May 17, 2020

Author: **Joram Bakekolo**

Report Computer vision Lab 1

Abstract

This paper describes guidelines for experimentation using Detectron2 object detection and segmentation platform released by Facebook. Details, instructions have been presented in the paper, including pictures or outputs obtained in each compilation using instance segmentation and pose Estimation models.

1 Part A

To install it, it is simple and easy than other installation ☹ , we used Google Colab to run it faster.

2 Part B: Model for instance segmentation

We used a pre trained model by creating a Default Predictor after load in a config and some weights. Then we simply made predictions and display with Detectron's Visualizer utility.

1. Model architecture: Instance Segmentation load [Mark R-CNN][maskrcnn] model with a ResNet50 backbone pre-trained on the COCO dataset which is an excellent object detection dataset with 80 classes, 80,000 training images and 40,000 validation images annoted.
2. Visualization output: Using the random image we obtained the image output (Fig1, a) with different probabilities prediction of instances. Persons with 100, 99,99,99, 90, 66, 97, 98, 59, Horse with 100, Umbrella: 89, 92, 80, Backpack with 58.
   - Correct Predictions: The model made good prediction with persons, horse and umbrella
   - Erreur: The model did not predicted the tree, gave less probabilities to certain persons, backpack.
3. Using my own images: We checked the consistency of the model a new image performance with a new image which is not part of the COCO dataset (Fig1, b), (Fig2, a).
   - Correct Predictions: Predicted Person with 100, Couch with 96, 90 and Tv with 80 (Fig1, b). For (Fig2, a) Couch 92, backpack 65, dinning table 72, 91, chairs 95, 96, cup 82, 51, sink 51, person 100, 96, laptop 56, and bottle 66.
   - Erreur: Predicted the backpack on the couch as a dog, it has not predicted the table, laptop (Fig1, b) and has detected only one laptop.

3 Part C: Model for pose estimation

Similary to part B, we repeated the process now with human pose estimation, key points. Pose estimation predicts and tracks the location by identifying the key points of the person, major joints(elbow, knee, more).

1. Model architecture: Model Architecture of pose estimation were as follow COCO Person Keypoint Detection Baselines with Keypoint R-CNN.
2. Visualization output: We can see the outputs
   - Correct Predictions: Persons present on the image for pose estimation, are correctly presented, where the line is the body part (Fig2, a)
   - Erreur: we can see the mistake made by the model on pose estimation of person at the border, we can not see the estimation of arms and knees.
3. Using my own image: We checked the consistency of the model a new image which are not part of the COCO dataset (Fig3, a) and (Fig3, b).
   - Correct Predictions: Persons present are visible with line which are body part
   - Erreur: We can see the mistake made by the model on the pose estimation of feet and arm of person (Fig3, a) and (Fig3, b).

4 Conclusion

From different results obtained throughout our experimentation, we can conclude that instance segmentation and pose estimation models performed well with images from COCO dataset and gave good performances on new images in general, since the model is not 100 percent accurate. The experimentation was a good opportunity to practice and learn better about the detectron2 specifically instance segmentation and pose estimation, we learnt a lot also discover the limits.

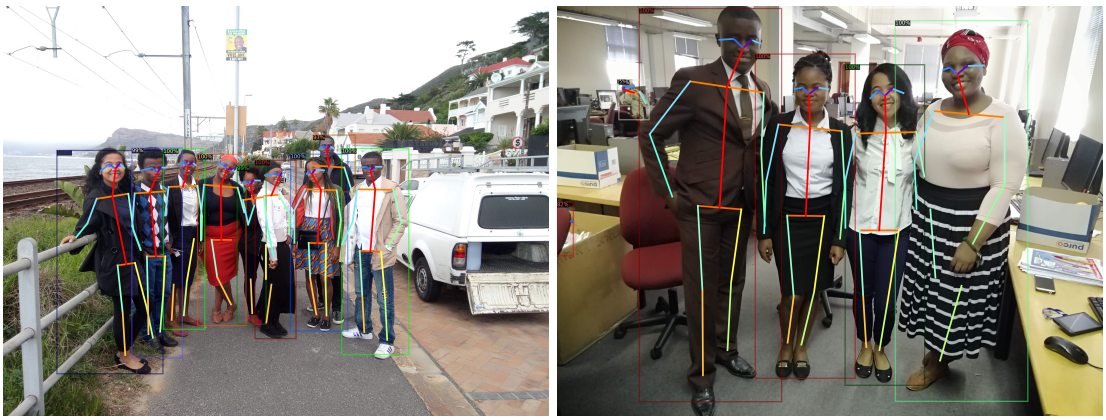
5 Images obtained

(a) Detection using instance segmentation (b) Detection using instance segmentation

Figure 1: The same model

(a) Detection using instance segmentation (b) Detection using pose estimation

Figure 2: The same model



(a) Detection using pose estimation (b) Detection using pose estimation