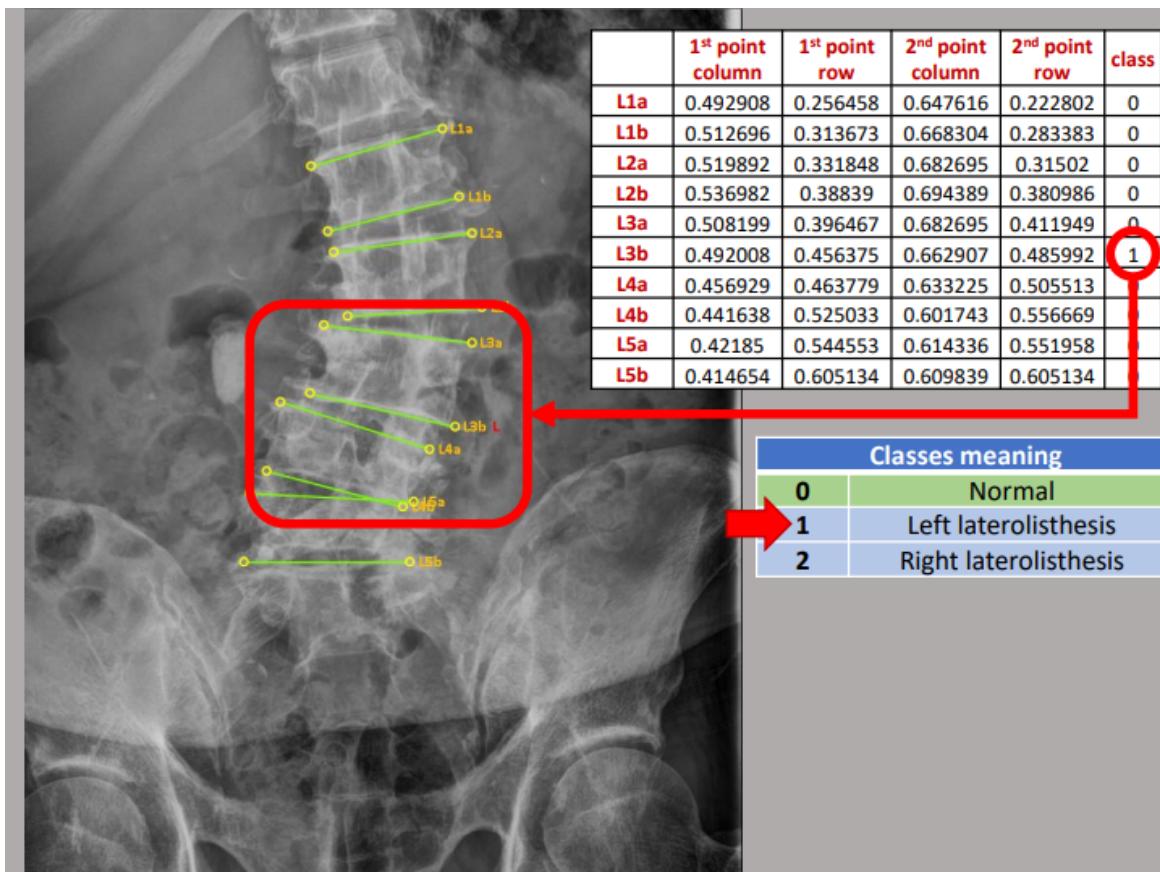
Your Best Entry!
Your most recent submission scored 0.00029, which is the same as your previous score. Keep trying!

1	▲ 2	300190-ກໍ່ມູຈນ		0.00016	3	11h
2	▼ 1	302123-ສຣຍທະ		0.00024	1	19h
3	▼ 1	301158-ຮ້ຽນພິສີ່ຫຼົງ		0.00029	2	10h

