shiny for Python Tutorial

大數據分析

- R/Python/Julia/SQL程式設計與應用 (R/Python/Julia/SQL Programming and Application)
- 資料視覺化 (Data Visualization)
- 機器學習 (Machine Learning)
- 統計品管 (Statistical Quality Control)
- 最佳化 (Optimization)

李明昌博士
alan9956@gmail.com
http://rwepa.blogspot.com/

大綱

1. RWEPA 簡介
2. 資料分析架構→APC方法
3. 資料分析與視覺化應用
4. shiny 簡介
5. shiny for Python 實作篇1 - my_app
6. shiny for Python 實作篇2 – 01_hello
7. 結論

1.RWEPA 簡介

RWEPA簡介 http://rwepa.blogspot.com/

- 姓名：李明昌 (ALAN LEE)
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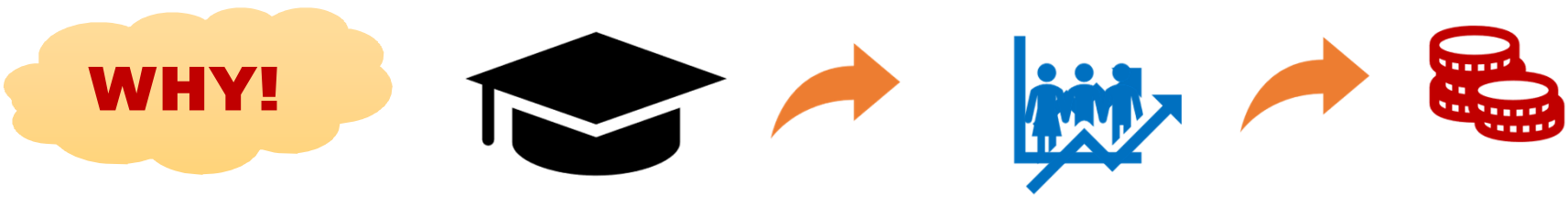
  臺灣資料科學與商業應用協會 常務理事
- 學歷：中原大學 工業與系統工程所 博士
- 經歷：
  - 淡江大學 兼任教師
  - 育達科技大學 兼任教師
  - 佛光大學 兼任教師
  - 國立台北商業大學 兼任教師
  - 東吳大學 兼任教師
  - 育達科技大學 資訊管理系(所) 專任助理教授
  - 崇友實業 行銷企劃專員
  - 國航船務代理股份有限公司 海運市場運籌管理員

- 大專院校、資策會、工業技術研究院、國家發展委員會、中央氣象局、公平交易委員會、各縣市政府與日本名古屋產業大學等公民營單位演講達300餘場，2900小時以上。
- 連絡資訊：*alan9956@gmail.com*

- **iPAS 巨量資料分析師 證照推廣**
- **iPAS 營運智慧分析師 證照推廣**

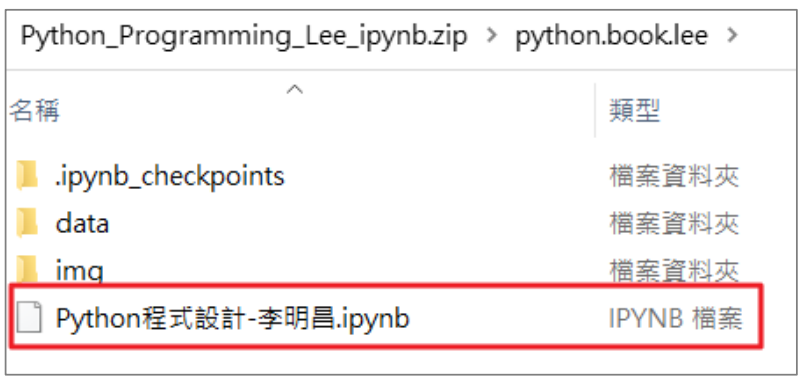
如何學習 shiny & Python &?

- 熟悉教材內容
- 將教材內容的資料集改為工作資料集
- 遇到問題時, 想辦法尋找答案
- 掌握 APC方法
- 掌握 摘要, 繪圖, 建模
- 參考網路應用文章 (進階) & 學術論文

