Lab 2: Colab and Python tutorial

CSE 185 Introduction to Computer Vision, Fall 2023

Description: Google Colab (`https://colab.research.google.com/`) is an online platform for editing, executing, and sharing Jupyter notebooks for Python hosted on Google drive. We will use Colab and Jupyter notebook for all the labs and assignments in this course. The goal of this lab is to get familiar with Colab and Python. This lab has three parts.

1 Colab tutorial

URL: `https://colab.research.google.com/drive/16pBJQePbqkz3QFV54L4NIkOn1kwpuRrj#scrollTo=oHTd7xQrt-BW`

Google sign-in is required to run any Colab notebook. Click "Copy to drive" so that you have a copy of the notebook in your google drive and changes will be saved as you work on the tutorial.

2 Python tutorial

`https://colab.research.google.com/github/data-psl/lectures2020/blob/master/notebooks/01_python_basics.ipynb`

This tutorial introduces basic python programming, NumPy, and Matplotlib. Skip this tutorial if you are already familiar with the subject.

3 Computer vision applications

In Lab 1, we have already tried some computer vision applications through web-based demos by uploading images. Here we redo these demos programmatically using provided API and Colab. Create your first Colab notebook and use provided API for the following applications. The following package needs to be installed in order to use inference API.

```
!pip install transformers
!pip install diffusers
```

An input image is provided and can be downloaded to your virtual machine.

```
import urllib.request
urllib.request.urlretrieve(
  'http://mengtang.org/cse185/files/resource/cat.jpeg',
   "cat.jpeg")
```

3.1 Image classification

See code sample in the URL bellow. Use transformers.pipeline instead of huggingface.js.

URL: `https://huggingface.co/tasks/image-classification`

3.2 Visual question answering

See code sample in the URL `https://huggingface.co/tasks/visual-question-answering`

3.3 Image to text

See code sample in the URL `https://huggingface.co/tasks/image-to-text`

3.4 Object detection

See code sample in the URL `https://huggingface.co/tasks/object-detection`. Display input image with output bounding boxes.

3.5 Text to image

See code sample in the URL `https://huggingface.co/tasks/text-to-image`. Display generated images.