Building a Machine Learning Web Application with Streamlit

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*** Open Source and Not-For-Profit Sharing / Demo**

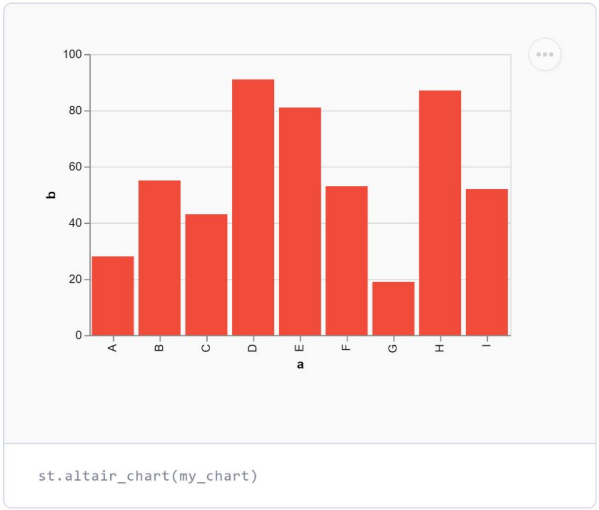
What will be covered?

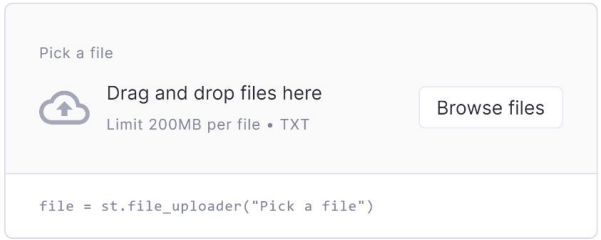
- Introduction to Streamlit
- Streamlit vs Dash
- Streamlit vs Shiny
- Streamlit Sharing/Cloud
- Creating a web app using Streamlit
- Machine Learning Examples/Use Cases

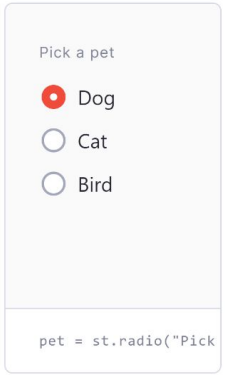
Before We continue:

Register Your **Streamlit Cloud** and **Github** accounts first

A: Introduction to Streamlit







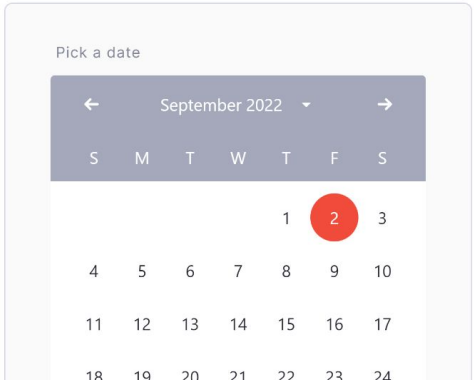


Image Credit: HERE

A: Introduction to Streamlit

- turns data scripts into shareable web apps in minutes
- All in pure Python
- No front-end experience required