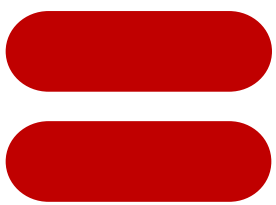


Python 程式設計-李明昌 免費電子書

- http://rwepa.blogspot.com/2020/02/pythonprogramminglee.html

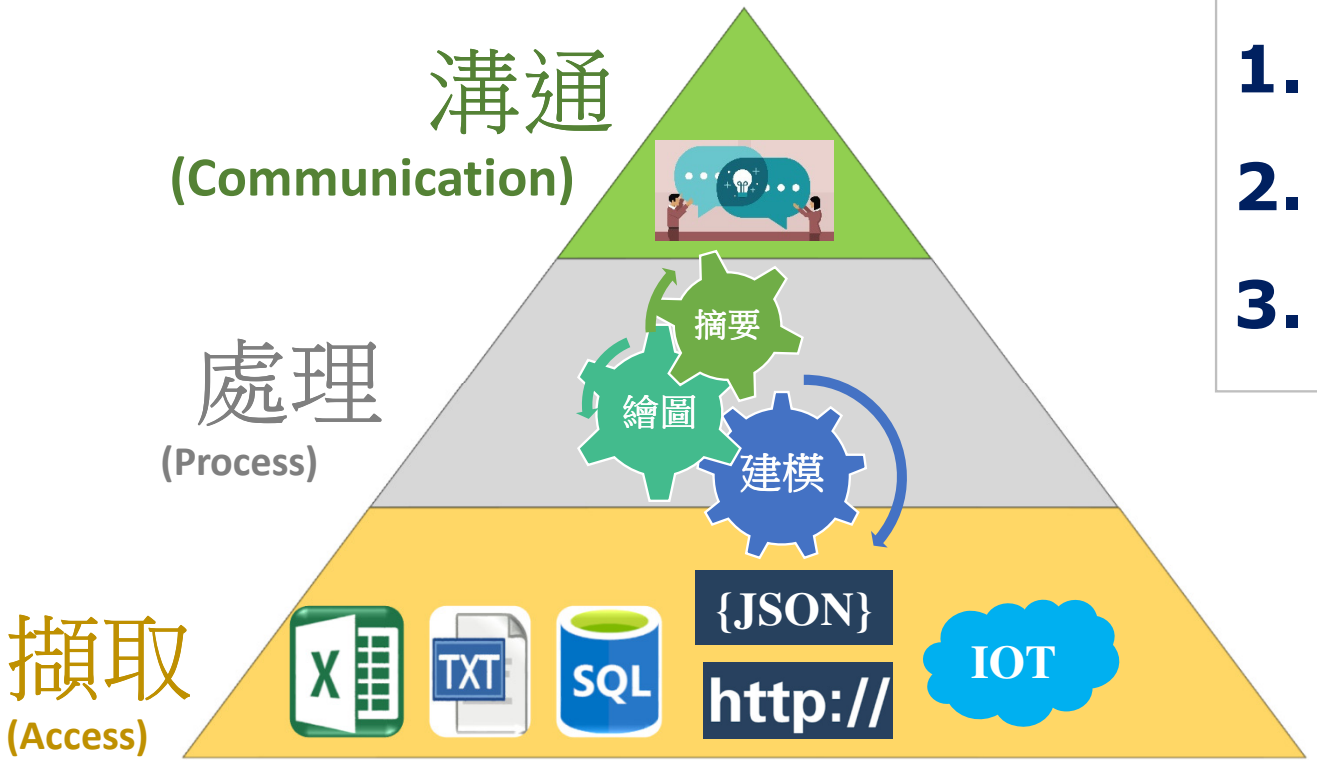


學習目標



2.資料分析架構→APC方法

★★★資料分析架構→APC方法



1. 群組
2. 時間
3. 建立評估變數

3.資料分析與視覺化應用

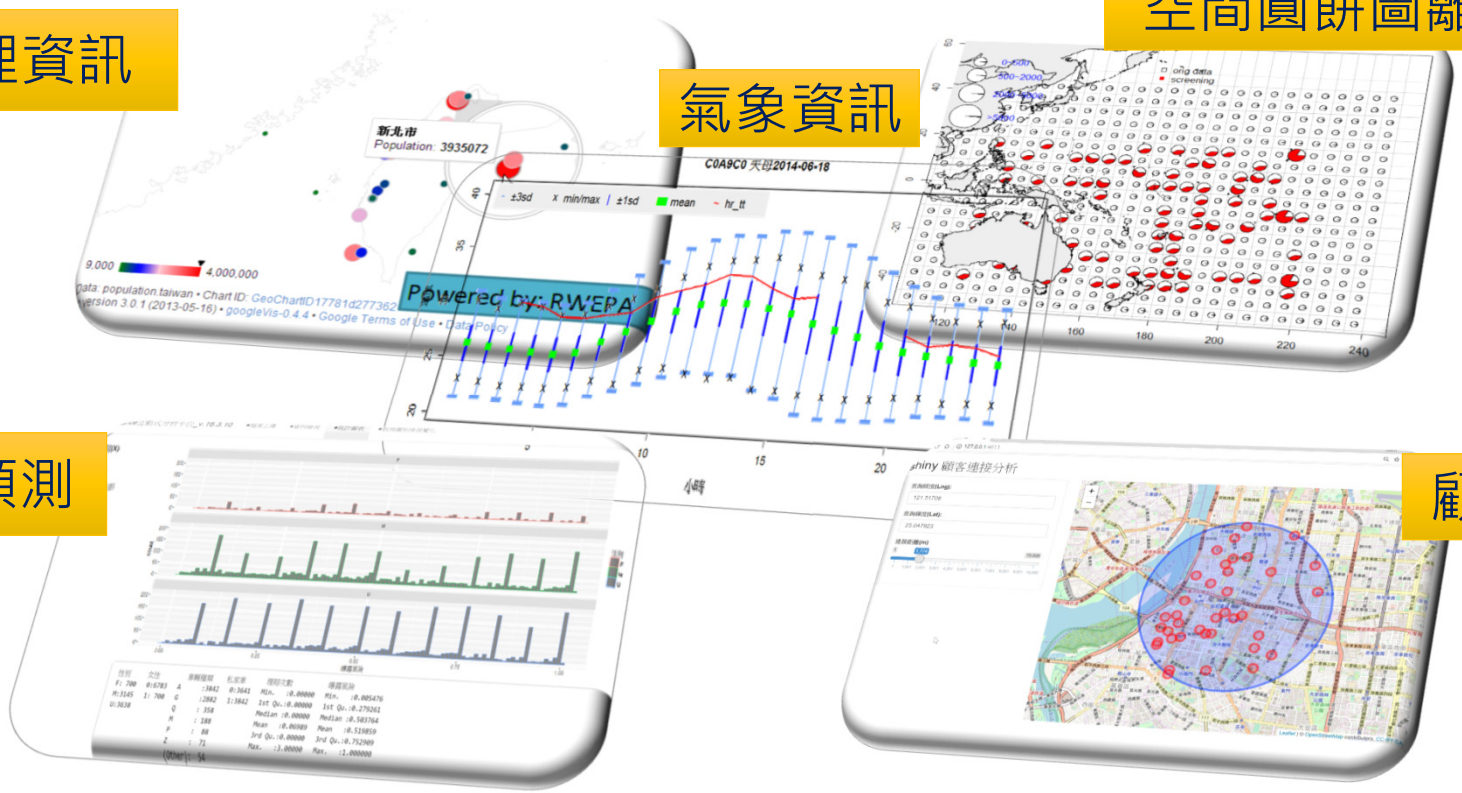
資料分析與視覺化應用

R + shiny → 互動式網頁

地理資訊

空間圓餅圖離群值分析

氣象資訊



保險預測

顧客連結資訊

中央氣象局 1,600萬筆資料

網頁呈現

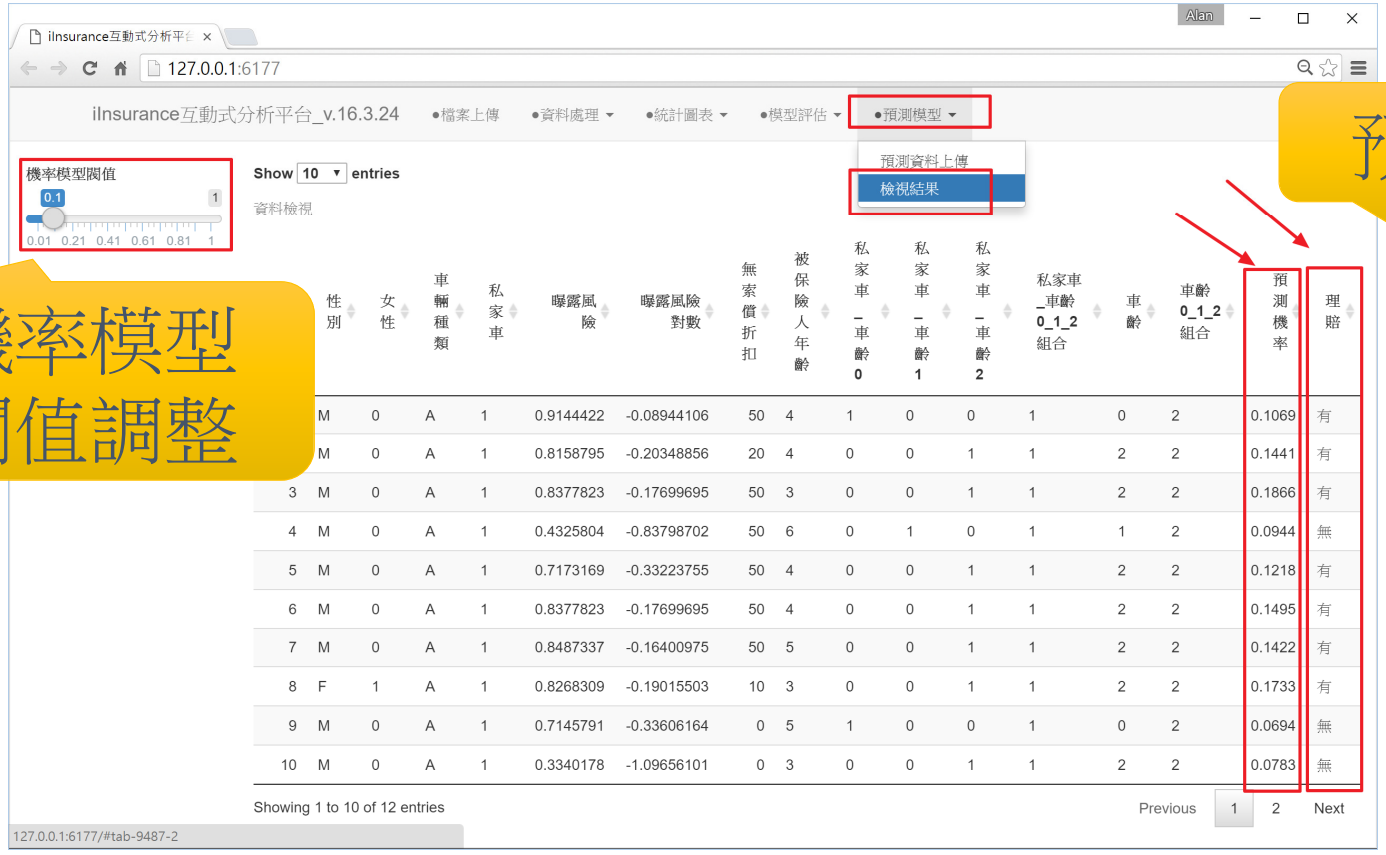
異常偵測

動態繪圖

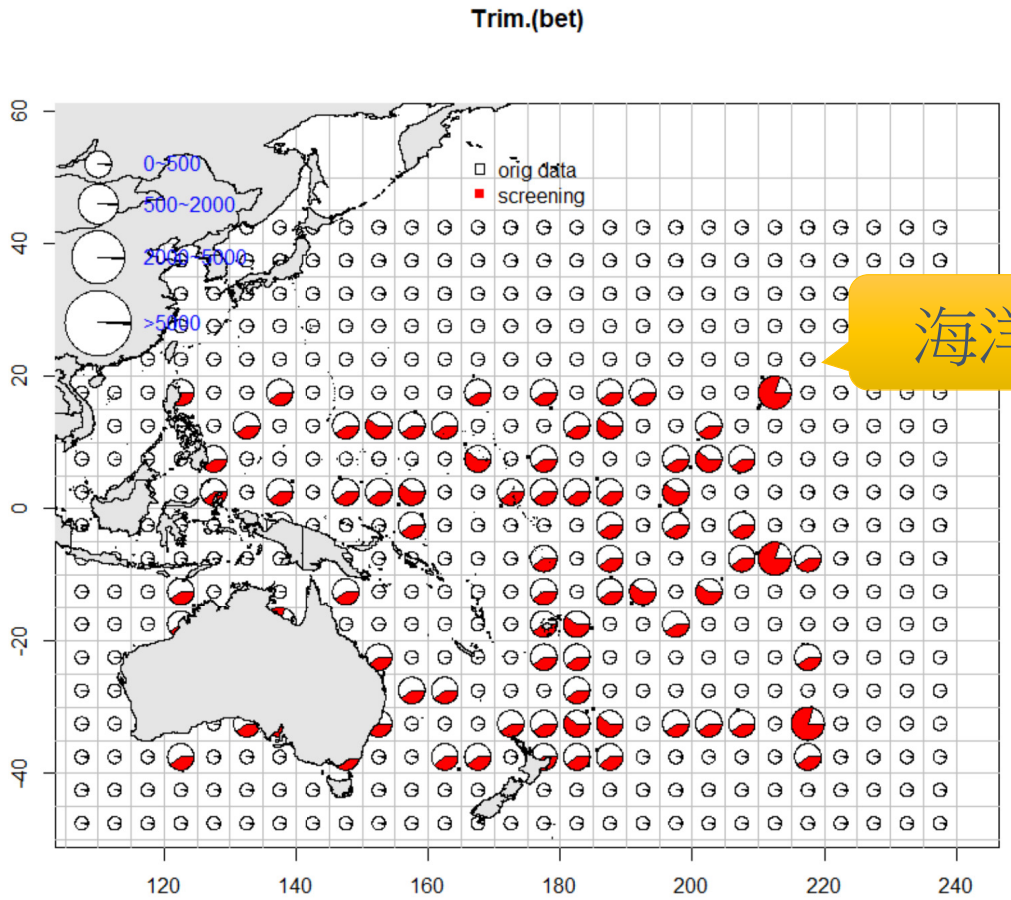
客製化選單

R統計運算

保險預測模型

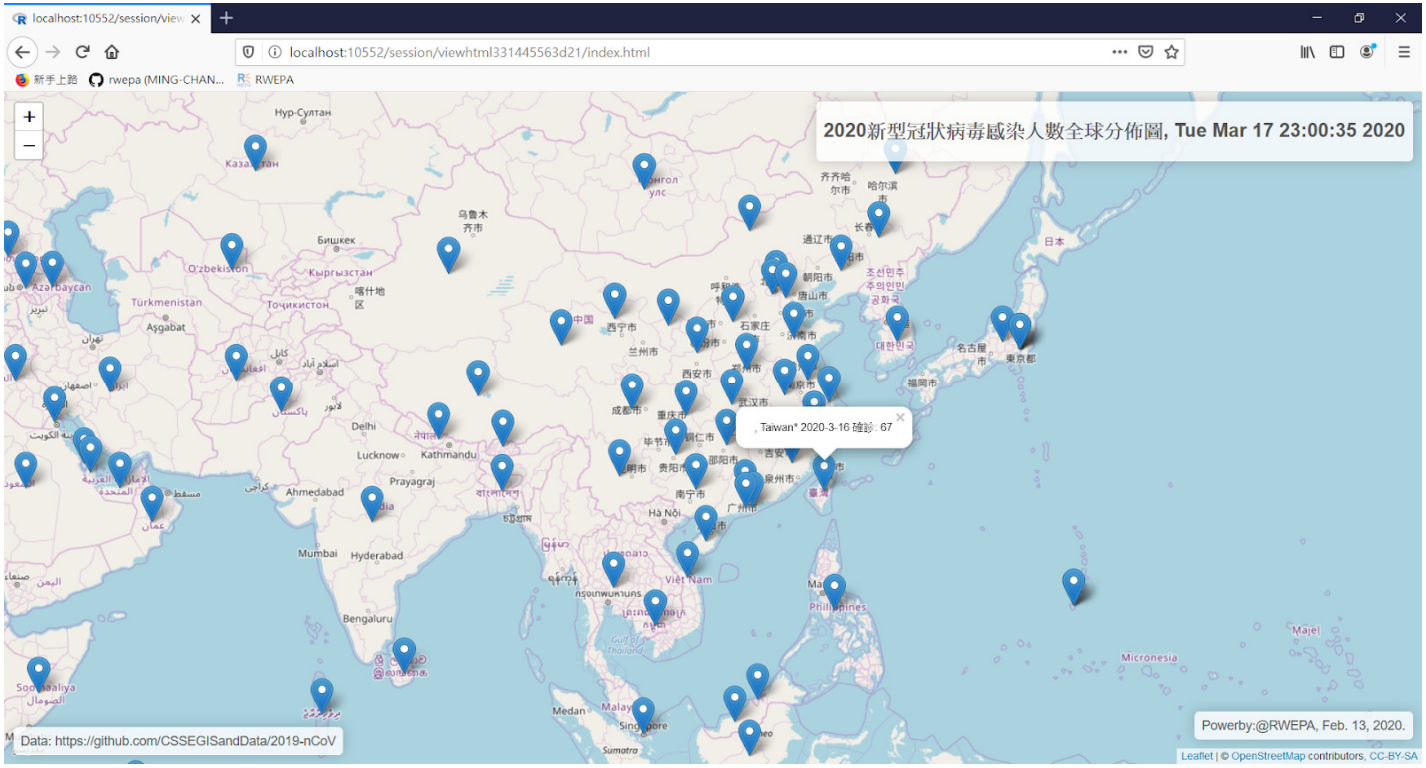

iInsurance互動式分析平台
127.0.0.1:6177
Alan
iInsurance互動式分析平台_v.16.3.24
●檔案上傳
●資料處理
●統計圖表
●模型評估
●預測模型
預測資料上傳
檢視結果
機率模型閥值
0.1
1
0.01 0.21 0.41 0.61 0.81 1
Show 10 entries
資料檢視
預測結果
機率模型
閥值調整
