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If you want to create a machine learning model but say you don't have a computer that can take the workload, Google Colab is the platform for you. In this article, we'll learn how to use google colab. What is Google Colab? Google Colab, short for Colaboratory, is a free cloud-based platform provided by Google that allows users to write and execute Python code collaboratively in a Jupyter Notebook environment. Google Collaboratory notebook, is designed to facilitate machine learning (ML) and data science tasks by providing a virtual environment, Google colab python with access to free GPU resources. Benefits of Google Colab Google Colab offers several benefits that make it a popular choice among data scientists, researchers, and machine learning practitioners. Key features of Google Collaboratory notebook include: Free Access to GPUs: Colab offers free GPU access, which is particularly useful for training machine learning models that require significant computational power. No Setup Required : Colab runs in the cloud, eliminating the need for users to set up and configure their own development environment. This makes it convenient for quick coding and collaboration. Collaborative Editing: Multiple users can work on the same Colab notebook simultaneously, making it a useful tool for collaborative projects. Integration with Google Drive : Colab is integrated with Google Drive, allowing users to save their work directly to their Google Drive account. This enables easy sharing and access to notebooks from different devices. Support for Popular Libraries :Colab comes pre-installed with many popular Python libraries for machine learning, data analysis, and visualization, such as TensorFlow, PyTorch, Matplotlib, and more. Easy Sharing :Colab notebooks can be easily shared just like Google Docs or Sheets. Users can provide a link to the notebook, and others can view or edit the code in real-time. 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Now as it is essentially a Jupyter Notebook, all commands of Jupyter Notebooks will work here. Though, you can refer to the details in Getting Started with Jupyter Notebook . Let's talk about what is different here: Change Runtime Environment: Click the "Runtime" dropdown menu. Select "Change runtime type" . Select python2 or 3 from the "Runtime type" dropdown menu. Runtime setting in Google colab Use GPU and TPU Click the "Runtime" dropdown menu. Select "Change runtime type" . Now select anything(GPU, CPU, None) you want in the "Hardware accelerator" dropdown menu. GPU and TPU in Google Colab Select python in colab Verify GPU in Colab Python import tensorflow as tftf.test.gpu_device_name() If GPU is connected it will output the following - '/device:GPU:0' Otherwise, it will output following '' Verify TPU Python import os if 'COLAB_TPU_ADDR' not in os.environ: print('Not connected to TPU')else: print("Connected to TPU") If GPU is connected it will output following Connected to TPU Otherwise, it will output following Not connected to TPU Install Python packages Use can use pip to install any package. For example: Python Clone GitHub repos in Google Colab Use the git clone command. For example: Python ! git clone Upload File on Google Colab Python from google.colab import filesuploaded = files.upload() Select "Choose file" and upload the file you want. Enable third-party cookies if they are disabled. Then you can save it in a dataframe. Python import iodf2 = pd.read_csv(io.BytesIO(uploaded['file_name.csv'])) Upload File By Mounting Google Drive To mount your drive inside the "mntDrive" folder execute the following - Python from google.colab import drivedrive.mount('/mntDrive') Then youll see a link, click on the link, then allow access, copy the code that pops up, and paste it at "Enter your authorization code:". Now to see all data in your google drive you need to execute the following: Python ! ls '/mntDrive/My Drive"' Uploading files on google colab File Hierarchy In Google Colab You can also see the file hierarchy by clicking ">" at the top left below the control buttons (CODE, TEXT, CELL). Download Files from Google Colab Let's say you want to download "file_name.csv". You can copy the file to your google drive (In "data" folder, you need to create the "data" folder in google drive) by executing this: Python cp file_name.csv "/mntDrive/My Drive/data/renamed_file_name.csv" The file will be saved in the "data" folder with the "renamed_file_name.csv" name. Now you can directly download from there, Or, you can just open the file hierarchy and right-clicking will give a download option. Download Jupyter Notebook: Click the "File" dropdown menu at the top left corner. Choose "download .ipynb" or "download .py" Downloading files from Google colab Share Jupyter Notebook: You can share your notebook by adding others' email addresses or by creating a shareable link. Share jupyter notebook in google colab Share Google colab Notebook Conclusion In conclusion, Google Colab stands out as a versatile and accessible platform for Python coding. Responsibilities Building responsible AI for everyone Were working to develop artificial intelligence responsibly in order to benefit people and society. Online prediction with BigQuery ML In this tutorial, you learn how to train and deploy a churn prediction model for real-time inference, with the data in BigQuery and model trained using BigQuery ML, registered to Vertex AI Model Registry, and deployed to an endpoint on Vertex AI for online predictions. Google Colab is the short form for "Google Colabortory". It is an executable document that lets you write, run, and share code or you can think as an improved version of "Jupyter Notebook" stored in Google Drive. You might