Ivan Flores Martinez AI and Deep Learning

Midterm exam

Step 1 – Get data to train the model.

I downloaded the Pascal VOC 2012.v3-416x416.coco dataset from roboflow. Then, I unzipped it and checked the files. The dataset contains 13690 images in COCO format for 21 categories of objects (i.e. person, airplane, chair, etc.).

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Descripción generada automáticamente

Step 2 – Register the dataset.

I registered the dataset with coco format for use with detectron

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Descripción generada automáticamente

Step 3 – Train the model.

I trained the model for 20 epochs using the faster RCNN model from detectron. This model is used for object detection in images. The hyperparameters to run the model are contained in the python script (see train\_detectron\_VOC.ipynb).

Texto

Descripción generada automáticamente

Step 4 – Test the model

I tested the model on a few images to make sure it was working. The model performed well on the test data.

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Descripción generada automáticamente

Step 5 – Record video from webcam

I recorded a video from my webcam using the VideoCapture() function from opencv. The video was recorded for 47 seconds with some volunteers in my office. The video is available in the videos folder of the midterm repository. The name of the file is video\_raw.mp4

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Step 6 – Use trained model to detect object in video

I passed the video I recorded to the detectron\_VOC model to detect objects in the frames of the video I recorded with my webcam. First, I created a predictor with the weights of my detectronVOC trained model. Then, I initialize the visualizer, using the VideoVisualizer function.

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Later, I created a function that passed the video frames (1412) to the predictor and stored the output in the file “video\_obj\_det.mp4” (see “videos” folder in repository). I made sure that all frame had color and that all frames were processed by the detectron model.

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Step 7 – Display original video and the video with the predictions simultaneously

I used open-cv to show the original video and the video with the predictions simultaneously. To do this, I had to create an object with a different name for each video. Then, I had to resize the windows to display side by side in the screen. Finally, I made sure the videos were displayed in color and that I could stop the streaming with the keyboard.

Texto

Descripción generada automáticamente

This is how the videos look side by side.

Imagen que contiene interior, hombre, espejo, parado

Descripción generada automáticamente

**Bonus**

I also trained a model for instance segmentation. It is in the “Videos” folder of the repository. The file name is “video\_inst\_segmention.mp4”. Here is a sample of the video using the same procedure described above.

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