Google Colab tutorial

BIG DATA ANALYTICS

POLITECNICO DI BARI

Summary

Jupyter and Colab Notebooks

Before we dive into Python, we would like to briefly talk about notebooks.

A Jupyter notebook lets you write and execute Python code locally in your web browser. Jupyter notebooks make it very easy to tinker with code and execute it in bits and pieces; for this reason they are widely used in scientific computing.

Colab on the other hand is Google's flavor of Jupyter notebooks that is particularly suited for machine learning and data analysis and that runs entirely in the cloud.

Colab is basically Jupyter notebook on steroids: it's free, **requires no setup, comes preinstalled with many packages, is easy to share** with the world, and **benefits from free access to hardware accelerators like GPUs** and TPUs (with some caveats).

As a programmer, you can perform the following using Google Colab:

1. Write and execute code in Python
2. Document your code that supports mathematical equations
3. Create/Upload/Share notebooks
4. Import/Save notebooks from/to Google Drive
5. Integrate PyTorch, TensorFlow, Keras
6. Free Cloud service with free GPU

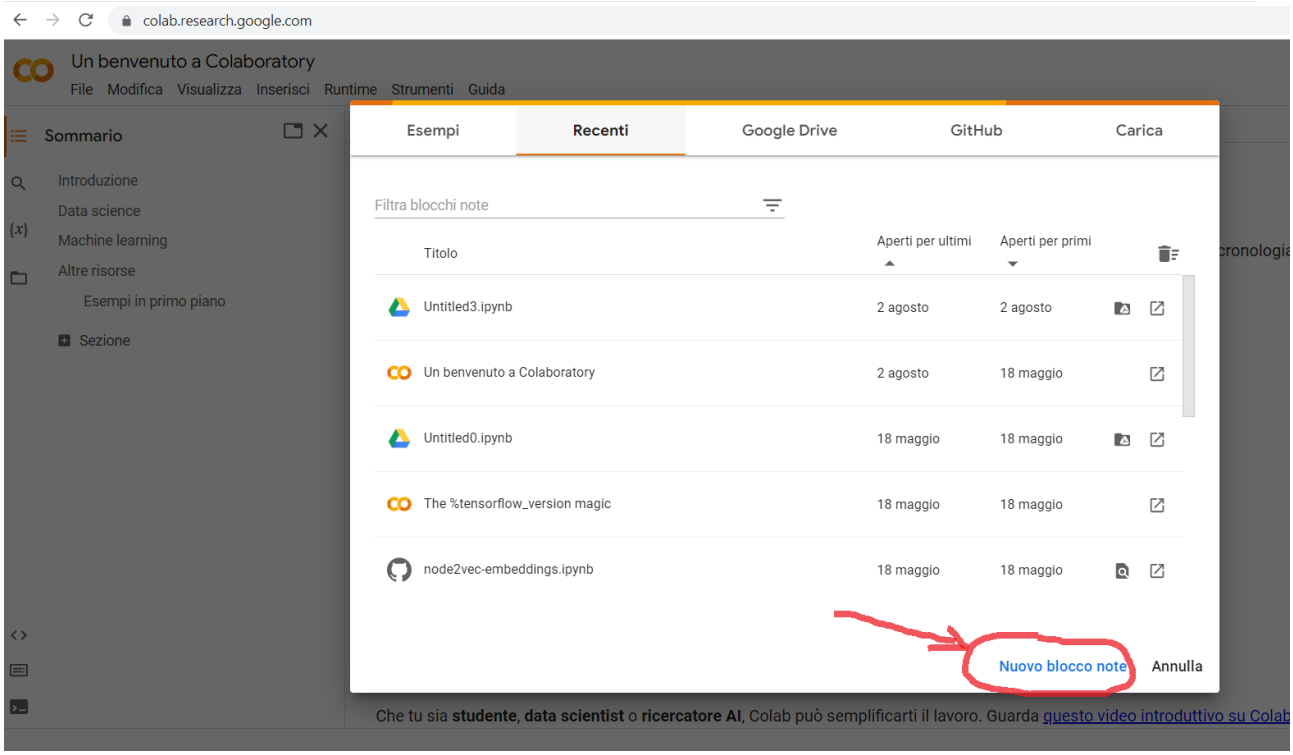
Here, we will create and execute our first trivial notebook.

