3D Bounding Box Regression

Project Progress Report

이지민

Overview

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Project Description

3D bounding box regression 성능 향상

더 나은 방법을 구현하기 위해 기존 방법들 조사

Paper Reviews

3D Bounding Box Estimation Using Deep Learning and Geometry

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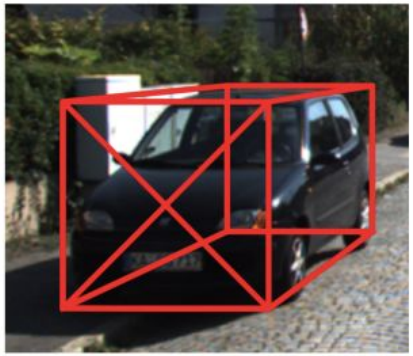

Objects as Points

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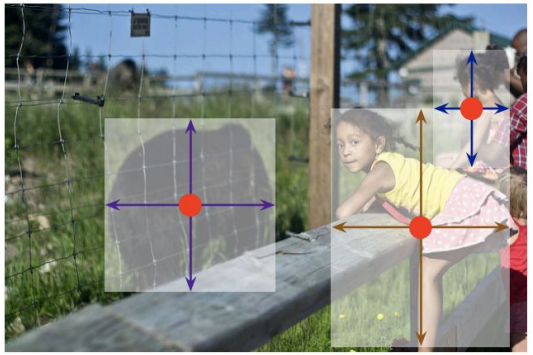
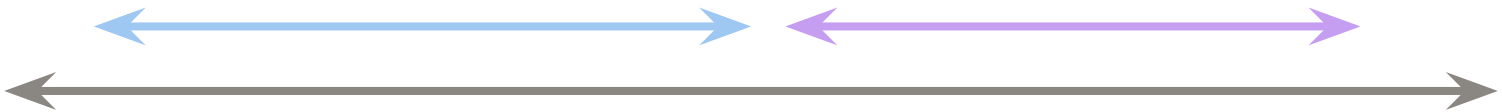


Timeline

Open source에 있는 모델들을
KITTI dataset에 train + test 시키기

3D bounding box regression
구현 및 학습하기



June July August

Milestones Achieved

1st Week 6/20-6/24	• 2D object detection - Faster R-CNN 논문 공부 • 3D bounding box regression 논문 공부
2nd Week 6/27-7/1	• 2D mmdetection (open source)에서 주어진 pre-trained Faster R-CNN model을 COCO dataset에 inference, PASCAL VOC dataset에 mAP evaluation • “3D Bounding Box Estimation Using Deep Learning and Geometry” Paper Review

Milestones Achieved

3rd Week 7/4-7/8	• Faster R-CNN model을 COCO dataset에 training, testing • KITTI dataset annotations를 COCO dataset annotations format로 변환시키는 방법 조사 • 3D bounding box regression 논문 공부
4th Week 7/11-7/15	• 2D mmdetection 코드 공부 • kitti2coco.py 스크립트 작성 (진행 중) • “Objects as Points” Paper Review

Results

```
---------------iou_thr: 0.5---------------

+-------------+------+-------+--------+-------+
| class       | gts  | dets  | recall | ap    |
+-------------+------+-------+--------+-------+
| aeroplane   | 285  | 806   | 0.944  | 0.857 |
| bicycle     | 337  | 1050  | 0.938  | 0.872 |
| bird        | 459  | 1054  | 0.891  | 0.797 |
| boat        | 263  | 1315  | 0.875  | 0.709 |
| bottle      | 469  | 1421  | 0.802  | 0.700 |
| bus         | 213  | 695   | 0.939  | 0.859 |
| car         | 1201 | 3284  | 0.957  | 0.878 |
| cat         | 358  | 881   | 0.969  | 0.892 |
| chair       | 756  | 4236  | 0.868  | 0.649 |
| cow         | 244  | 883   | 0.963  | 0.852 |
| diningtable | 206  | 2077  | 0.942  | 0.743 |
| dog         | 489  | 1294  | 0.982  | 0.878 |
| horse       | 348  | 1034  | 0.945  | 0.860 |
| motorbike   | 325  | 990   | 0.932  | 0.849 |
| person      | 4528 | 11747 | 0.940  | 0.862 |
| pottedplant | 480  | 1984  | 0.788  | 0.554 |
| sheep       | 242  | 716   | 0.938  | 0.822 |
| sofa        | 239  | 1344  | 0.950  | 0.783 |
| train       | 282  | 994   | 0.936  | 0.848 |
| tvmonitor   | 308  | 975   | 0.909  | 0.808 |
+-------------+------+-------+--------+-------+
| mAP         |      |       |        | 0.804 |
+-------------+------+-------+--------+-------+
OrderedDict([('mAP', 0.8035303354263306), ('AP50', 0.804)])
```

mAP evaluation of pre-trained Faster R-CNN model on PASCAL VOC dataset

Results

Trained Faster R-CNN model on COCO test dataset

Milestones Remaining

5th Week 7/18-7/22	• Faster R-CNN model을 KITTI dataset에 training, testing • 3D mmdetection CenterPoint model training, testing • 3D bounding box regression 논문 공부
6th Week 7/25-7/29	• 기존 3D bounding box regression 방법 공부, 개선할 점 찾기 • Paper Review
7th Week 8/1-8/5	• 기존 3D bounding box regression 방법 개선, 구현하기 • 3D bounding box regression 논문 공부
8th Week 8/8-8/12	• 구현한 3D bounding box regression 방법으로 학습하기 • Paper Review

Thank you!

감사합니다!

Q & A