性別 女性 車輛種類 私家車 曝露風險 曝露風險對數 無索償折扣 被保險人年齡 私家車_車齡0 私家車_車齡1 私家車_車齡2 私家車_車齡0_1_2組合 車齡 車齡0_1_2組合 預測機率 理賠
1 M 0 A 1 0.9144422 -0.08944106 50 4 1 0 0 1 0 2 0.1069 有
2 M 0 A 1 0.8158795 -0.20348856 20 4 0 0 1 1 2 2 0.1441 有
3 M 0 A 1 0.8377823 -0.17699695 50 3 0 0 1 1 2 2 0.1866 有
4 M 0 A 1 0.4325804 -0.83798702 50 6 0 1 0 1 1 2 0.0944 無
5 M 0 A 1 0.7173169 -0.33223755 50 4 0 0 1 1 2 2 0.1218 有
6 M 0 A 1 0.8377823 -0.17699695 50 4 0 0 1 1 2 2 0.1495 有
7 M 0 A 1 0.8487337 -0.16400975 50 5 0 0 1 1 2 2 0.1422 有
8 F 1 A 1 0.8268309 -0.19015503 10 3 0 0 1 1 2 2 0.1733 有
9 M 0 A 1 0.7145791 -0.33606164 0 5 1 0 0 1 0 2 0.0694 無
10 M 0 A 1 0.3340178 -1.09656101 0 3 0 0 1 1 2 2 0.0783 無
Showing 1 to 10 of 12 entries
Previous 1 2 Next
127.0.0.1:6177/#tab-9487-2