Note − As Colab implicitly uses **Google Drive** for storing your notebooks, **ensure that you are logged in to your Google Drive account before proceeding further.**

Step 1 – Open Colab

Open the following URL in your browser − **https://colab.research.google.com**

Your browser would display the following screen (**assuming that you are logged into your Google Drive**):

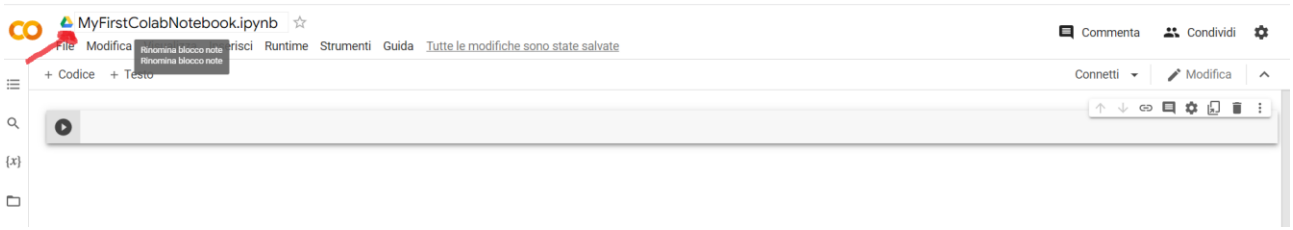


Step 2 – Open a notebook

Click on the **NEW PYTHON 3 NOTEBOOK** link at the bottom of the screen (or **NUOVO BLOCCO NOTE** in italian). A new notebook would open up as shown in the screen below:

Step 3 - Setting Notebook Name

By default, the notebook uses the naming convention UntitledXX.ipynb. To rename the notebook, click on this name and type in the desired name in the edit box as shown here . We will call this notebook as MyFirstColabNotebook. So type in this name in the edit box and hit ENTER. The notebook will acquire the name that you have given now.



Step 4 - Entering and execute code

You will now enter a trivial Python code in the code window and execute it. Enter the following two Python statements in the code window:

After a while, you will see the output underneath the code window. You can clear the output anytime by clicking the icon on the left side of the output display.

Step 5 - Adding Code Cells

To add more code to your notebook, select the following **menu options**:

Insert / Code Cell

Alternatively, just hover the mouse at the bottom center of the Code cell. When the CODE and TEXT buttons appear, click on the CODE to add a new cell. This is shown in the screenshot below:

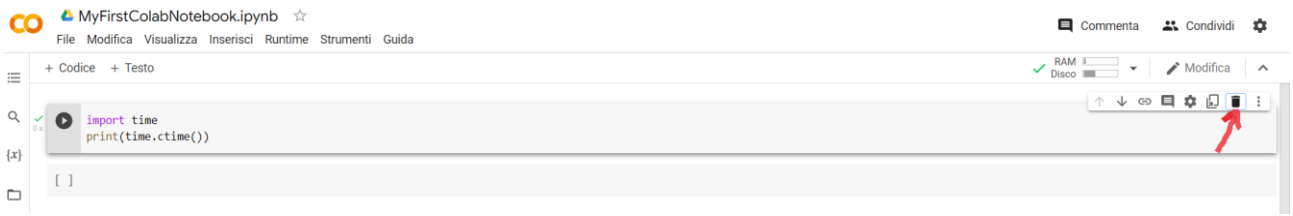
Step 6 - Run All

To run the entire code in your notebook without an interruption, execute the following menu options :

Runtime / Reset and run all

Step 7 - Deleting Cell

During the development of your project, you may have introduced a few now-unwanted cells in your notebook. You can remove such cells from your project easily with a single click. Click on the vertical-dotted icon at the top right corner of your code cell.



Step 8 – Comment your code

As the code cell supports full Python syntax, you may use Python comments in the code window to describe your code. However, many a time you need more than a simple text based comments to illustrate the ML algorithms.

