深蓝学院
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三维点云处理第三期

——第六章作业讲评

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题目

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Homework

1. Setup the KITTI object detection evaluation environment
    1. git clone https://github.com/prclibo/kitti_eval.git
    2. g++ -O3 -DNDEBUG -o evaluate_object_3d_offline evaluate_object_3d_offline.cpp
    3. sudo apt-get install gnuplot
    4. sudo apt-get install texlive-extra-utils
2. Download and read the KITTI Object Detection dataset ”devkit” readme.
3. Divide the KITTI Object Detection into training set and validation set.
    - KITTI train/val split used in 3DOP/Mono3D/MV3D
    - “train.txt” for training, “val.txt” for testing, ignore the ”test.txt/trainval.txt”
4. Generate object detection results on KITTI validation set
    1. Option 1: find any open-source 3d object detector, run it.
    2. Option 2: copy the ground truth as the result, but you need to process it into the correct format.
5. Write a report.

作业1 画PR曲线

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步骤一：首先根据4步构建3d目标检测的评估工具

1. git clone https://github.com/prclibo/kitti_eval.git
2. g++ -O3 -DNDEBUG -o evaluate_object_3d_offline evaluate_object_3d_offline.cpp
3. sudo apt-get install gnuplot
4. sudo apt-get install texlive-extra-utils

步骤二：下载kitti devkit，根据readme了解点云目标检测数据集的格式

步骤三：根据课件提供的地址，下载数据集划分train.txt和val.txt

作业1 画PR曲线

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步骤四：根据开源3d目标检测的实现，训练自己的检测器，
同时在val.txt上做测试

或者：没有GPU条件的同学，也可以手动修改val.txt，构造“识别”结果

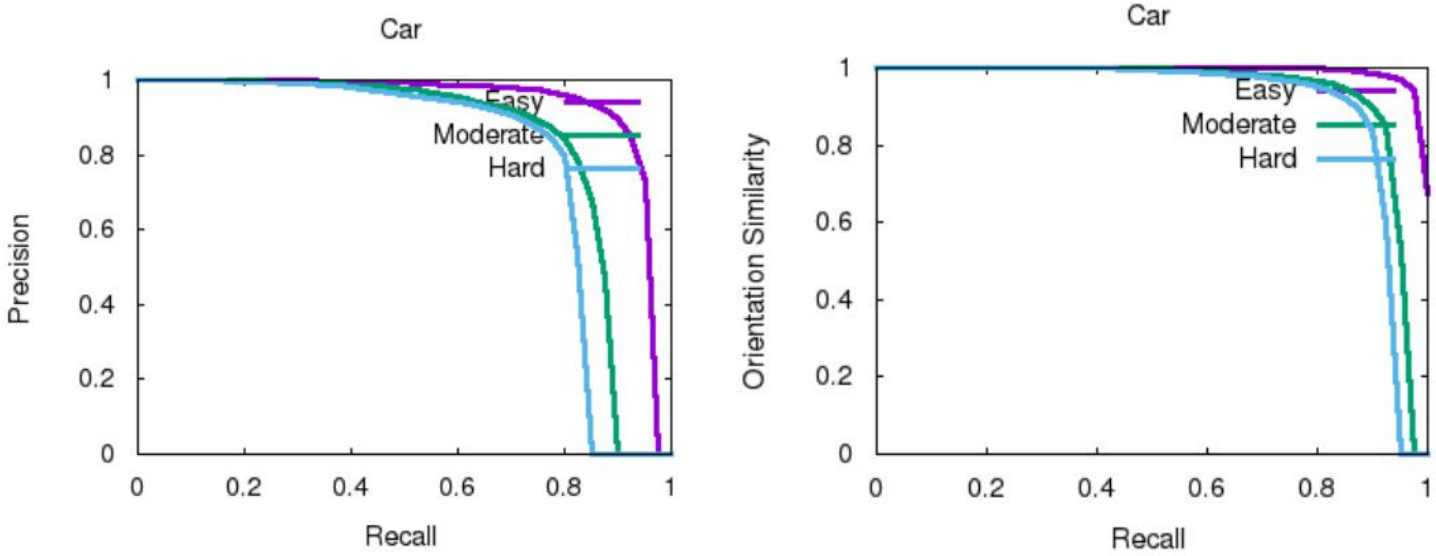
- Label example:
  - 000000.txt
    - Pedestrian 0.00 0 -0.20 712.40 143.00 810.73 307.92 1.89 0.48 1.20 1.84 1.47 8.41 0.01

- Result example:
  - data/000000.txt
    - Pedestrian 0.00 0 -0.20 712.40 143.00 810.73 307.92 1.89 0.48 1.20 1.84 1.47 8.41 0.01 10.0
    - Pedestrian 0.00 0 -0.20 712.40 143.00 810.73 307.92 1.89 0.48 1.20 1.84 1.47 8.41 0.01 8.0
    - Pedestrian 0.00 0 -0.20 712.40 143.00 810.73 307.92 1.89 0.48 1.20 1.84 1.47 8.41 0.01 6.0

无论你用3d检测得到的结果，还是手动编辑的结果，都需要将结果转换为kitti要求的格式，同时在最后一列添加score

作业1 画PR曲线

步骤五： ./evaluate_object_3d_offline gt_dir result_dir



By zhutong940221

作业2 计算Conv3D输出维度

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- Input: $128 \times 10 \times 400 \times 352$
- Conv3D
  - Output channel # 64, kernel (3, 3, 3), stride (2, 1, 1), padding (1, 1, 1)
  - Output channel # 64, kernel (3, 3, 3), stride (1, 1, 1), padding (0, 1, 1)
  - Output channel # 64, kernel (3, 3, 3), stride (2, 1, 1), padding (1, 1, 1)
- Output: $C' \times D' \times H' \times W'$ – Homework
  - Answer is $64 \times 2 \times 400 \times 352$
- Reshape into 2D feature map $2C' \times H' \times W'$
  - This is image-like feature map!

举例

$$D1\_out=(10-3+2\times1)/2+1=5$$

$$D2\_out=(5-3+2\times0)/1+1=3$$

$$D'=(3-3+2\times1)/2+1=2$$

$$C'=C1\_out=C2\_out=64$$

在线问答

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Q&A

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感谢各位聆听！

Thanks for Listening