Pedestrian Identification Using CNNs

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Baseline Presentation

AGENDA

01 QUESTION

What is the question we will be working on?
Why is it interesting?

02 DATA

Data source, size, and main features used.
Summary statistics

03 ALGORITHMS

What prediction algorithms will we use?

04 EVALUATION

How will we evaluate our results?
What is our chosen performance metrics and statistical tests?

05 CLOSING

Questions
Thank You

01

Question

Can we use CNN-based algorithms to effectively identify pedestrians on the street?

Objective:
- Investigate the effectiveness of CNN-based algorithms in detecting pedestrians in real-world street environments

Motivation:
- Pedestrian detection is a critical component of autonomous vehicle (AV) perception systems
- Ensures the safety of both AV users and pedestrians

Context:
- AVs rely heavily on computer vision systems for situational awareness
- Detecting dynamic objects like pedestrians is more complex than identifying static objects

02

Data

Waymo Open Dataset

- Collected from Waymo's autonomous vehicles using 5 cameras and 5 lidars
- Has 11.8 million 2D bounding box annotations on camera images
  - Covers objects like vehicles, pedestrians, cyclists, and traffic signs
- Complements other datasets with:
  - 12.6 million 3D bounding boxes (lidar)
  - 3D semantic segmentation labels
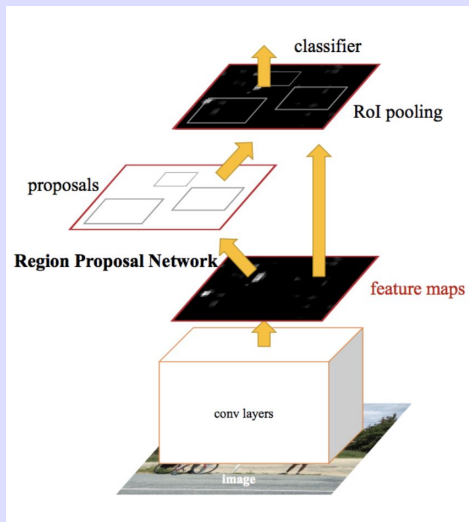- Good for object detection, tracking, and scene understanding for autonomous driving
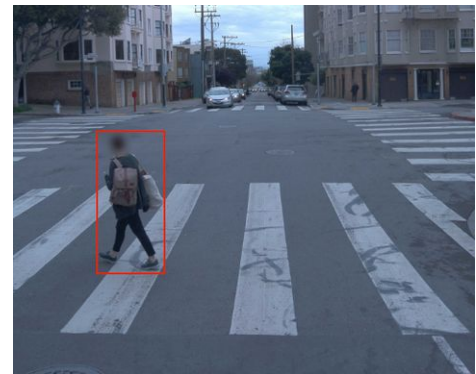
03

Algorithms

Algorithms

Fast R-CNN

Fast Region-based Convolutional Neural network
- Identifies objects and draws boxes while classifying
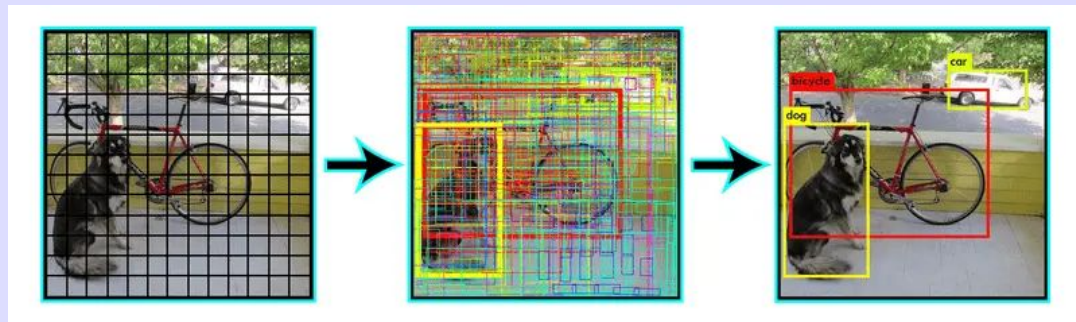
Faster R-CNN

Improves Fast R-CNN by also using a region proposal network (RPN)
- Same as Fast R-CNN

YOLO

You Only Look Once
- Uses single CNN to predict bounding boxes and class probabilities for objects

04

Evaluation

Evaluations

Quantitative Evaluation

Examples include F1, precision, recall, or IoU (intersection over union) score to understand the models ability to detect or fail to detect pedestrians

Qualitative Evaluation

Visually look at the predictions from the model to ensure they are correctly identifying all pedestrians and not mislabelling objects as pedestrians

Thank you for listening