空間圓餅圖離群值分析



海洋生態視覺化

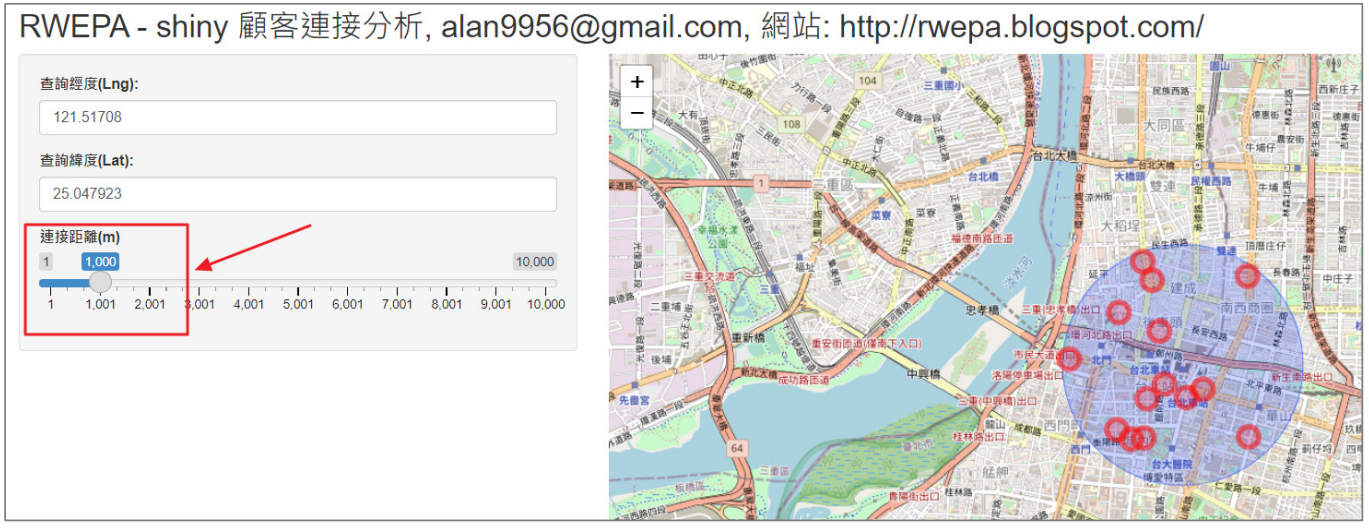
2020新型冠狀病毒視覺化



http://rwepa.blogspot.com/2020/02/2019nCoV.html

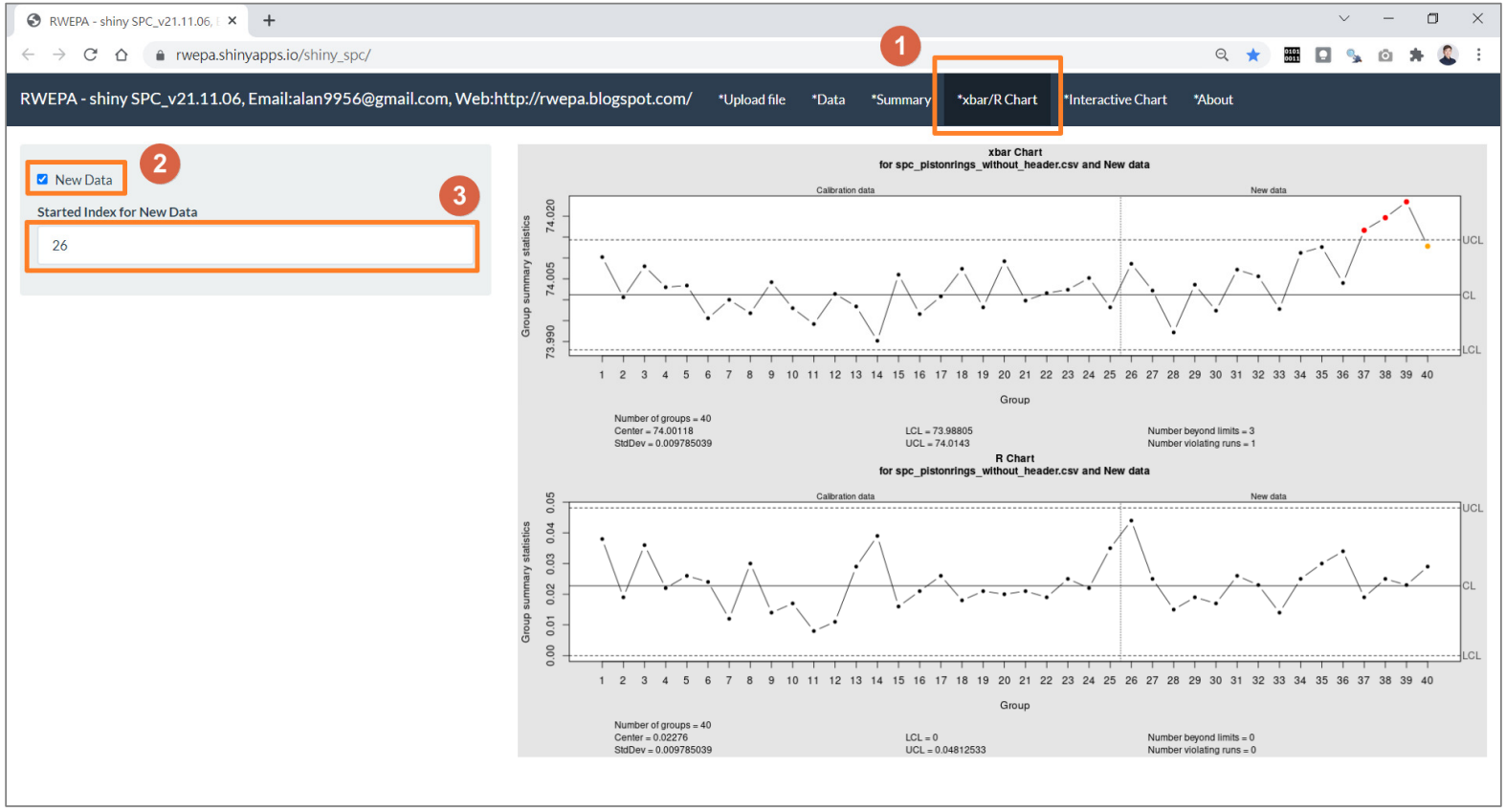
shiny 顧客連接分析

- https://rwepa.shinyapps.io/shinyCustomerConnect/



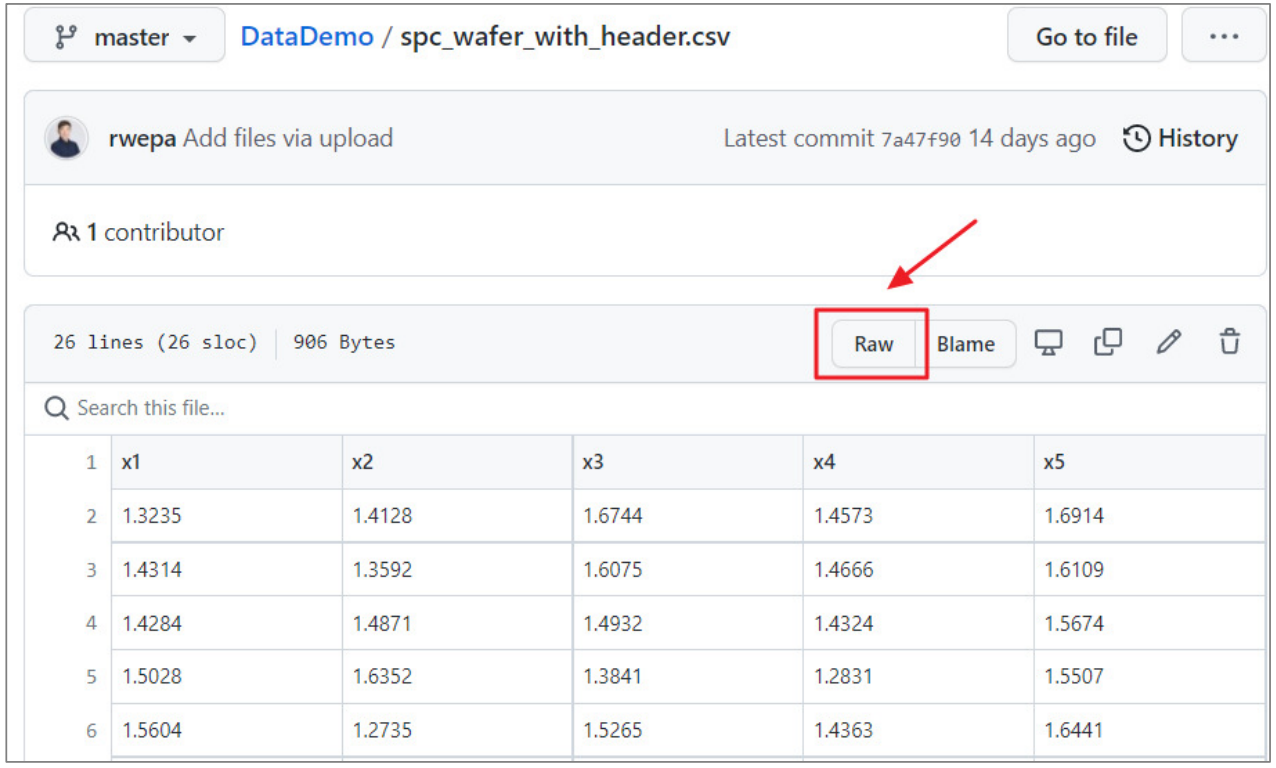
品質管制圖(quality control chart)應用

- http://rwepa.blogspot.com/2021/10/r-shiny-quality-control-chart.html



品質管制圖應用 (續)

- https://github.com/rwepa/DataDemo/blob/master/spc_wafer_with_header.csv
- https://github.com/rwepa/DataDemo/blob/master/spc_pistonrings_without_header.csv



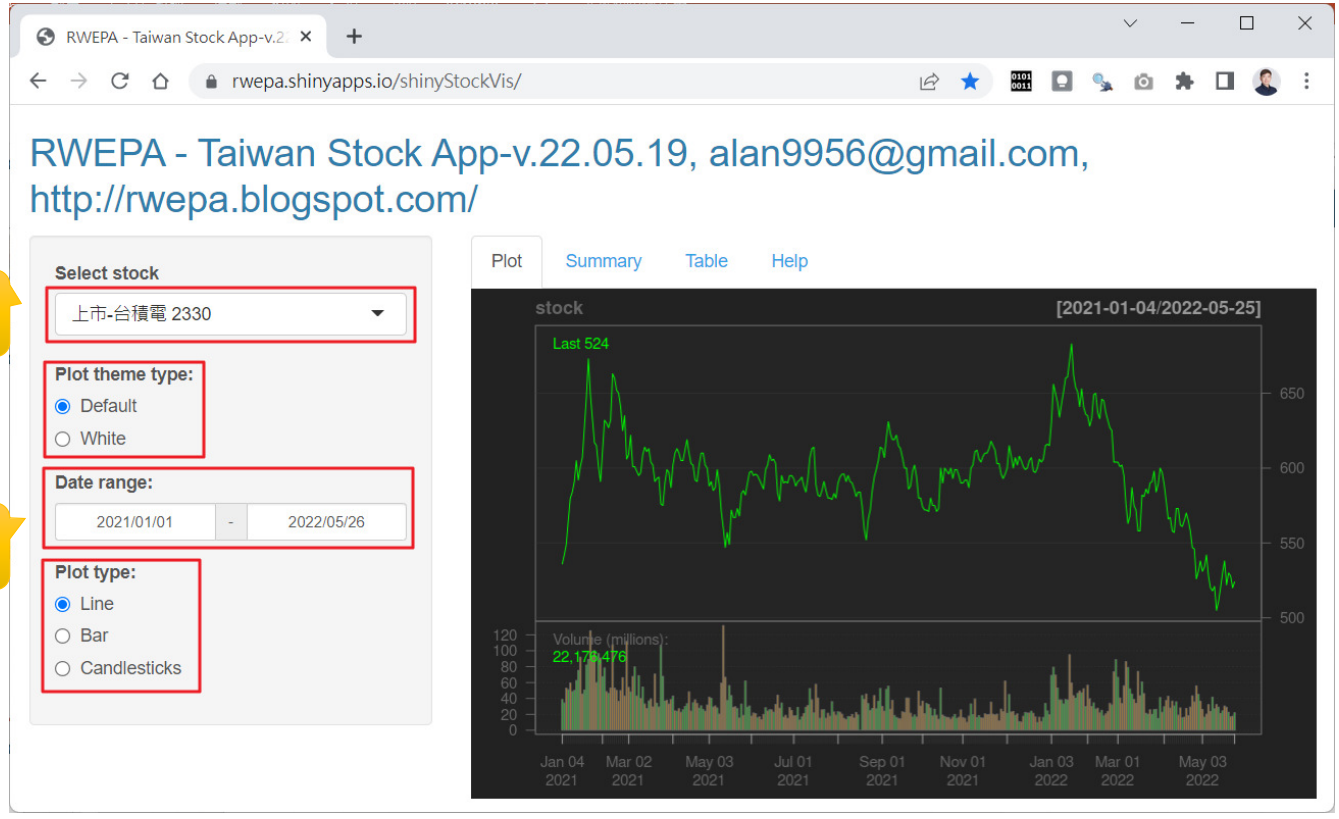
	x1	x2	x3	x4	x5
2	1.3235	1.4128	1.6744	1.4573	1.6914
3	1.4314	1.3592	1.6075	1.4666	1.6109
4	1.4284	1.4871	1.4932	1.4324	1.5674
5	1.5028	1.6352	1.3841	1.2831	1.5507
6	1.5604	1.2735	1.5265	1.4363	1.6441

Taiwan Stock App

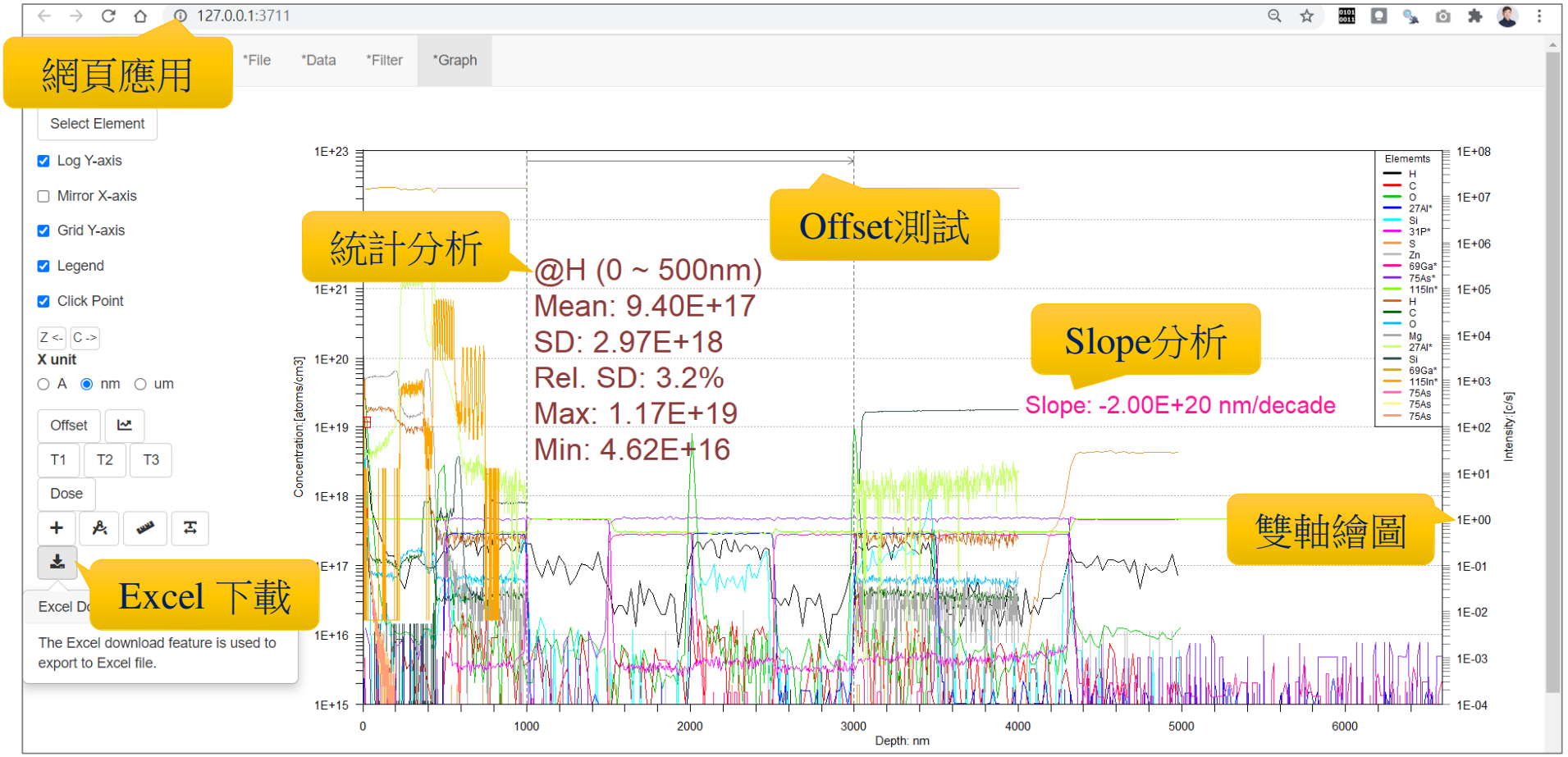
- https://rwepa.shinyapps.io/shinyStockVis/
- https://github.com/rwepa/DataDemo/blob/master/shinyStockVis.zip

下拉式選單

日期範圍



離子資料分析與視覺化應用

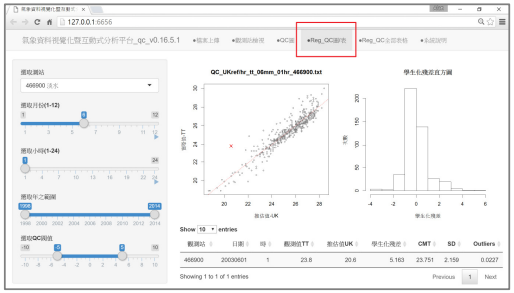


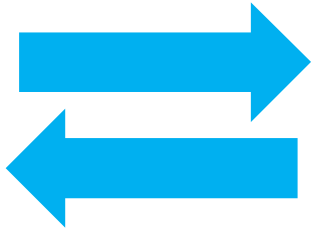
4.shiny 簡介

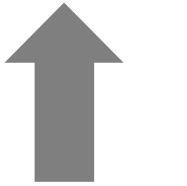
shiny 簡介

- 隨著資訊科技技術的進步，如何提供WEB化的應用服務。
- shiny 套件提供更方便，互動式與動態更新等應用
  - 輸入 - 文字方塊、下拉式選單、按鈕。
  - 處理 - 執行 R 運算、 建立模型。
  - 輸出 - 網頁中呈現文字摘要、表格與圖表等。
- shiny 套件來自於R語言，目前已經可應用於Python語言。
- shiny for R 0.2.3 - December 01, 2012.
- shiny for Python 0.2.1 - RStudio's CTO Joe Cheng announced Shiny for Python, RStudio Conference, July 28, 2022.

shiny (server) 架構







ui.R

server.R

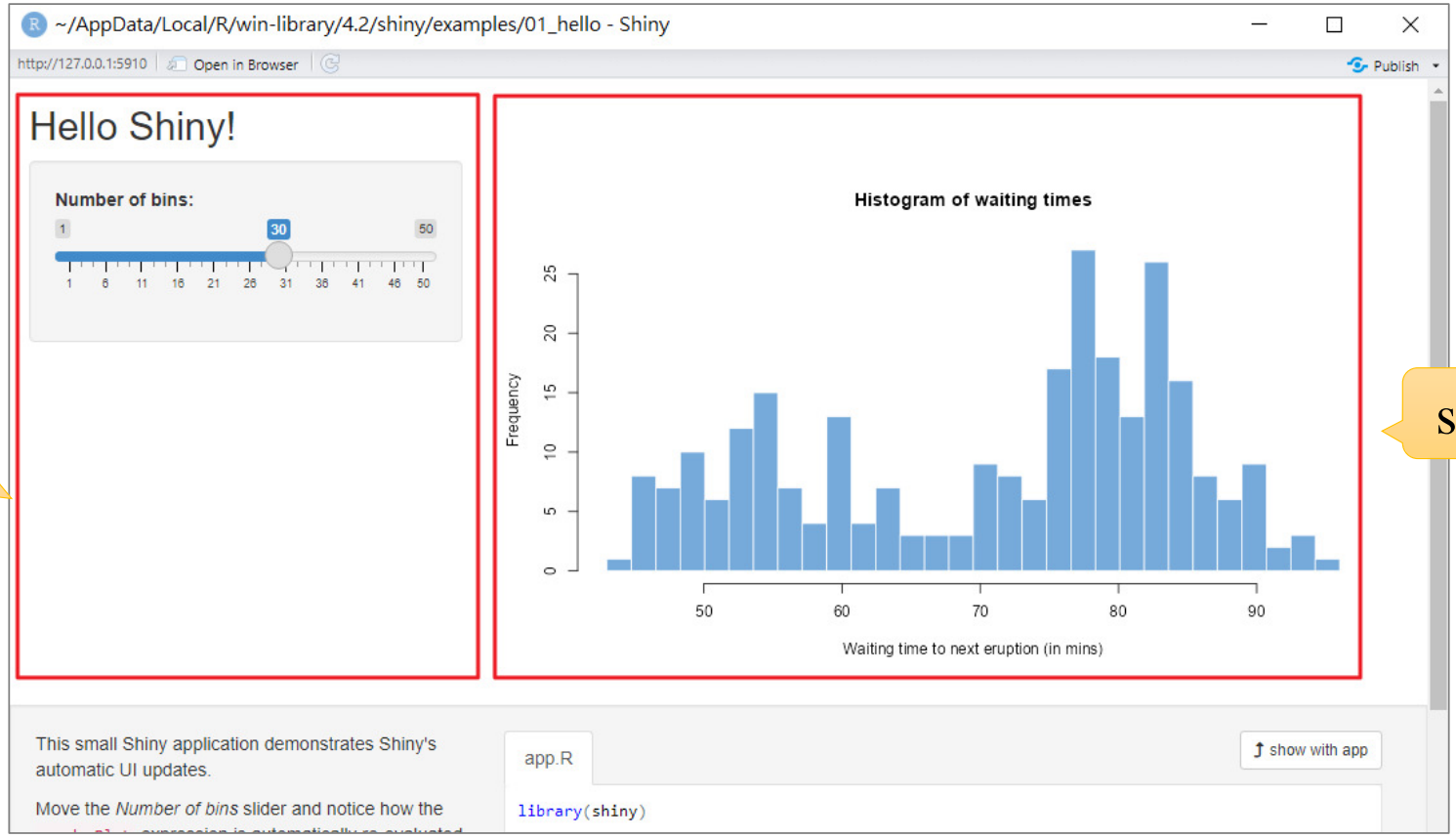
R – shiny tutorial

- Shiny 參考 第10章 - 10.基礎互動式shiny,進階互動式shiny Server佈署
  - PDF https://github.com/rwepa/DataDemo/blob/master/ai_using_python_and_r/ai_using_python_and_r_part2_r.pdf
  - R 下載 https://github.com/rwepa/DataDemo/blob/master/ai_using_python_and_r/ai_using_python_and_r_part2_r.R
- R shiny 內建11個範例:

```
> dir(paste0(.libPaths(), "/shiny/examples"))
 [1] "01_hello"      "02_text"       "03_reactivity" "04_mpg"        "05_sliders"
 [6] "06_tabsets"    "07_widgets"    "08_html"       "09_upload"     "10_download"
[11] "11_timer"
```

```
> library(shiny)
> runExample("01_hello")

Listening on http://127.0.0.1:5910
```