A: Introduction to Streamlit

- Compatible to many other libraries

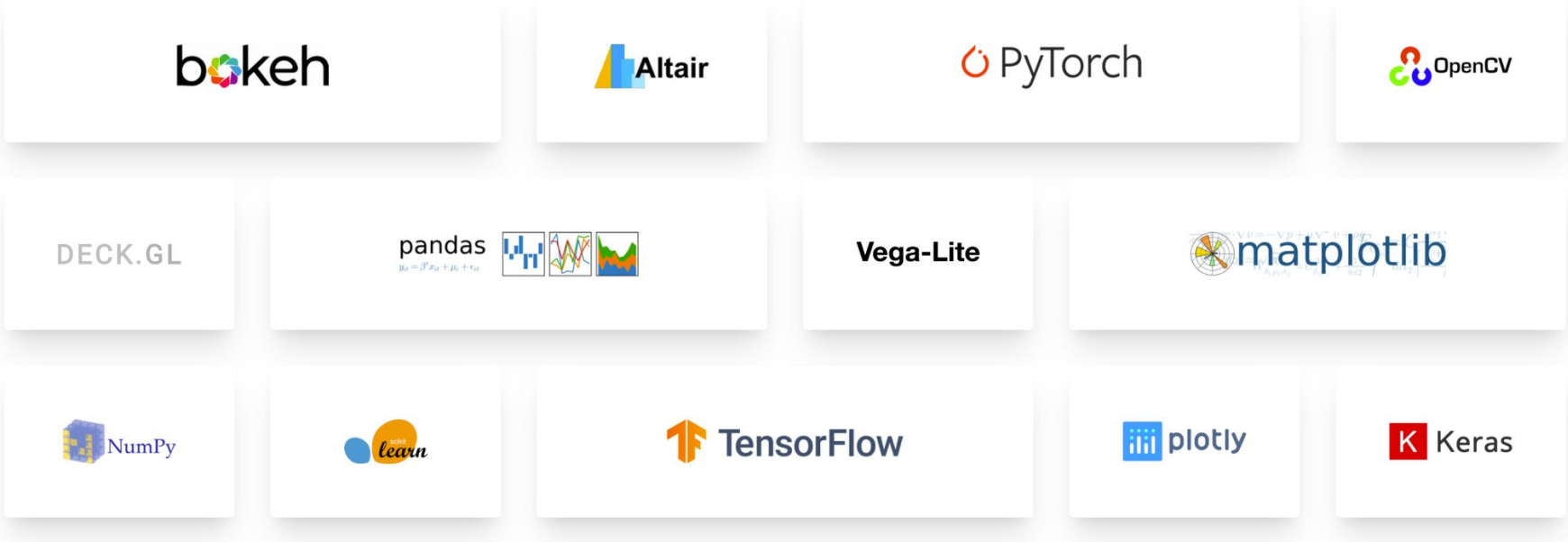


Image Credit: HERE

B: Streamlit vs Dash

- *(Very) minimal overhead effort:* ***Streamlit***
- *Need for CSS customisation:* **Dash**
- *Effortless responsiveness:* **Streamlit(?)**
- *REST Endpoints:* **Dash**
- *Rapid Multiple Tabs / Sidebar:* **Streamlit**
- *Low-latency UI:* **Dash**

Source: HERE

C: Streamlit vs Shiny

	Dash	Shiny	Streamlit
Languages Supported	Python and R	Python and R	Python
OSS License	MIT	AGPL	Apache 2.0
Back-end Architecture	Stateless	Stateful	Stateful
Downloads/month	890,000	330,000	900,000
Web protocol	HTTP(S)	Websockets	Websockets
Recommended deployment	Dash Enterprise	Shiny Server Pro (RStudio Connect)	Heroku
User experience	Web app	Model output with controls in a Web page	Notebook with controls
App structure	Multi-page	Single page	Notebook with code
Front end	React	jQuery	React
Interactivity	Complete: any component can be an input/output, including tables	Partial: some components can be inputs/outputs	Limited: only widgets as inputs, graphs and tables can only be outputs

Source: HERE

C: Streamlit Cloud

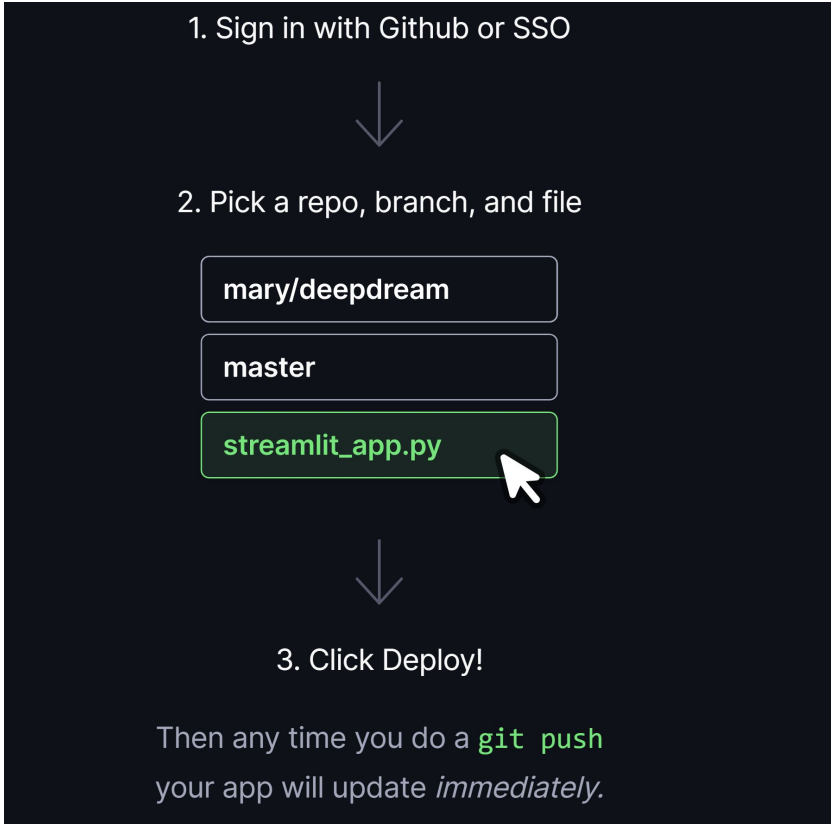


Image Credits: HERE

C: Streamlit Cloud

Deploy in one click

Your fully hosted app is ready to share in under a minute.