be wondering about the word "Notebook", in simple words it is just a document that includes executable lines of code along with text, images, figures, tables, graphs, equations, and much more that even a layman can able to get insights about the concepts behind it not just developers/programmers out there. It is widely used by data scientists, analysts, and machine learning enthusiasts due to its unique features and advantages. What makes it different? We might be thinking why colab, why not Jupiter Notebook or any other IDE out there? A simple and Precise answer would be its active features which make it different. Here are the highlighted features one should be aware of: Cloud-based notebook interface: Users can access Colab from a web browser, eliminating the need for complex installations or setting up local development environments.Pre-installed Libraries: Certainly! Google Colab comes with several pre-installed libraries and packages such as NumPy, Pandas, Matplotlib, and much more that are commonly used in data science, machine learning, and deep learning tasks.Real-time CollaborationGoogle Drive: It offers a collaborative environment for individuals and teams to work on projects, data analysis, machine learning tasks, and more.Colab real-time collaborationFree Computing Resources : It provides access to powerful resources such as GPUs and TPUs. So you can work on projects hassle free irrespective of your local storage configurations.Colab resource computationIntegration with Google Drive and Github : It allow users to save, share, and store their Colab notebooks directly in the cloud. User can access the notebooks from anywhere with an internet connection, and there's no risk of data loss due to local storage issues or hardware failures.Colab gitHub & drive integrationHow to Use Google ColabIt is a cloud based interface as specified earlier, you can simply get started by the following: 1. Accessing Google ColabOpen your web browser and search for google colab and then simply click the first link provided which will redirect you to the Google Colab's welcome page. Colab web browsing2. Creating a Google Account (if needed) and Sign InIf you don't have one, simply create a Google account its absolutely free else sign in to your account. Colab account sign-in3. Create a new file / notebookYou can simply click on the new notebook redirecting you to a new page to get started. Colab new notebook creationOR simply you can select the New notebook in the File menu. Another method to create new notebook in Colab4. 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Click on theDrivetab and navigate to the folder where you want to save the notebook and click on theSave button. collab notebooks folder in drive3. Colab automatically saves your notebooks to a Colab Notebooks folder in Google Drive. colab notebooks folder in driveShare your Notebook 1. Click on theSharebutton in the top right corner of the notebook. select share button2. Enter the email addresses of the people you want to share the notebook. share notebook using email addressAdditionally you can upload or download your Notebook as .py or .ipynb format. 1. Upload Notebook upload your colab notebook from file menu2. Download Notebookdownload your colab notebook from file menuUnderstanding the Colab Interface1. EditorThe editor is where you write your code. It also includes a number of features to help you write and debug your code, such as code completion, syntax highlighting, and error messages. Code cellsThe area where you can able write and execute the program.Click thePlay iconin the left gutter of the cell;TypeCmd/Ctrl+Enterto run the cell in place;TypeShift+Enterto run the cell and move focus to the next cell (adding one if none exists); orTypeAlt+Enterto run the cell and insert a new code cell immediately below it.Code cells in google colabText cells The area where you can able write any text.It supports Markdown syntax.You can also add math to text cells usingLaTeXto be rendered byMathJax. Just place the statement within a pair of $ signs. For example: $\sqrt{3x-1}+(1+x)^2$ becomes(3x-1) + (1+x)2.Colab text area which support MarkdownAdditionally you can add new cells by using the+ CODE and+ TEXTbuttons that show when you hover between cells. These buttons are also in the toolbar above the notebook where they can be used to add a cell below the currently selected cell. This makes your code well organized and proof helpful for other people whom you share. Adding & moving cells using top toolbar in Google colab2. RuntimeThe runtime is where your code is executed. It includes a number of features to help you run your code. Colab runtimes are servers that are used to execute your code such as : GPU :Graphical Processing Unit. Capable of enhancing your graphical interface.TPU : Tensor Processing Unit. Much powerful powerful custom-built processors to run the project made on a specific framework, i.e. TensorFlowCPU : Central Processing Unit. It manage all your functions such as calculations and input/output of the computer.To select runtime, navigate to the Runtime menu and select Change runtime type according to the usability. select runtime type from runtime menu change the required runtime typeKeyboard Shortcuts for a Better Colab ExperienceHere are some keyboard shortcuts that you can use to improve your Colab experience: Ctrl + Enter :Run the current code cell.Shift + Enter :Run the current code cell and move to the next one.Ctrl + Z :Undo the previous action.Ctrl + Y :Redo the previous action.Ctrl + C :Copy the current cell or selected text.Ctrl + V :Paste the copied cell or text.Ctrl + X :Cut the current cell or selected text.Ctrl + / :Comment/Uncomment the current line or selected text.Ctrl + S :Save the current notebook.