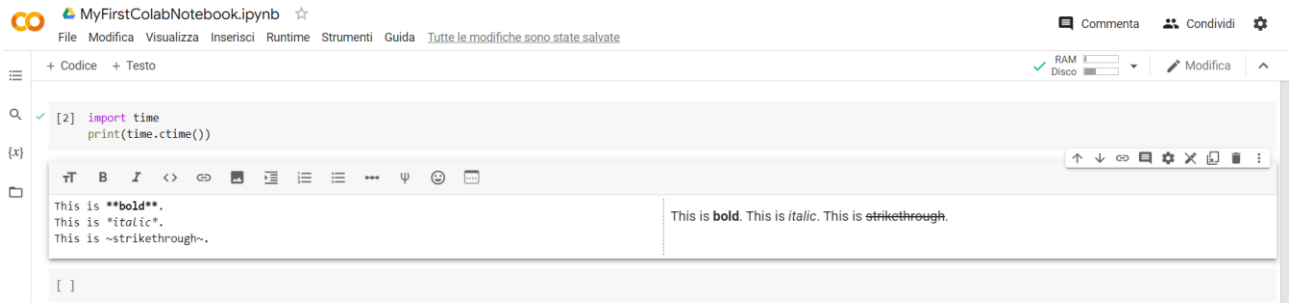
a) Type in the following text in the Text cell:

   This is **bold**.

   This is *italic*.

   This is ~strikethrough~.

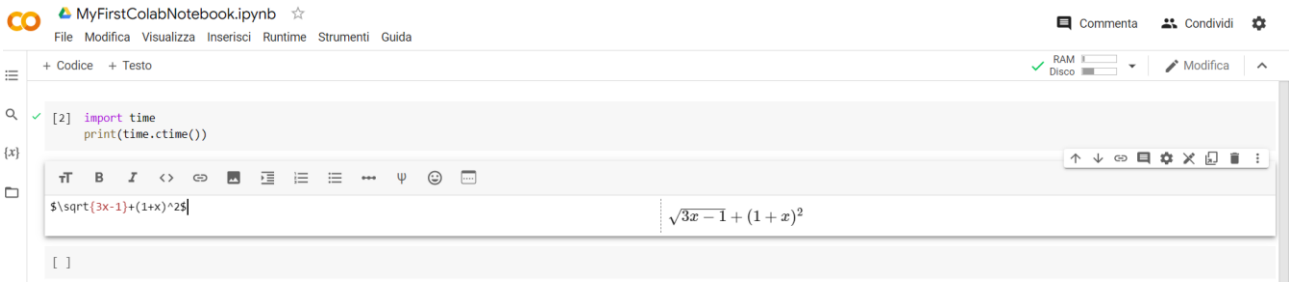
   The output of the above commands is rendered on the right hand side of the Cell as shown here.



b) Add a Text Cell to your notebook and enter the following markdown syntax in the text window:

$\sqrt{3x-1}+(1+x)^2$

You will see the immediate rendering of the markdown code in the right hand side panel of the text cell. This is shown in the screenshot below.

