Assignment 3 report

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Name on Kaggle leaderboard: Oswaldo Russian
(For each of the sections below, your reported metrics should approximately match the metric submitted on Kaggle.)

Part 1:

Did you upload final CSV file on Kaggle (Yes/No):	Yes
My best mAP value on Kaggle:	0.3403
What platform did you use to train your CNN? (Colab, uHPC, your own GPU, others)	Colab

Classifier A

- **Description: What is the architecture you implemented?**

  Here, I applied batch normalization after each convolutional layer given in the reference classifier. I also removed one of the fully connected layers at the end of the network.

- **mAP obtained:** 0.1498 (Reference mAP: 0.3223)
- **Explanation:** Why do you think the network performed the way it did?

  The recommendations indicated that incorporating batch normalization and removing fully connected layers could help achieve a significant improvement in mAP. In my case, including batch normalization after the first two convolutional layers, as well as eliminating one fully connected layer, resulted in a significant decrease in final mAP with respect to the reference classifier. The blame for this reduction is assigned to the batch normalization, because of the results obtained for Classifier B (where removing one fully connected layer was the only modification). The code runs with no errors, and there is a small amount of "learning" from the initial epochs to the last (approximately 0.11 to 0.15).

  I think that the hyperparameter tuning applied based on the reference classifier may not be applicable to a classifier that includes batch normalization, and this is the reason why the performance is not adequate. Before hyperparameter tuning (optimizer, transformations), the reference classifier also showed low values of mAP even for a high number of epochs.

Classifier B

- **Description: What is the architecture you implemented?**

  Here, I only removed one of the fully connected layers at the end of the network.

- **mAP obtained:** 0.3403 (Reference mAP: 0.3223)

- **Explanation:** Why do you think the network performed the way it did?

  As given in the recommendations, removing one of the fully connected layers resulted in a modest improvement in mAP. However, there are only 3 such layers in the reference classifier, so there will be limited benefits in further exploring this option for the given template. It is shown here, additionally, that the hyperparameter tuning performed for the reference classifier can be maintained for the case where only fully connected layers are altered, in contrast with Classifier A.

  This is my best mAP score and the one submitted to Kaggle.

Part 2:

Did you upload final CSV file on Kaggle (Yes/No):	Yes
My best mAP value on Kaggle:	0.49
My final loss value:	2.687
What platform did you use to train your CNN? (Colab, uHPC, your own GPU, others)	Colab
What did not work in my code (if any):	-
A sample image from my detector from PASCAL VOC: