Robot INT3409-21

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Challenge 1

Object Detection and Classification

Classification

Classification is the process of categorizing a object or objects into a finite set of classes or labels.

Localization

Sometimes we need to know how many dogs or how many known objects (objects in the database) are there and where they are in a scene.

Detection

Detection is thus a process that involves both classification and localization. An object detection system is tasked to categorize and locate all known content in the scene.

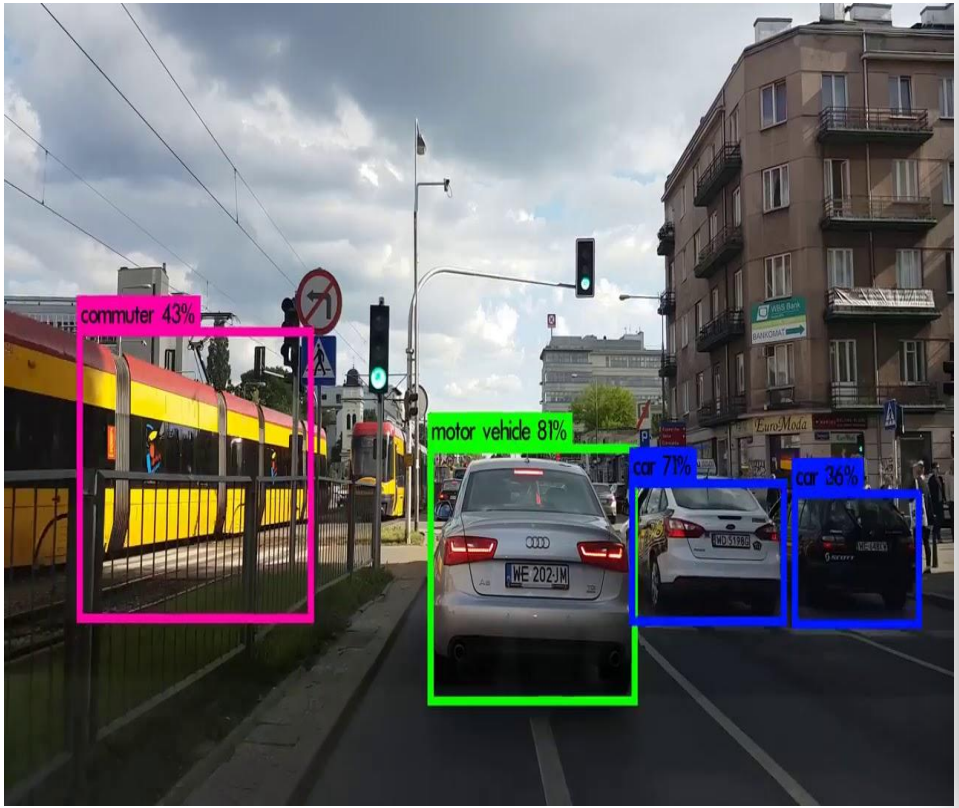
So **detection = classification + localization**

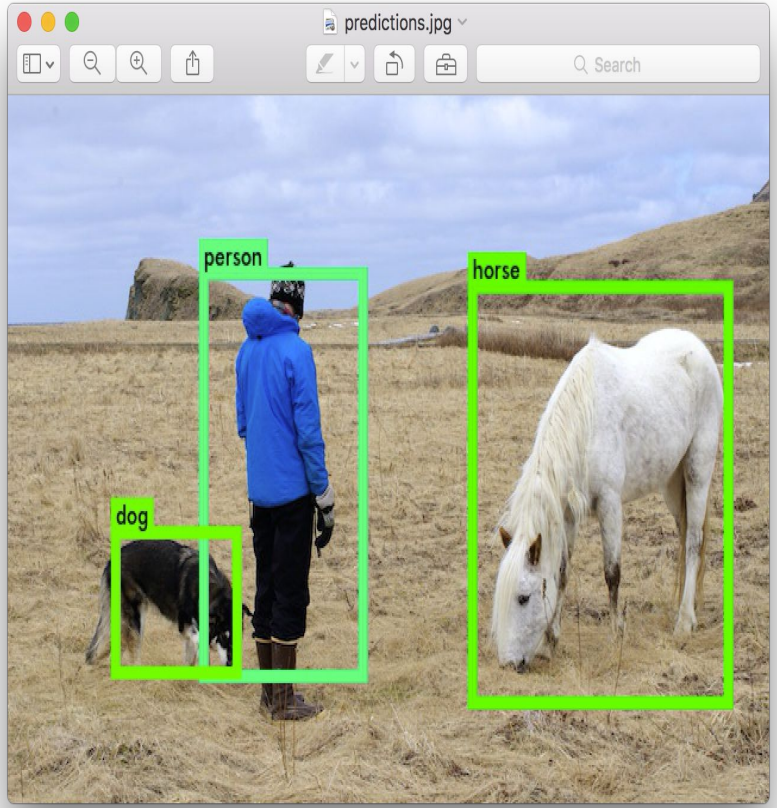
YOLO - You Only Look Once

Prior detection systems repurpose classifiers or localizers to perform detection. They apply the model to an image at multiple locations and scales. High scoring regions of the image are considered detections.

YOLO uses a totally different approach. YOLO applys a single neural network to the full image. This network divides the image into regions and predicts bounding boxes and probabilities for each region. These bounding boxes are weighted by the predicted probabilities.

YOLO


commuter 43%
motor vehicle 81%
car 71%
car 36%


predictions.jpg
Search
person
horse
dog

Idea

Agent moves freely.

When we press ‘f’, we will call yolo to process that frame with pre-trained weight.

Actions

- “w” - Move agent forward.

- “s” - Move agent backward (without changing view direction).

- “a” - Move agent to the left(without changing view direction).

- “d” - Move agent to the right(without changing view direction).

- “left arrow” - Rotate agent by 90 degrees to the left of its current facing.

- “right arrow” - Rotate the agent by 90 degrees to the right of its current facing.

- “up arrow” - Angle the agent’s view up in 30 degree increments.

- “down arrow” - Angle the agent’s view down in 30 degree increments.

Demo