Master of Technology

Unit 2/6: Computational Intelligence I

Workshop (3): Deep Neural Networks with Python

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Objectives

On completion of this workshop, students will

- **have practical understanding on deep neural networks with Python**
- **conduct image classification using deep learning models**
- **train deep neural networks using Python packages, i.e. keras with tensorflow backend**
- **make use of both 'Cloud GPU' and 'Local CPU' for deep learning**

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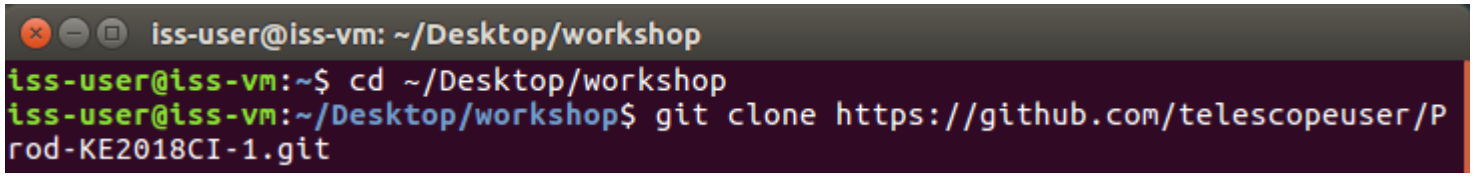
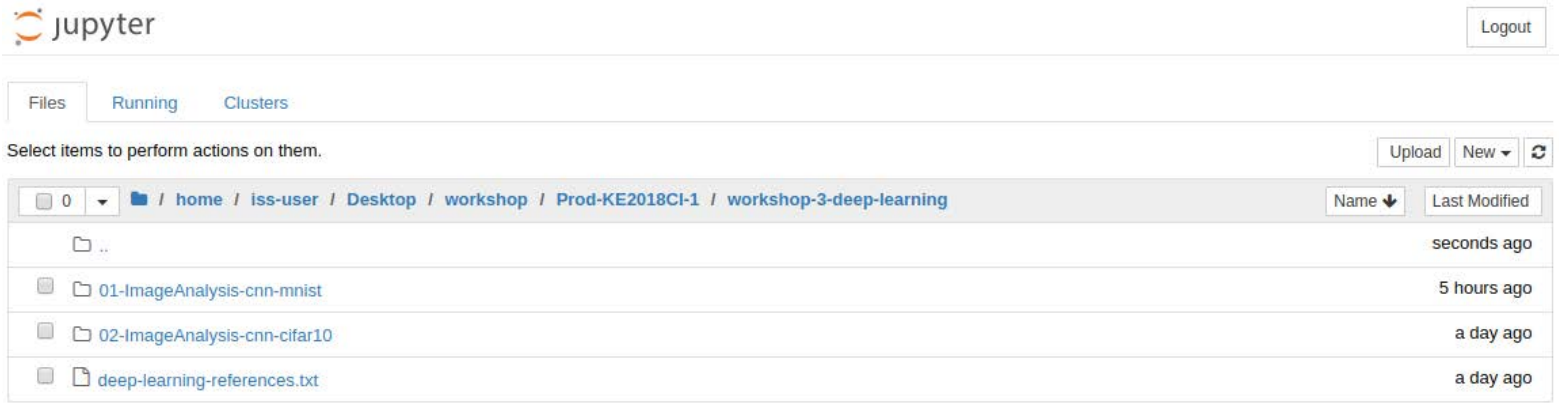
1. **Download and install virtual machine iss-vm (25 GB) if necessary**
   - http://bit.ly/iss-vm
2. **Open terminal and run command:**
   - `cd ~/Desktop/workshop`
   - `git clone https://github.com/telescopeuser/Prod-KE2018CI-1.git`