Keep your code in your repo

No changes to your development process. Code stays on GitHub.

Live updates

Your apps update instantly when you push code changes.

Securely connect to data

Connect to all your data sources using secure protocols.

Restrict access to apps

Authenticate viewers with per-app viewer allow-lists.

Easily manage your apps

View, collaborate, and manage all your apps in a single place.

Image Credits: HERE

(Question - how about anaconda prompt/jupyter notebook and colab??)

In the terminal that appears, type:

```
pip install streamlit
```

More Details: HERE

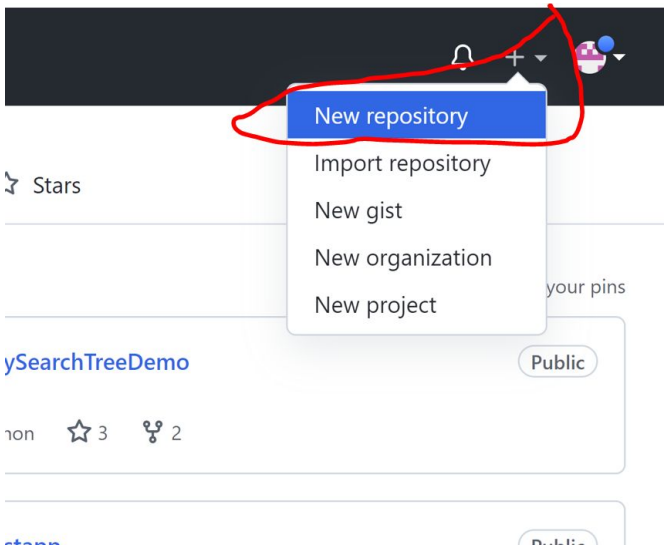
D: Creating a simple web app

- Example: https://www.richieyyptutorialpage.com/demo-python-series/deploying-python-web-app-to-heroku