ui.R

server.R

R - CRAN shiny 套件

互動式網頁應用

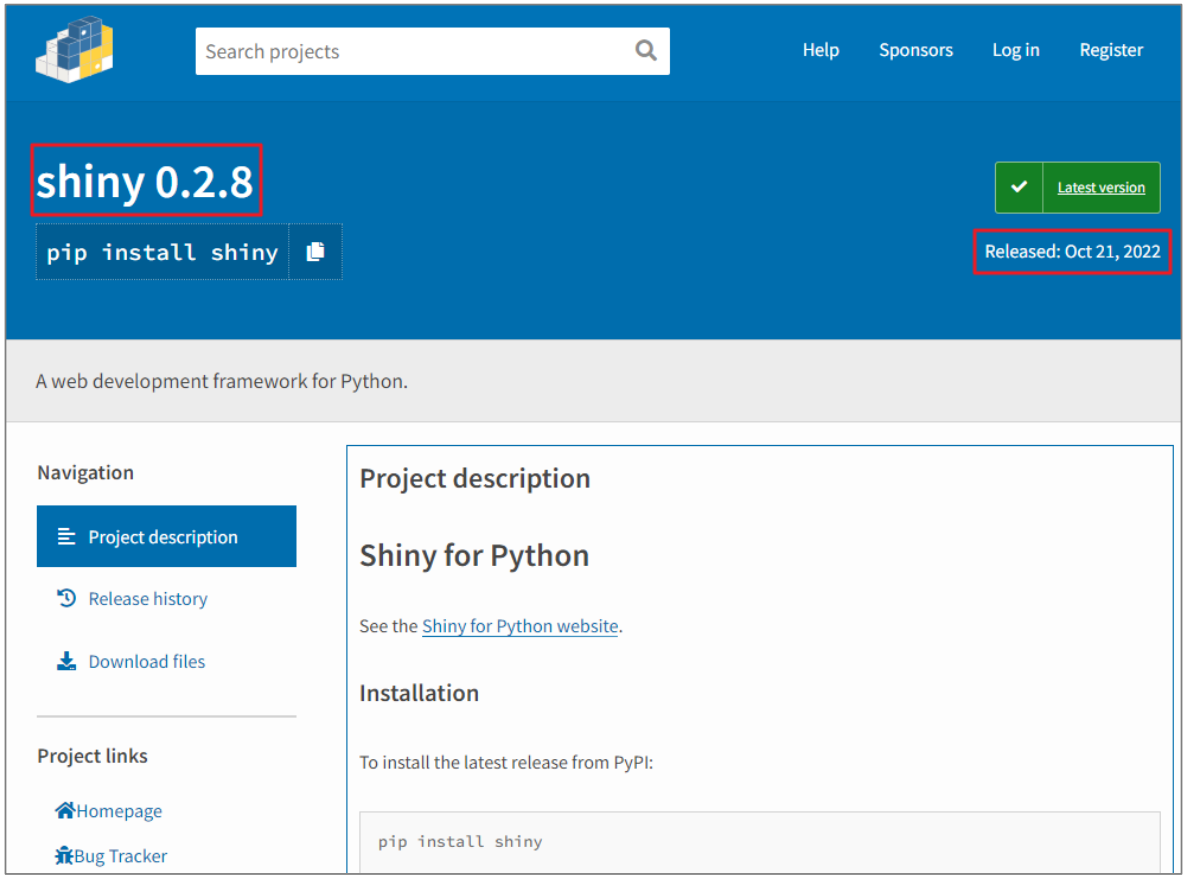
shiny: Web Application Framework for R

Makes it incredibly easy to build interactive web applications with R. Automatic "reactive" binding between inputs and outputs and extensive prebuilt widgets make it possible to build beautiful, responsive, and powerful applications with minimal effort.

Version:	1.7.2
Depends:	R (≥ 3.0.2), methods
Imports:	utils, grDevices, httpuv (≥ 1.5.2), mime (≥ 0.3), jsonlite (≥ 0.9.16), xtable, fontawesome (≥ 0.2.1), htmltools (≥ 0.5.2), R6 (≥ 2.0), sourcetools, later (≥ 1.0.0), promises (≥ 1.1.0), tools, crayon, rlang (≥ 0.4.10), fastmap (≥ 1.1.0), withr, commonmark (≥ 1.7), glue (≥ 1.3.2), bslib (≥ 0.3.0), cachem, ellipsis, lifecycle (≥ 0.2.0)
Suggests:	datasets, Cairo (≥ 1.5-5), testthat (≥ 3.0.0), knitr (≥ 1.6), markdown, rmarkdown, ggplot2, reactlog (≥ 1.0.0), magrittr, yaml, future, dygraphs, ragg, showtext, sass
Published:	2022-07-19
Author:	Winston Chang [aut, cre], Joe Cheng [aut], JJ Allaire [aut], Carson Sievert [aut], Barret Schloerke [aut], Yihui Xie [aut], Jeff Allen [aut], Jonathan McPherson [aut], Alan Dipert [aut], Barbara Borges [aut], RStudio [cph], jQuery Foundation [cph] (jQuery library and jQuery UI library), jQuery contributors [ctb, cph] (jQuery library; authors listed