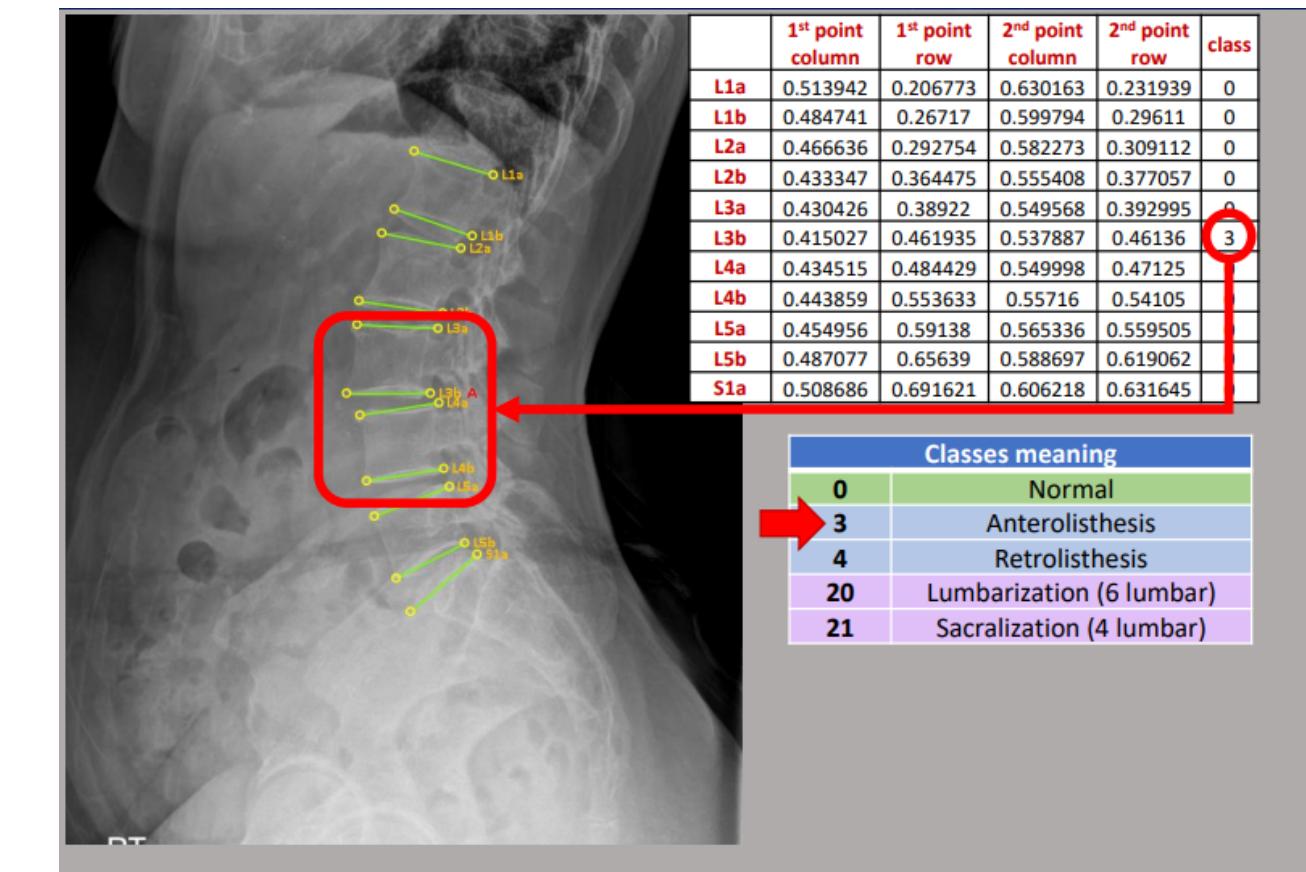
Spondylolisthesis

Classification Case of Lumbar Spine by using detection model from Vertebral positions.

