WEB-BASED TOOLS FOR DATA ANALYSIS: JUPYTERLAB ENVIRONMENT AND WORKFLOW OPTIMIZATION

Miguel Portela

October 2021

The following material is available on GitHub

https://github.com/reisportela/R_Training

1. Operating system

- Linux (e.g., Ubuntu 20.04), OSX Catalina, Windows 10

2. Packages

Windows: consider installing Chocolatey, a package manager for Windows (similar to `yum` in CentOS or `brew` in OSX)

- Python: install Anaconda – https://www.anaconda.com

  Example, using Chocolatey: `choco install anaconda3`

  or download and install

- **R**: https://www.r-project.org
- **Julia**: https://julialang.org
- **Stata**: https://www.stata.com

  Recomendation: install RStudio

3. Jupyter

"The Jupyter Notebook is an open-source web application that allows you to **create and share** documents that contain *live code*, equations, visualizations and **narrative text**. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more."

3.1 Install jupyter

- Open a Terminal in either Linux or OSX
- Open Windows Powershell as Administrator

Run the following lines

- **jupyter notebook**: *pip install notebook* **or** *conda install -c conda-forge notebook*
- **jupyter lab**: *pip install jupyterlab* **or** *conda install -c conda-forge jupyterlab*

3.2 Install your kernels

- **Python**: this should be the first one installed ipykernel
- **R**: irkernel

  Open an R console, e.g. within RStudio, and execute sequentially, *install.packages('IRkernel')*, *IRkernel::installspec()*

  Add `Node.js` and `npm`

  Visit Nodejs.org to **install** `Node.js` and `npm`

- **Julia**: IJulia

  Run Julia and execute sequentially, *using Pkg*, *Pkg.add("IJulia")*

- **Stata**: stata_kernel

  for Stata see the instructions by Kyle Barron

  Magics – "Magics are programs provided by stata_kernel that enhance the experience of working with Stata in Jupyter."

3.3 Start 'notebook' or 'lab'

Open a `Terminal/Power shell`, move to your working folder and type:

- **jupyter notebook**: *jupyter notebook*
- **jupyter lab**: *jupyter lab*

It should open your browser with the notebook and the installed kernels.

3.4 Remove a Kernel

```
jupyter kernelspec list
```

```
jupyter kernelspec uninstall unwanted-kernel
```

4. Binder

Running R Projects in MyBinder: Dockerfile Creation With Holepunch

- myBinder
- Gesis Notebooks

Check the following link

Configuration Files

mybinder allows you to create a linked icon to your interactive notebook

Check the example in GitHub with RStudio & R 3.6 + Python + Julia + Stata

`reisportela/prjs`

- or a setup where we can build a notebook with Python 3.0 or R (you can also run RStudio from this link)

Even better, use GESIS notebooks to launch your image

The concept using GESIS

MyBinder: EXAMPLES

5. A gallery of interesting Jupyter Notebooks

- Gallery
- Plotting and Programming in Python
- Exploratory data analysis in Python

6. Books

- Python Data Science Handbook
- Bookdown
- How to Hide all the code cells in Jupyter Notebook Python with single Click

7. Checks

- Binder Multi-language demo
- mybinder.io

8. SoS NOTEBOOK

- Local installation

pip installation

pip3 install sos

pip3 install sos-pbs

pip3 install sos-notebook

pip3 install sos-papermill

pip3 install sos-r

pip3 install sos-julia

pip3 install sos-stata

python3 -m sos_notebook.install

jupyter kernelspec list

jupyter notebook

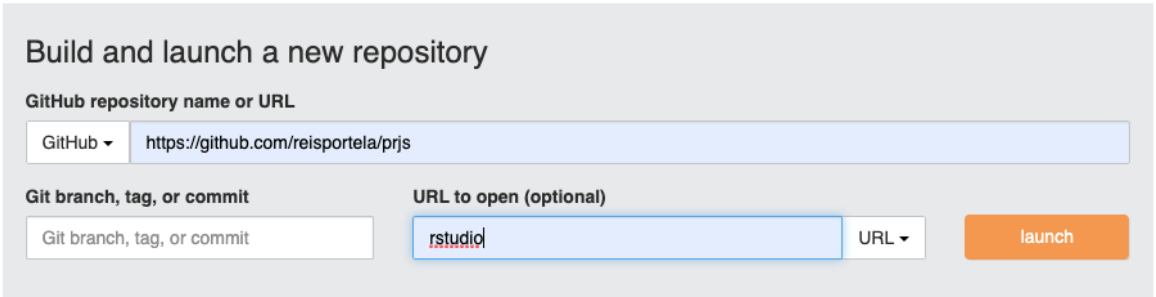
9. Discussion on Julia

- use an environment julia-python
- a multi-language-demo
- Using Julia in Binder: interactive web environment for running your code

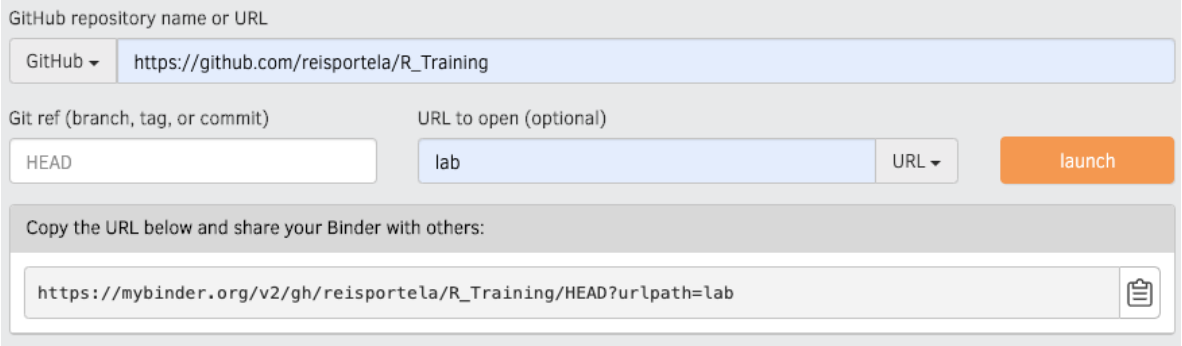
By default I will not activate a machine running Python, R and Julia as it takes too long to build the image. I recomend using the link.

10. GESIS Notebooks

- Create a login in GESIS Notebooks and add your machine (running RStudio)



or a **Jupyter Lab**



11. Further notes

11.1 Jupyter's extensions

conda install -c conda-forge jupyter_contrib_nbextensions

jupyter contrib nbextension install –user

11.2 Kaggle Kernels

Kaggle

11.3

How to Hide all the code cells in Jupyter Notebook Python with single Click

11.4 Pandas

Pandas cookbook

R and Dropbox

rdrop2

12. Usefull links

- Binder
- CODE OCEAN
- GESIS Notebooks
- Hypernet Labs
- IBM Skills Network Lab
- RStudio Cloud