https://cran.r-project.org/web/packages/shiny/index.html

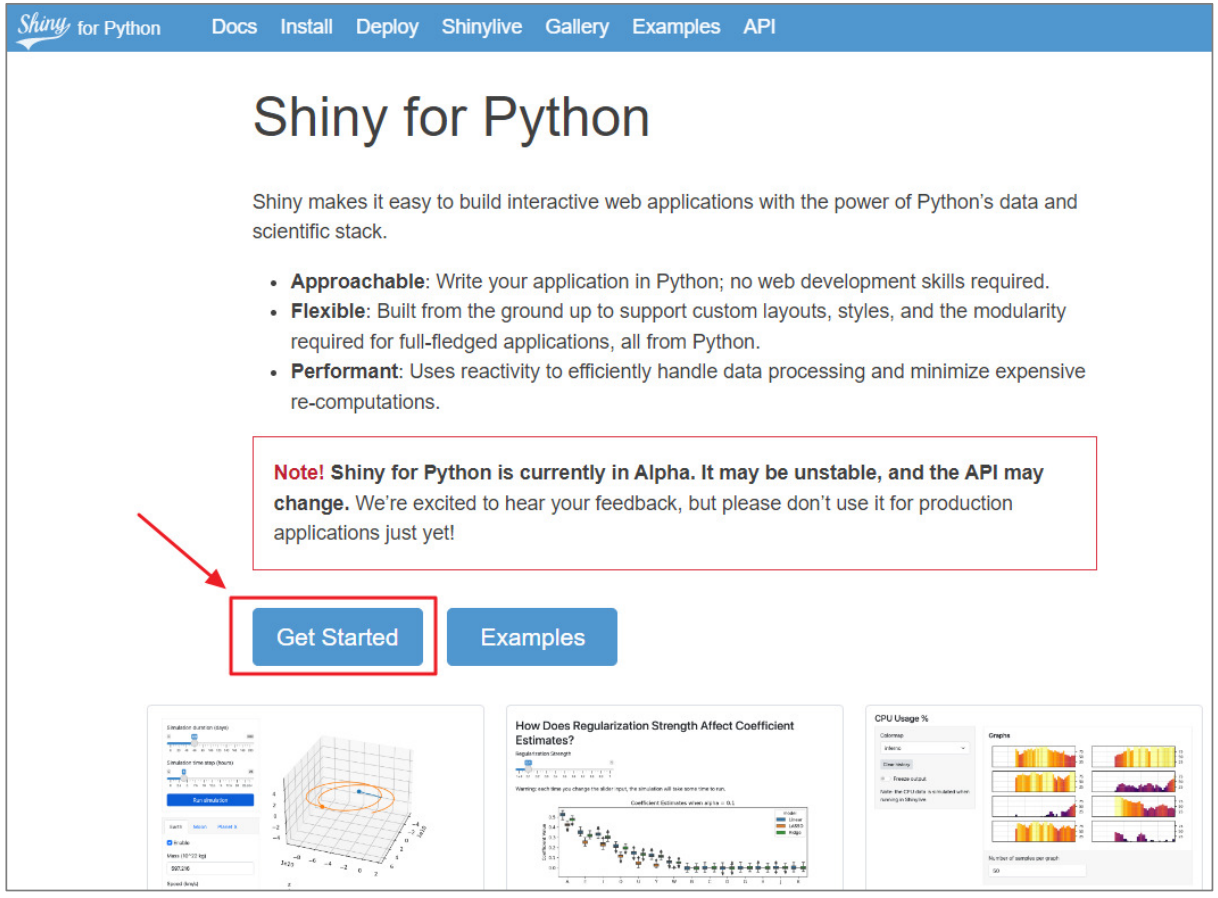
Python – PyPI shiny 模組

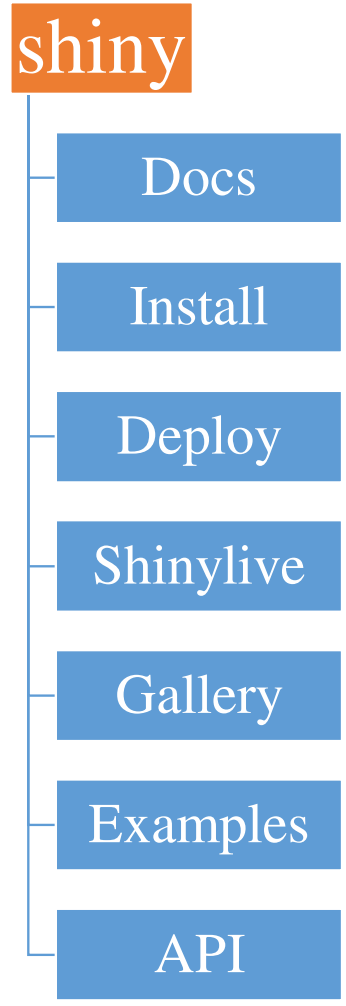


https://pypi.org/project/shiny/

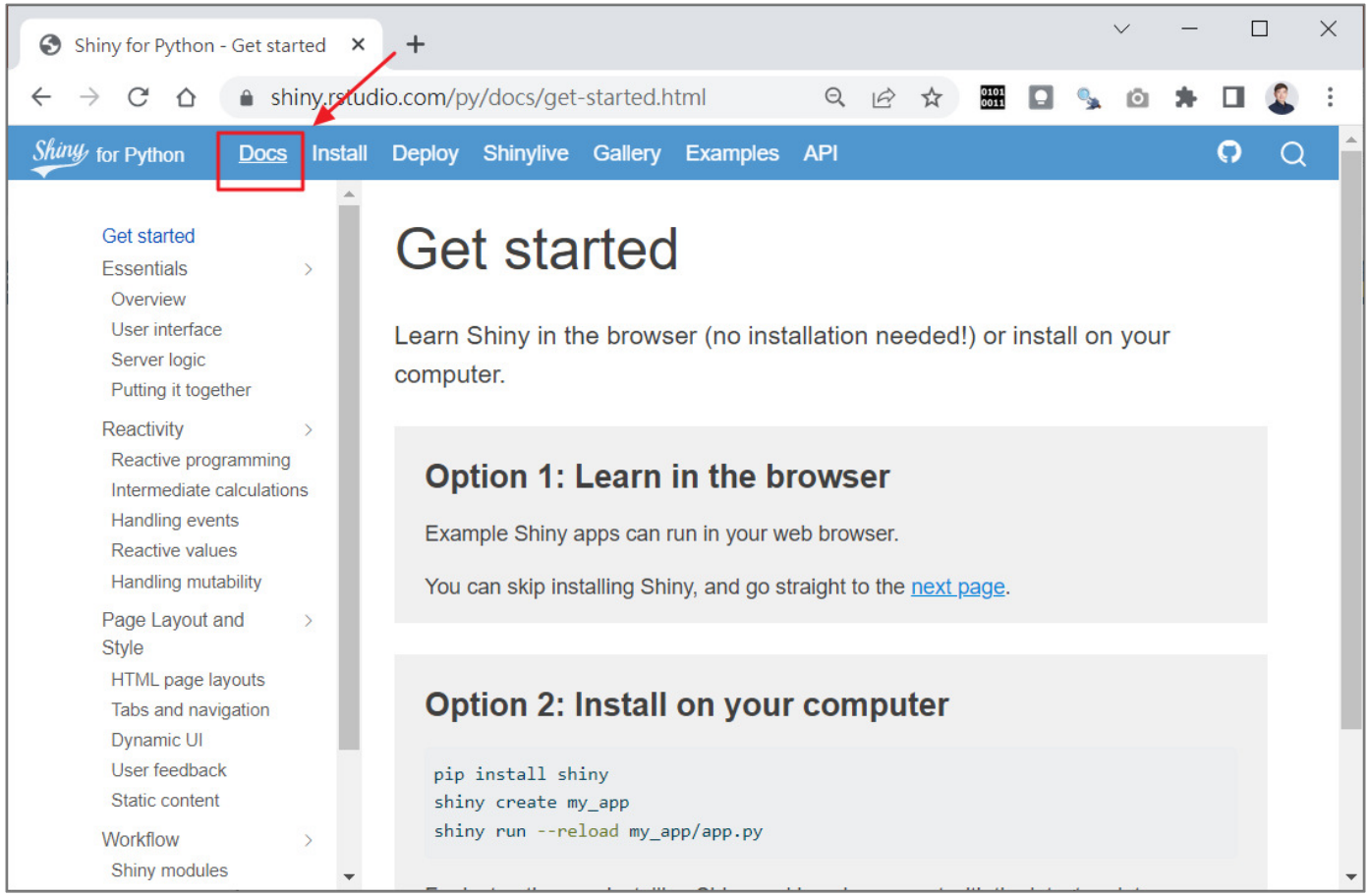
Shiny for Python

- https://shiny.rstudio.com/py/

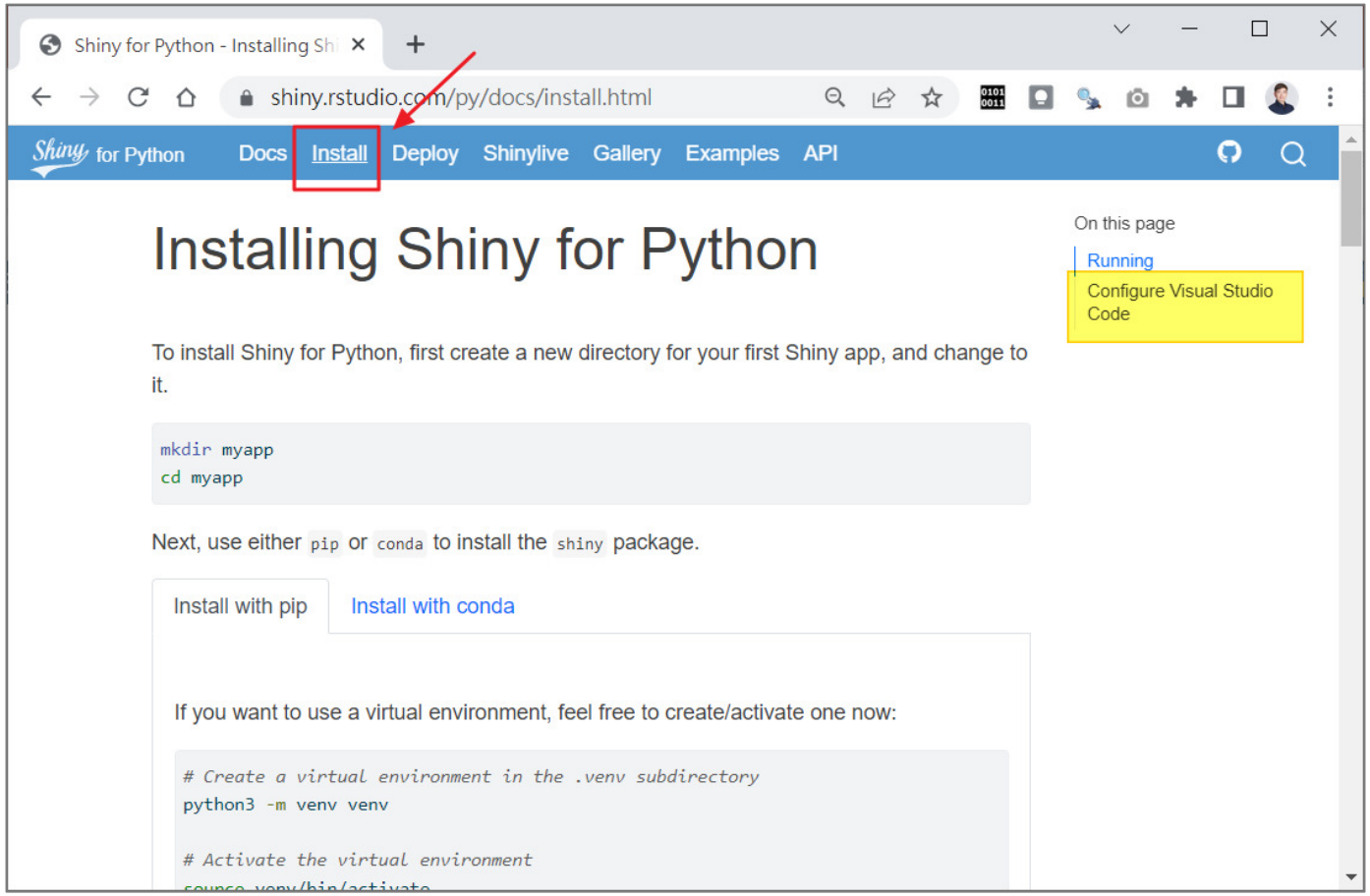