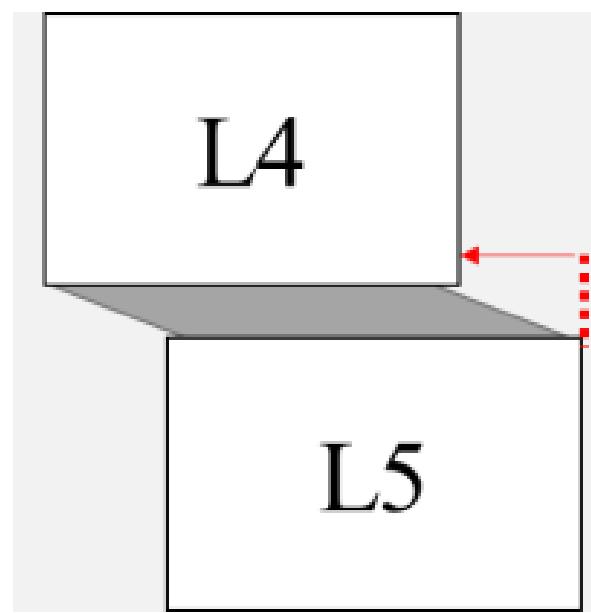
AP



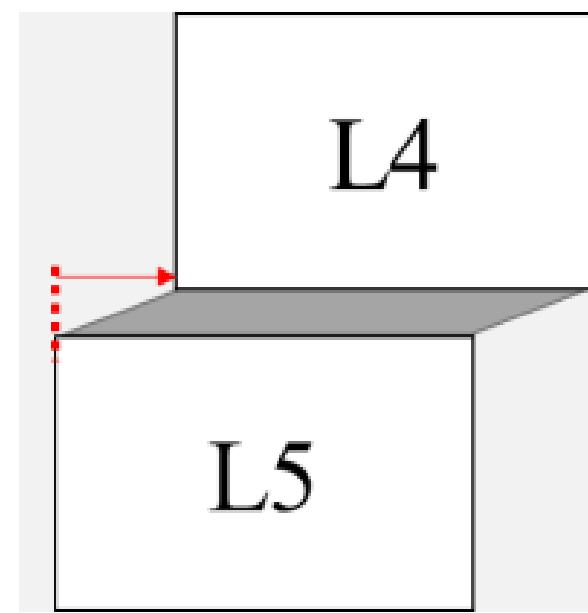
LA