- Note: we will deploy and host it on streamlit cloud

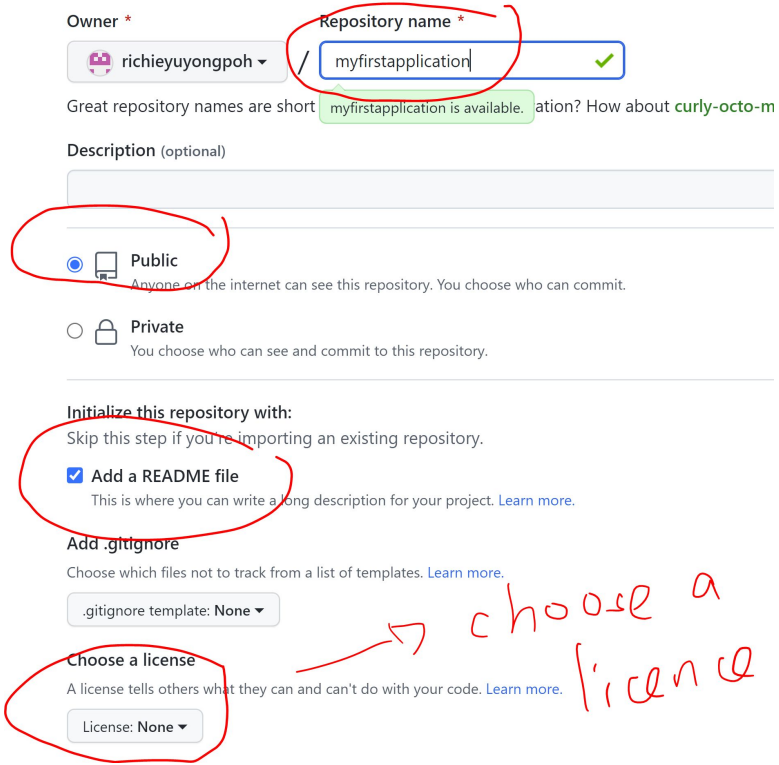
D: Creating a simple web app

- Login your github
- Create a new repository

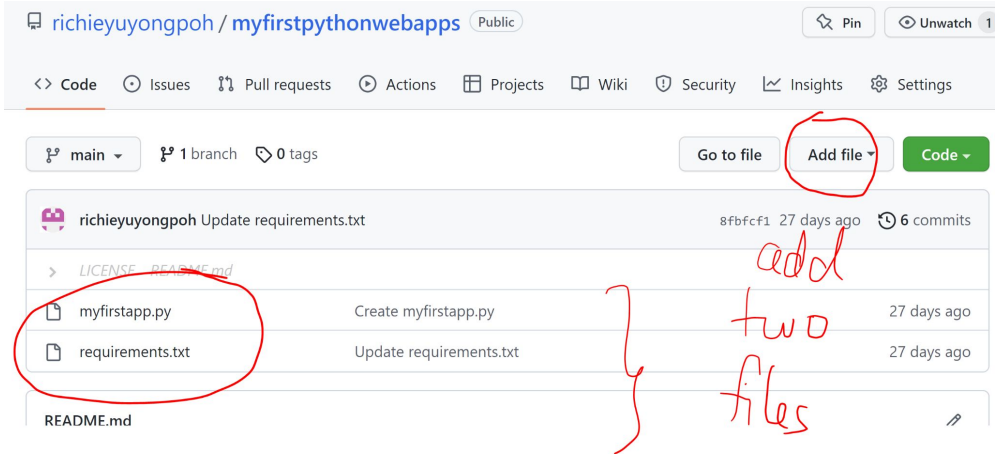


D: Creating a simple web app

- Follow the instructions



D: Creating a simple web app



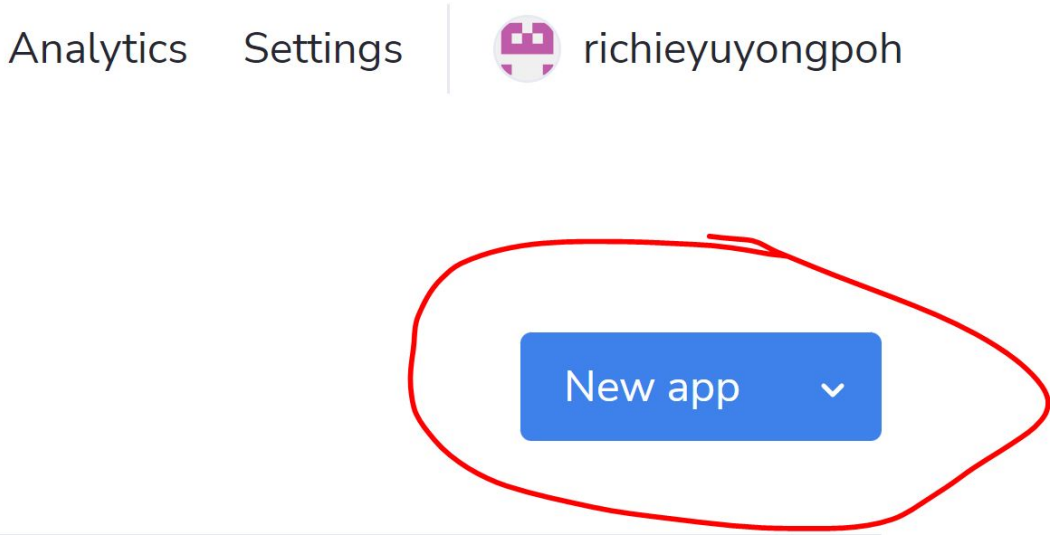
- Add/Create two files: myfirstapp.py & requirements.txt
- Reference: https://github.com/richieyuyongpoh/myfirstpythonwebapps

D: Creating a simple web app

- **myfirstapp.py**: main python file that runs streamlit and other libraries/functions
- **requirements.txt**: list of python libraries to be installed in the cloud
- Reference: https://github.com/richieyuyongpoh/myfirstpythonwebapps