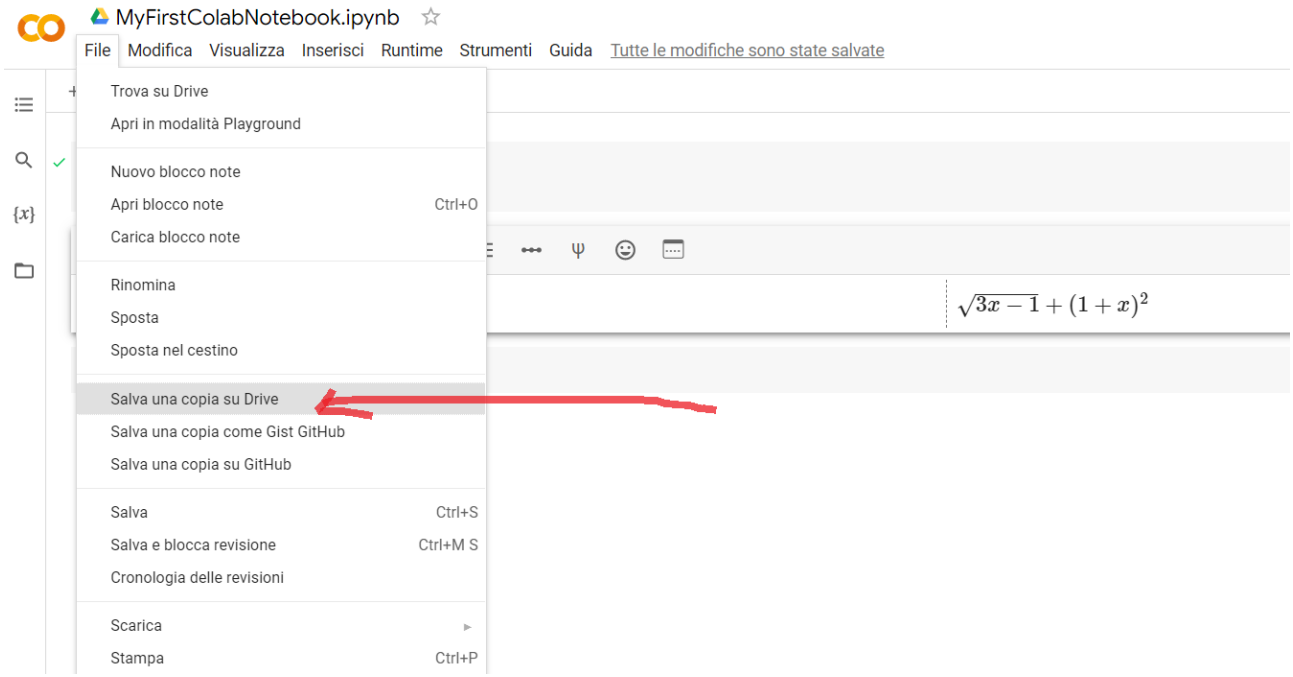


Step 9 - Saving to Google Drive

Colab allows you to save your work to your Google Drive. To save your notebook, select the following **menu options**:

File / Save a copy in Drive…

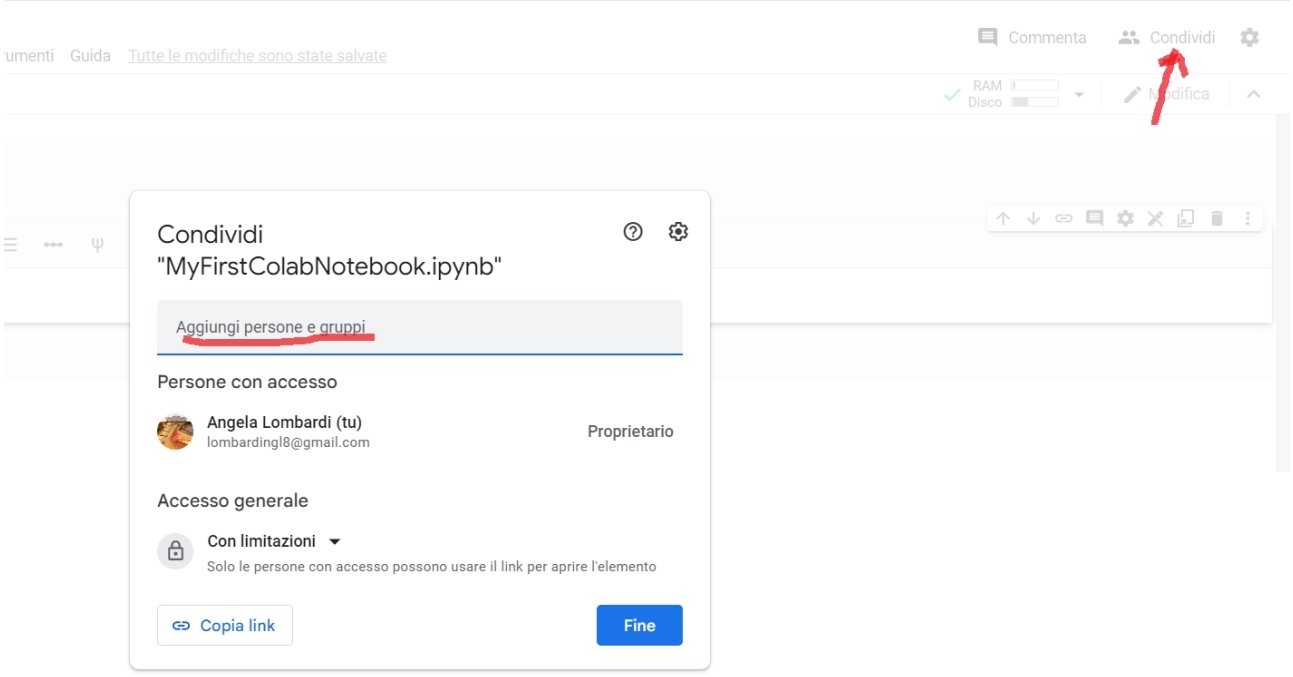
You will see the following screen:



Step 10 – Share

To share the notebook that you have created with other co-developers, you may share the copy that you have made in your Google Drive.

There is one more way to share your work and that is by clicking on the **SHARE link** at the **top right hand corner** of your Colab notebook. This will open the share box as shown here:



You may enter the email IDs of people with whom you would like to share the current document. You can set the kind of access by selecting from the three options shown in the above screen.

Click on the **Get shareable** link option to get the URL of your notebook. You will find options for whom to share as follows:

- Specified group of people

- Anyone with the link

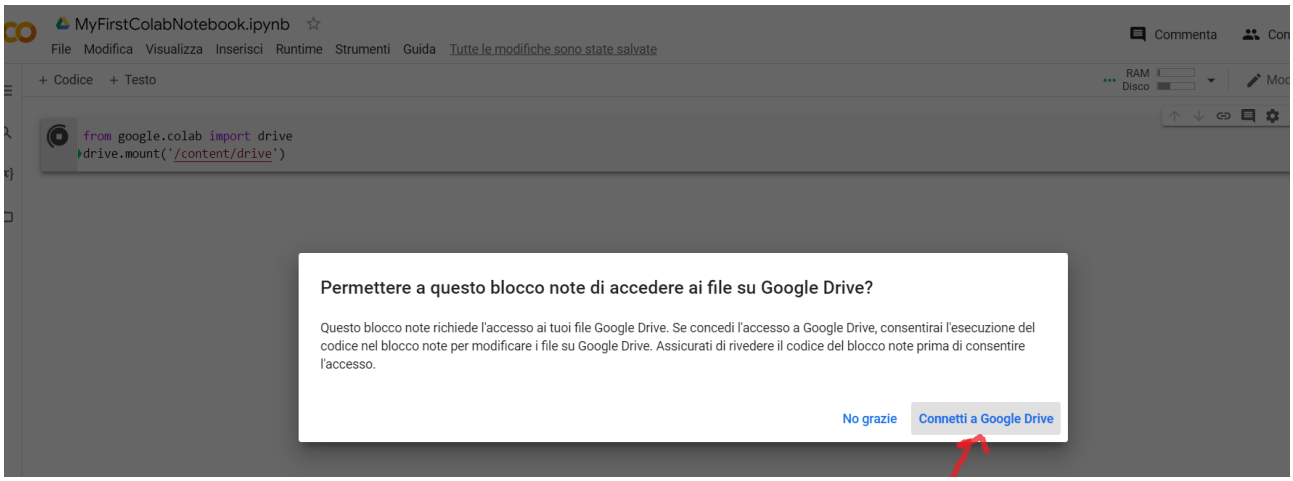
- All public on the web

Step 11 – Mount Google Drive

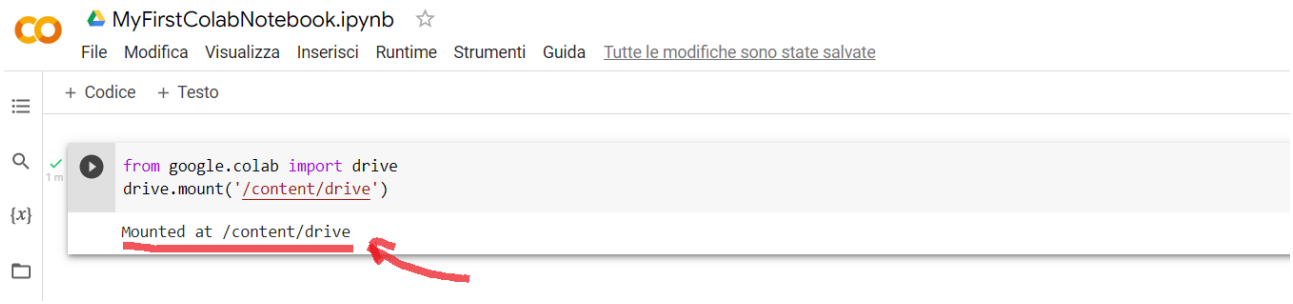
The following code would be **inserted in your Code cell** to mount your Google Drive:

```
from google.colab import drive
drive.mount('/content/drive')
```

If you run this code, you will be asked to enter the authentication code. The corresponding screen looks as shown below:



You will be asked to login to your Google account. If you grant the permissions, after a while, the drive will be mounted as seen in the screenshot below:



You can list the contents of the drive using the ls command as follows:

!ls "/content/drive/My Drive/Colab Notebooks"

This command will list the contents of your Colab Notebooks folder.