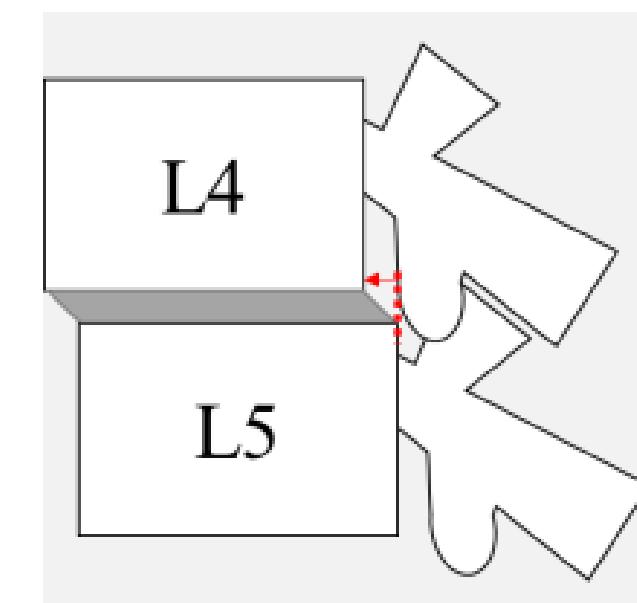
Spondylolisthesis type



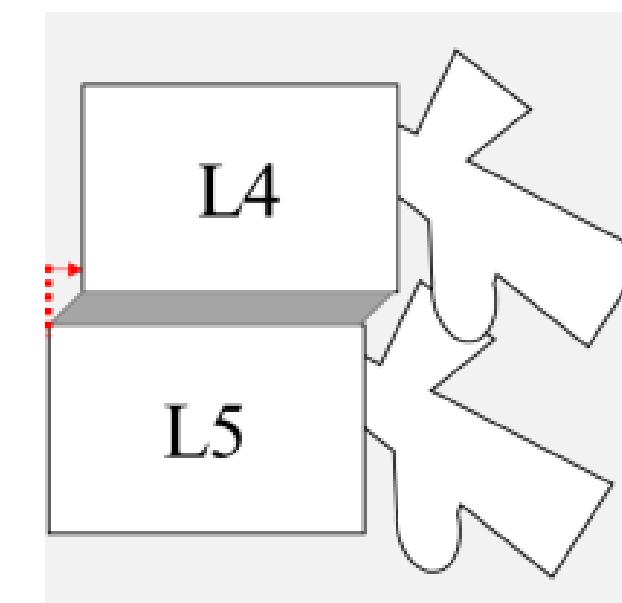
Right laterolisthesis



