HPE DSI 312 – Introduction to Deep Learning – Fall 2024
Project #1
Due Sunday, Nov 3rd, 11:59 pm (Central)

Develop a tutorial which demonstrates how a neural network performs a computer vision task of your choice (e.g., classification, object detection, segmentation). Create a notebook (Google Colab markdown file) that implements that tutorial. Your tutorial should pair code cells with text cells that describe/comment on the actions performed by the code.
This should be similar to the TensorFlow tutorials we discussed in class, e.g.,
https://www.tensorflow.org/hub/tutorials/tf2_image_retraining

The tutorial should comprise code cells (that run without errors) paired with text cells that summarize:

- the training dataset (e.g., image size, file type, number of images); choose a dataset that will be easy for you to process, describe, and discuss. It is also perfectly acceptable to use a small image dataset you are familiar with from any other class (e.g., DSI311) (**1 point**)
- the model description (input, output, architecture); you get to choose these options, but explain them and discuss why you chose them. It is perfectly acceptable (in fact, it is encouraged) to use transfer learning to keep things simple (**1 point**)
- the training hyperparameters and procedure (e.g., loss function and optimizer); you get to choose these options, but explain them and discuss why you chose them (**1 point**)
- the model performance evaluation results; you get to choose the dataset and evaluation methods (e.g., mAP@0.5), but explain them and discuss why they are appropriate. Again, try to keep things simple (**1 point**)
- the intended uses & potential limitations (e.g., do you think the network in your tutorial was overfitted?), to the extent that you are able to explain them and offer suggestions for improvement (**1 point**)

There is no "perfect project". The objective of this project is to provide you with hands-on practice and an opportunity to learn. For example, if you choose to design a classifier and it doesn't achieve state-of-the-art accuracy, it will not mean that the project is not successful and negatively affect your grade. Be honest, describe the issues well, and suggest potential improvements. Good luck!