Machine Learning Engineer Nanodegree

Capstone Proposal

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PROPOSAL

Domain Background:

The rich heritage and deep rooted emotions for the Tourists Sites of India is something hardly anyone is unaware of.

But it so happens that with time, even for an Indian like me, we just remember that it is a famous place but forget exactly which one! Hence it takes a lot of research to find out which landmark is it from our bunch of pictures.

Here in this project, I'll try to identify the various Heritage Landmark sites of India using deep neural networks, so as to make things a little easy for someone.

Problem Statement:

The goal of this project, is to train a deep learning model that will able to recognize a tourist site located in India.The model should be able to recognize arbitrary photos with a high degree of accuracy.

Datasets and Inputs:

I will choose about 25 popular landmarks, from these lists[1,2]:

Till now I've not found any relevant dataset, hence I'll be downloading atleast 100 images for each landmark and manually eliminate irrelevant images. I have identified some browser plugins such as "Fatkun", which can help me with batch downloading of images to save time.

This project will use images from the publicly available platforms and I'll ensure that all images have permissive license.

The images can be of varying sizes and quality so they may need to be cropped and processed. The dataset will be divided into Training set(75%), Validation set(15%) and Test set(10%).

Solution Statement:

I am targeting to make a minimal web app, using which a user can upload an image of what they think is an Indian landmark and get back the name and a short description about the place.

The user should also be notified incase the model is not able to identify the requested image as part of any of the trained classes.

Benchmark Model:

Since this is my own dataset, hence I don't have any benchmark to compare. However, there is a project[3] with a somewhat similar objective (dataset was not available) that was able to achieve atleast 80% overall accuracy, which would also be my target.

Evaluation Metrics:

I'll evaluate my model based on its overall accuracy score.

Project Design:

Model Development

I am planning to use PyTorch for the training process. I will experiment with transfer learning from pre trained popular CNN architectures available in torchvsion models collection(ResNet, SqueezeNet etc). During training, I will use image augmentation using various transforms to effectively increase the image pool and improve the robustness of the model.

Model Deployment

I will create an endpoint and a simple web application that allows image to be uploaded. Ideally the solution should identify and return the name of the landmark along with a short description.

References:

1. https://www.greavesindia.co.uk/50-incredible-landmarks-india/
2. https://en.wikipedia.org/wiki/List_of_World_Heritage_Sites_in_India
3. https://github.com/AKASH2907/indian_landmark_recognition
4. https://pytorch.org/docs/stable/torchvision/models.html