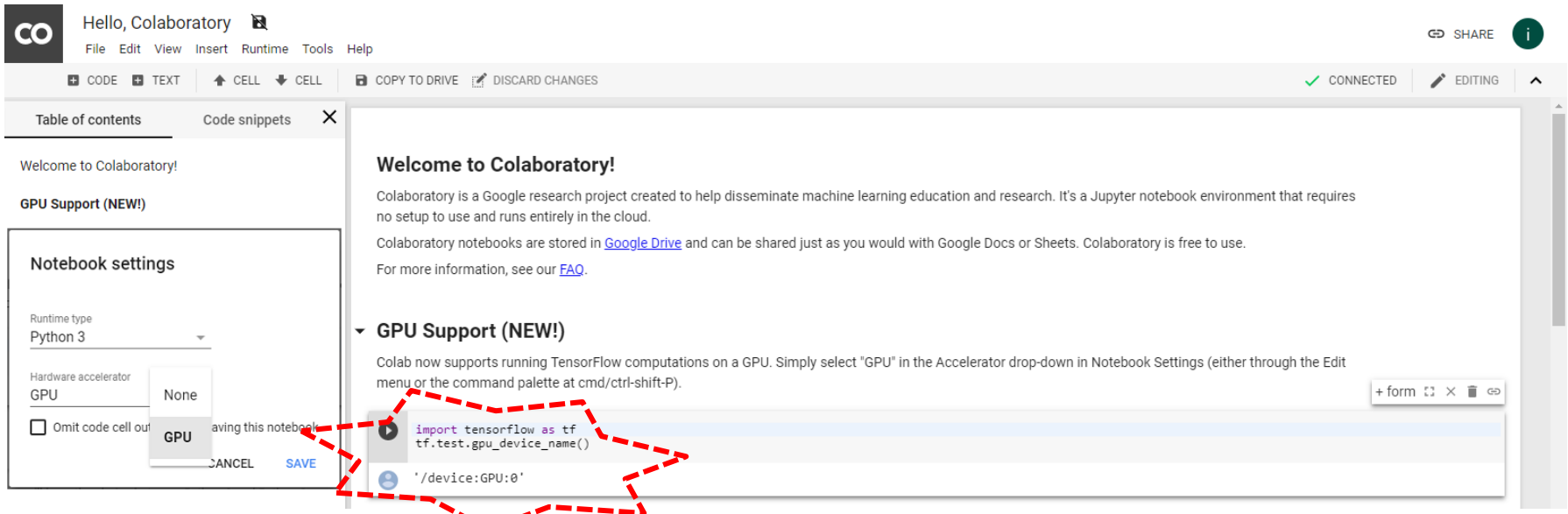
3. **Click 'Tool Python3 Jupyter Notebook' on desktop to start Python**
4. **Run ipynb in** `01-ImageAnalysis-cnn-mnist & 02-ImageAnalysis-cnn-cifar10`



Workshop (3)

5. [Optional] Migrate completed ipynb to run in Google Colab using free Cloud GPU

- https://colab.research.google.com



You will encounter many Colab problems, please conduct online research to make your ipynb running.

You can also consider other cloud services with GPU, which requires VISA/MasterCard debit/credit bank card for registration.
Google Cloud (free US$ 300 upon registration)
https://github.com/telescopeuser/Prod-GCP-GPU-Setup
Amazon Web Service, Microsoft Azure
https://hackernoon.com/keras-with-gpu-on-amazon-ec2-a-step-by-step-instruction-4f90364e49ac
https://github.com/fastai/courses/tree/master/setup

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References & Deep Learning Application Demo

❖ **Google Brain: neuraltalk**

1. https://cs.stanford.edu/people/karpathy/neuraltalk2/demo.html
2. https://github.com/karpathy/neuraltalk2
3. https://github.com/tensorflow/models/tree/master/research/im2txt/im2txt

❖ **Real time video object detection:**

1. https://github.com/telescopeuser/object_detector_app

❖ **Deep Fake:**

1. https://www.youtube.com/watch?v=jI6H-0YWkSc
2. http://fakeapp.org/?ver=1.1
3. https://www.heise.de/download/product/deepfakes-fakeapp
4. https://www.youtube.com/watch?v=D-96CM4chHc
5. https://github.com/telescopeuser/deepfakes_faceswap

❖ **An Intuitive Explanation of Convolutional Neural Networks:**

1. https://ujjwalkarn.me/2016/08/11/intuitive-explanation-convnets/

❖ **A NOT-SO-Intuitive (Hardcore) Explanation of Convolutional Neural Networks:**

1. https://medium.com/@ageitgey/machine-learning-is-fun-part-3-deep-learning-and-convolutional-neural-networks-f40359318721
2. http://cs231n.github.io/convolutional-networks/

❖ **Deep NN architectures:**

1. https://towardsdatascience.com/neural-network-architectures-156e5bad51ba