Left laterolisthesis

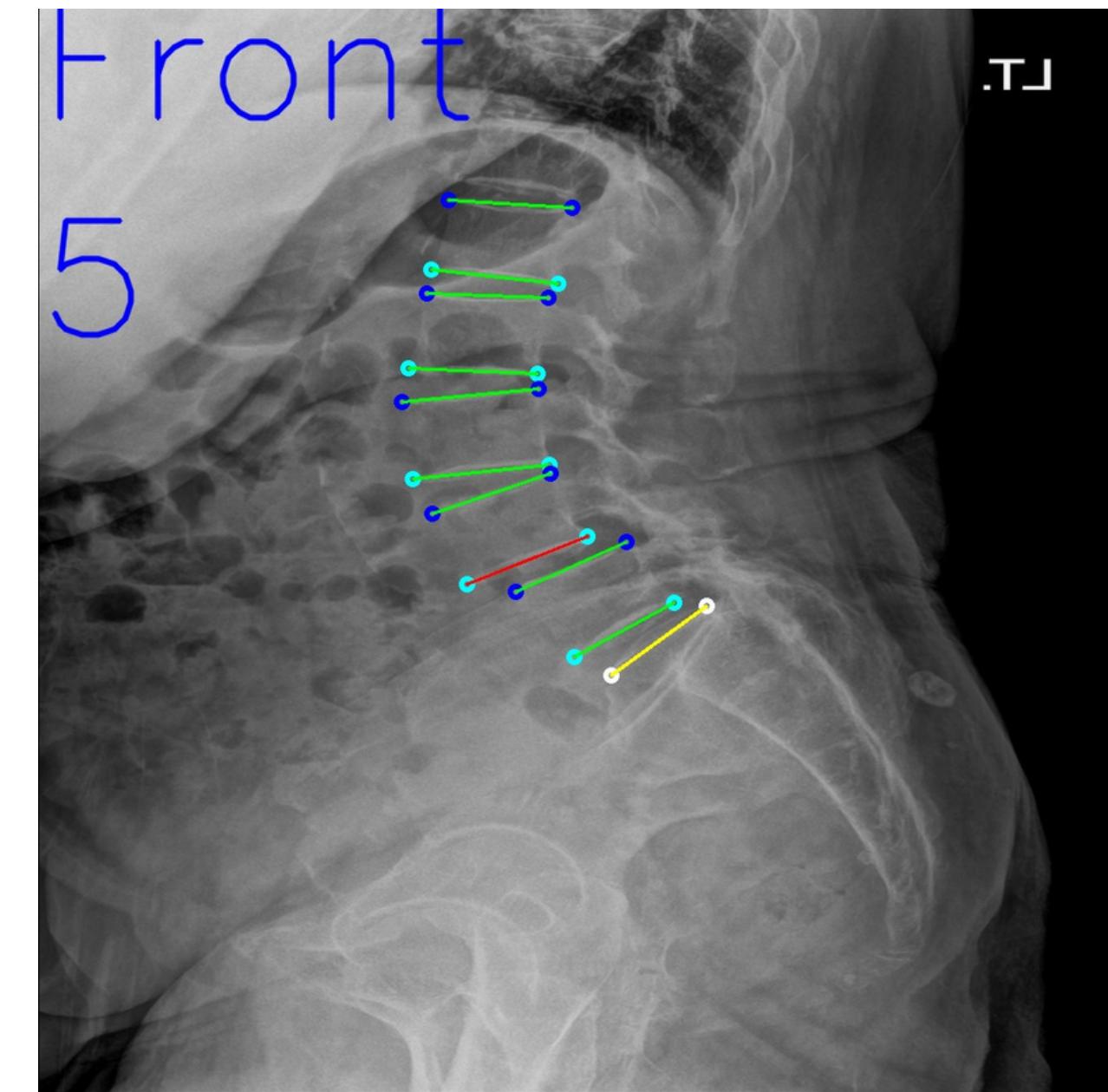
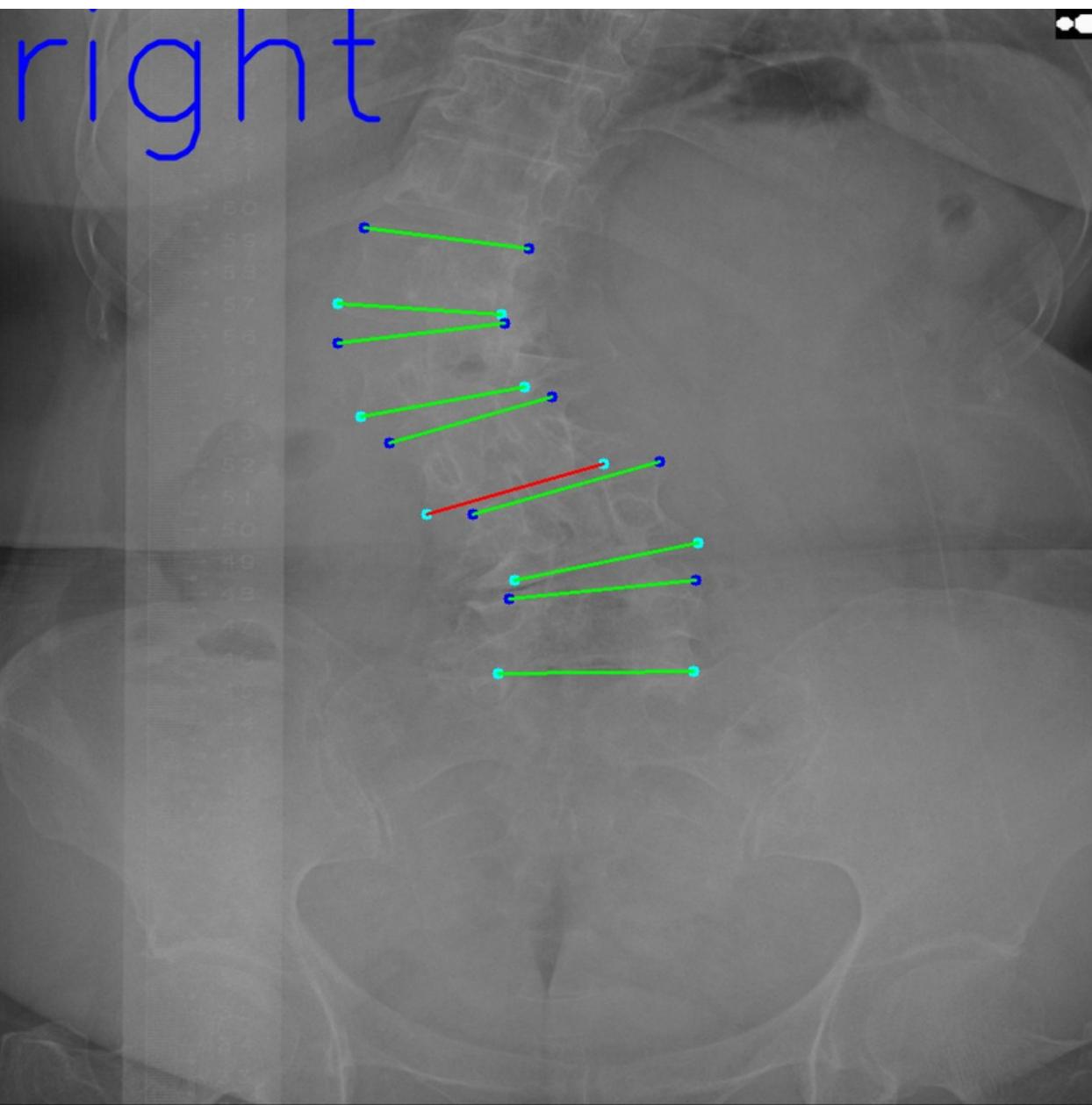