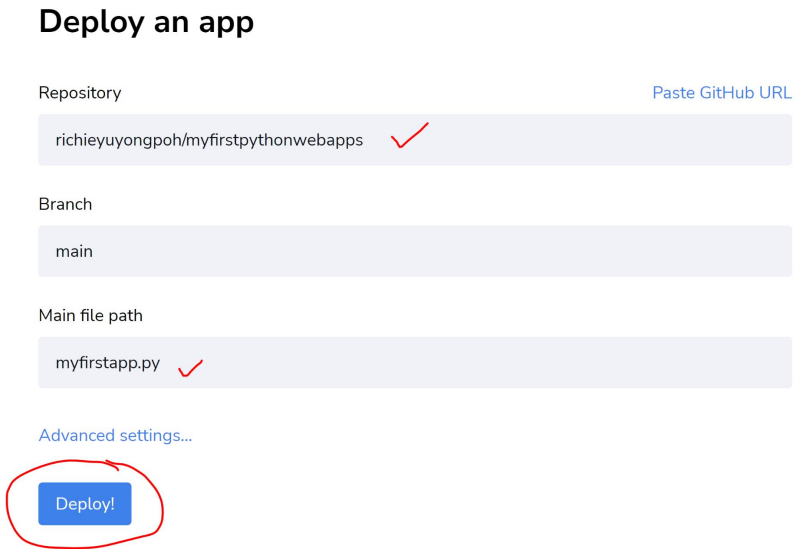
D: Creating a simple web app

- Sign in your streamlit cloud account
- Add new app
- Link/Connect to your github



D: Creating a simple web app

- **Deploy the app**



D: Creating a simple web app

- Streamlit Cloud is “baking” now
- Once your app is deployed successfully, Share the link by typing it in the chat room there

E: Machine Learning Use Cases

Ok… what is the next…?

E: Machine Learning Use Cases

Ok, why don't we try the classical example - iris classification?

E: Machine Learning Use Cases

Iris Dataset

https://archive.ics.uci.edu/ml/datasets/iris

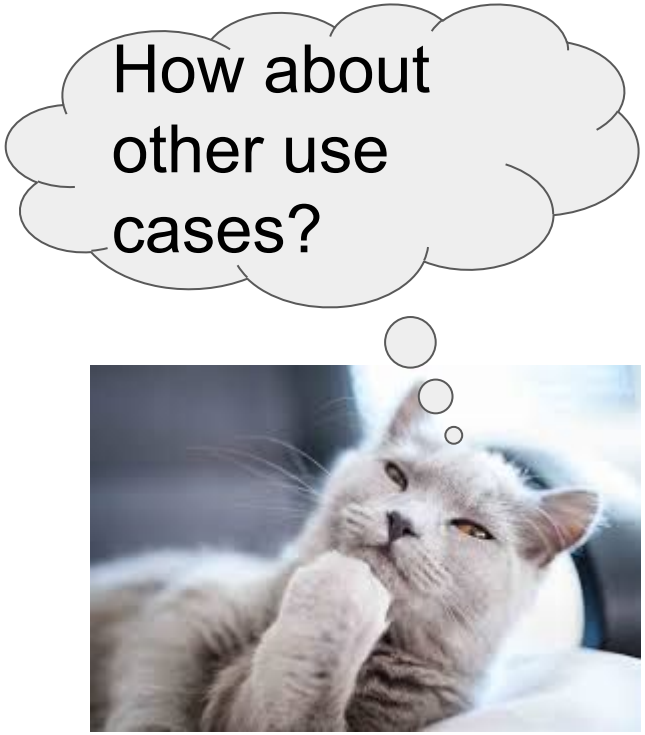
E: Machine Learning Use Cases

Ok. Go to the following github page…

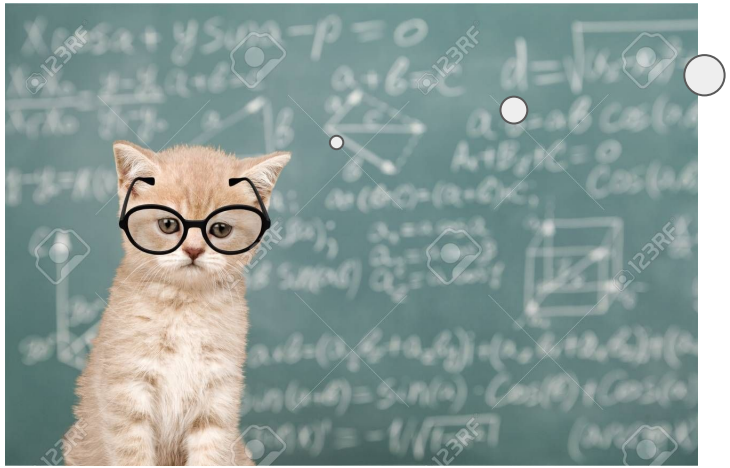
https://github.com/richieyuyongpoh/IRIS_Classification

Image Credit: HERE

E: Machine Learning Use Cases



E: Machine Learning Use Cases



Object Recognition…

https://github.com/richieyuyongpoh/objectrecognitionyolov5

Finally, the talk is over…