Anterolisthesis

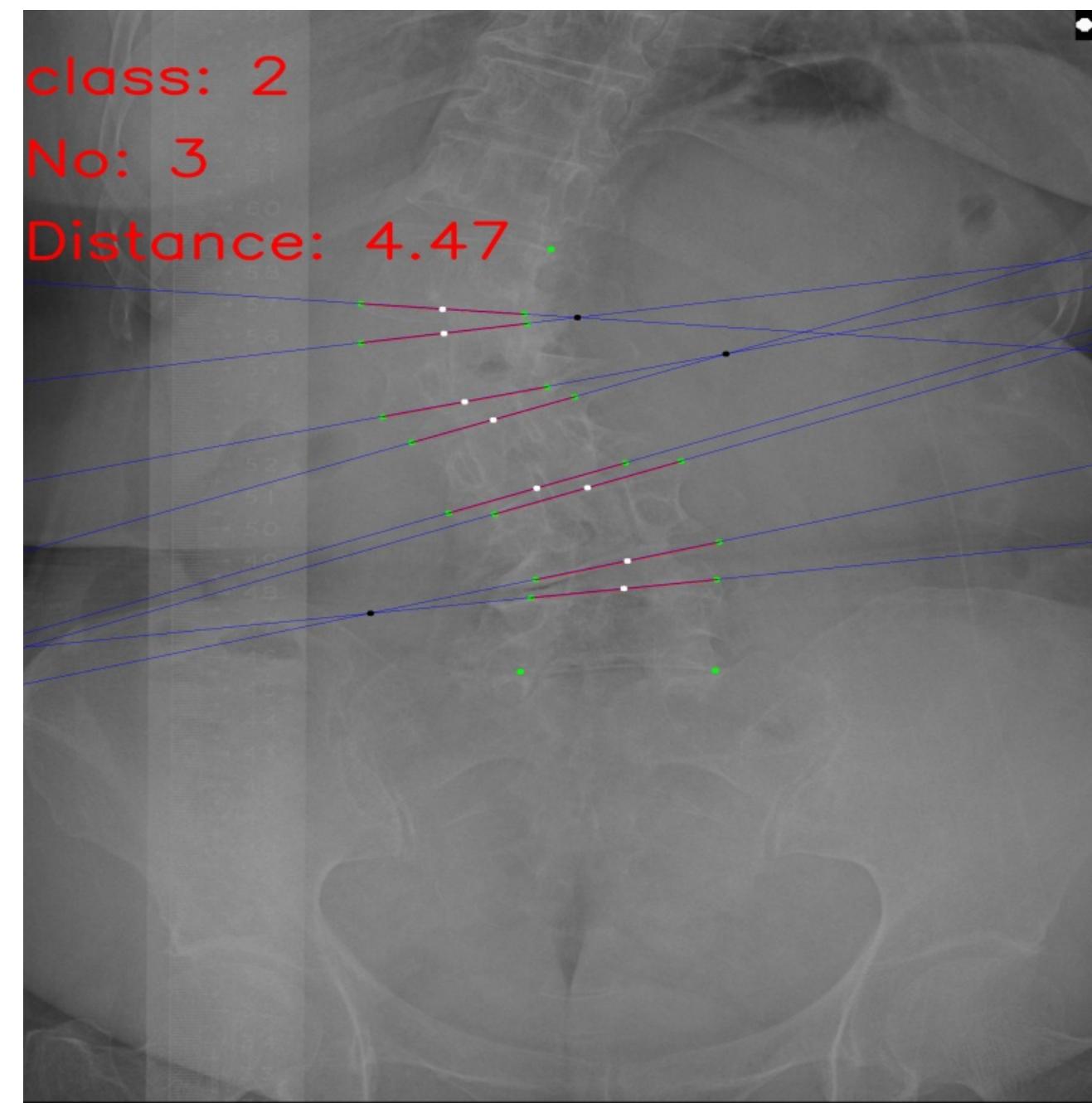


Retrolisthesis

Labels



Distance from intercation point

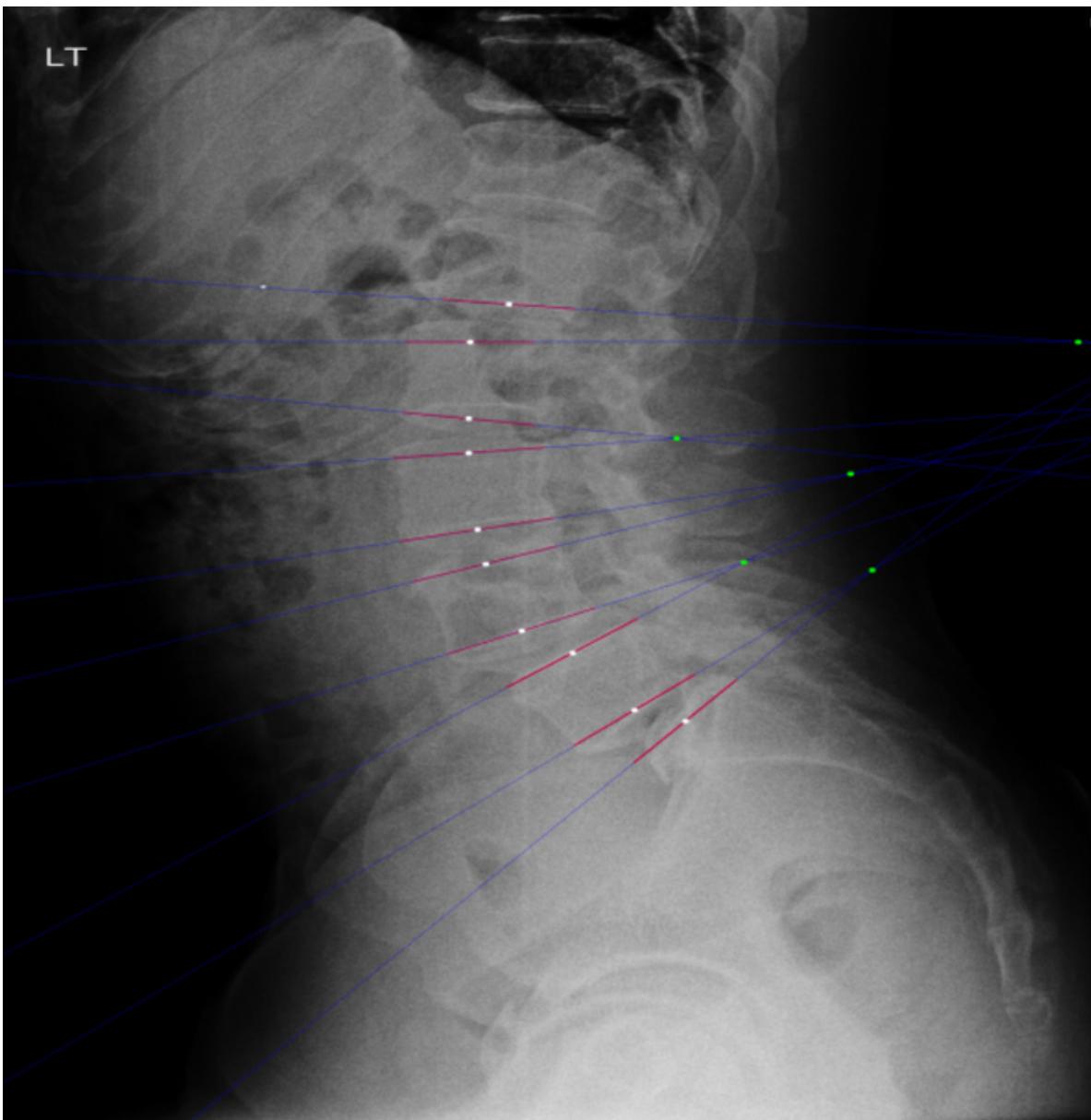


Threshold



```
[1.381, 1.482, 1.765, 0.794, -1.217]  
[0, 0, 0, 0, 0]
```

Threshold



```
[3.343, -0.033, -0.083, -3.408, -3.136]  
[4, 0, 0, 3, 3]
```

2

300190-កញ្ញាន់



0.63333

5

10h



Your Best Entry!

Your most recent submission scored 0.63333, which is the same as your previous score. Keep trying!

2

—

300190-កញ្ញាន់



0.73853

5

10h

Summary results

1st

Lumbar Spine Gender

Using x-ray images to classify gender of patient

1st

Vertebral positions

Detect 5 Lumbar Spines and locate Vertebral position which has 4 points for each Lumbar Spine

2nd

Spondylolisthesis

Classification Case of Lumbar Spine by using detection model from Vertebral positions.



STUDIO SHODWE

Thank You

SLIDE PRESENTATIONS DESIGN