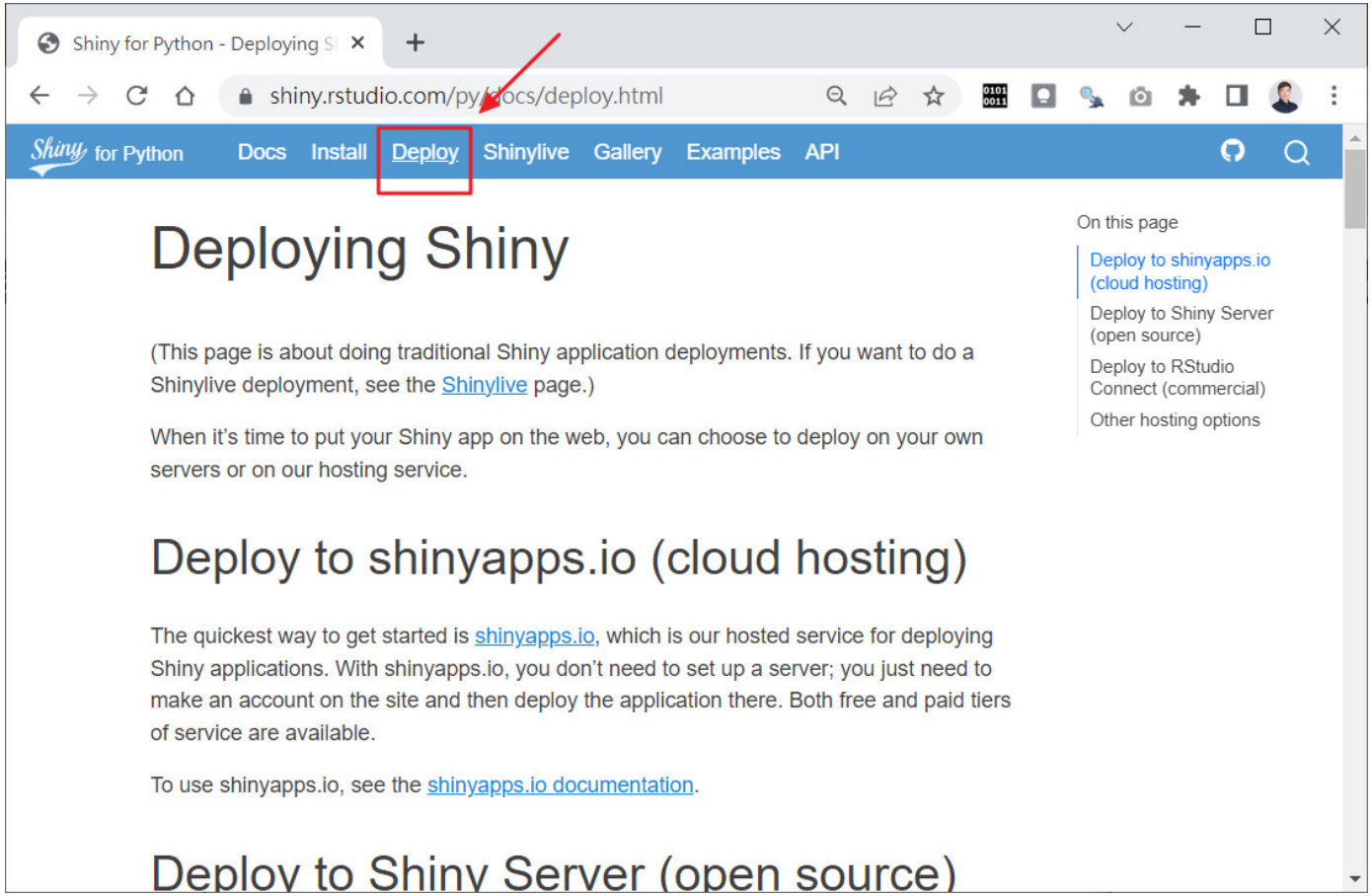
Shiny for Python - Docs



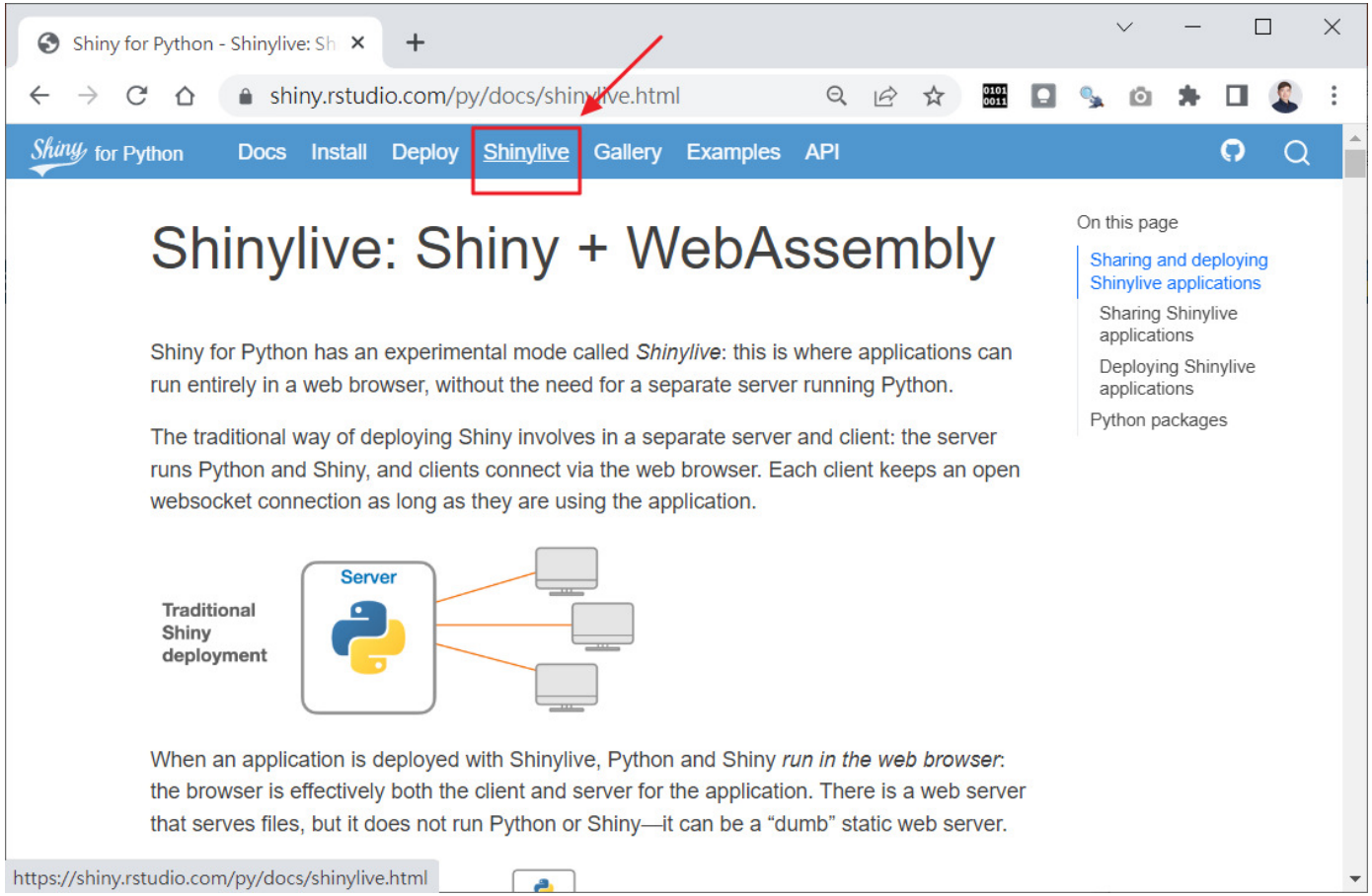
Shiny for Python - Install



Shiny for Python - Deploy

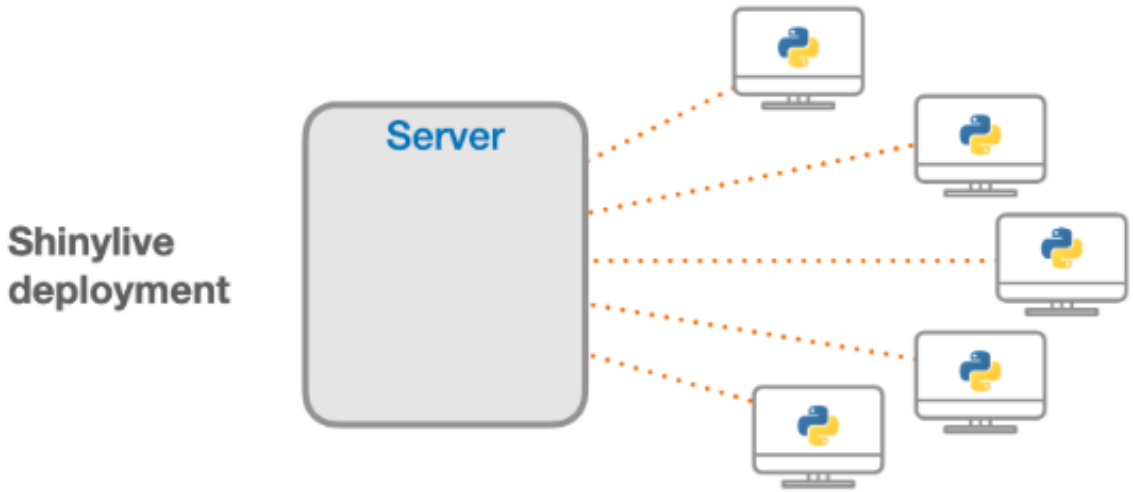


Shiny for Python - Shinylive

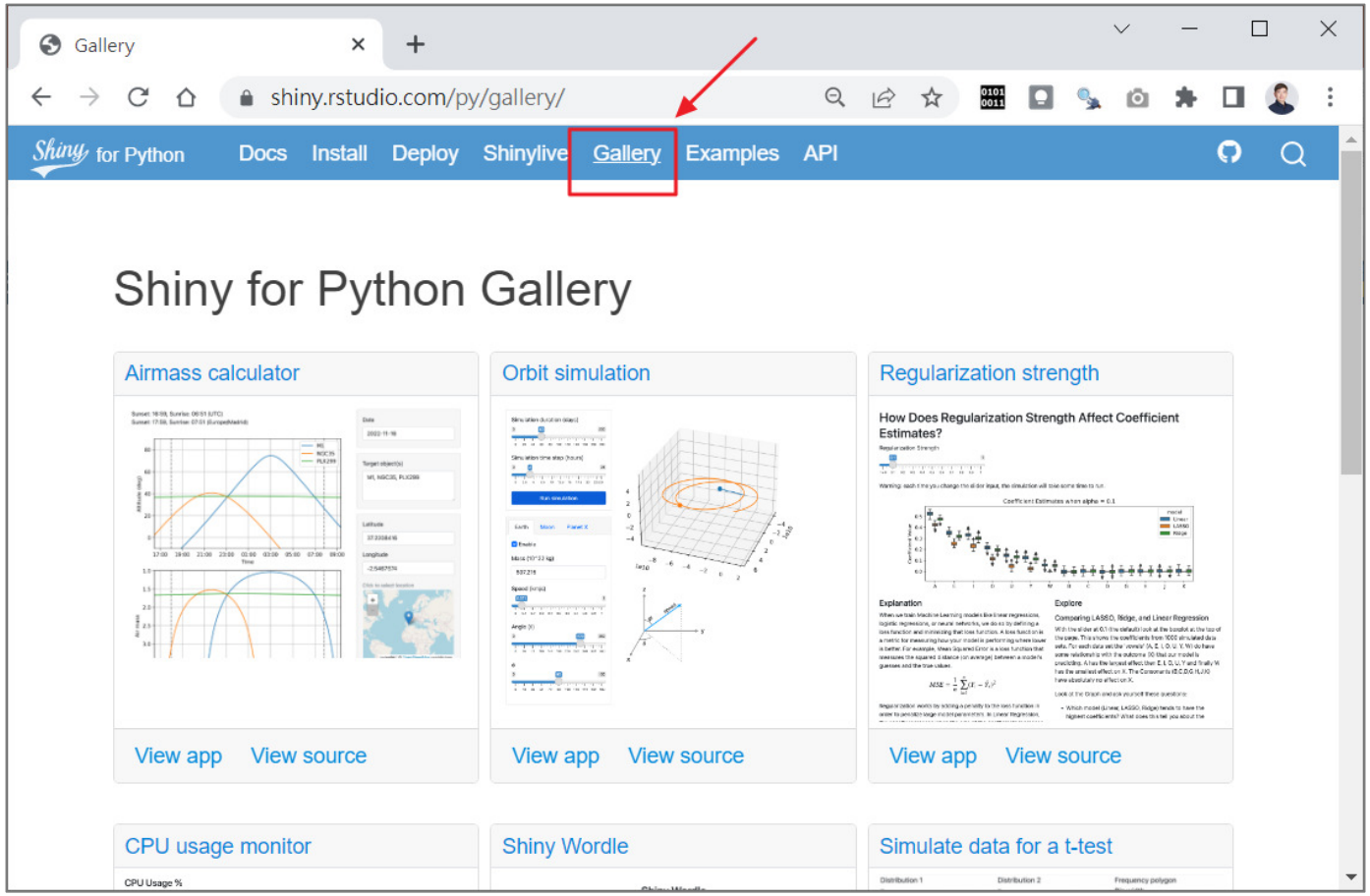


佈署 - shinylive

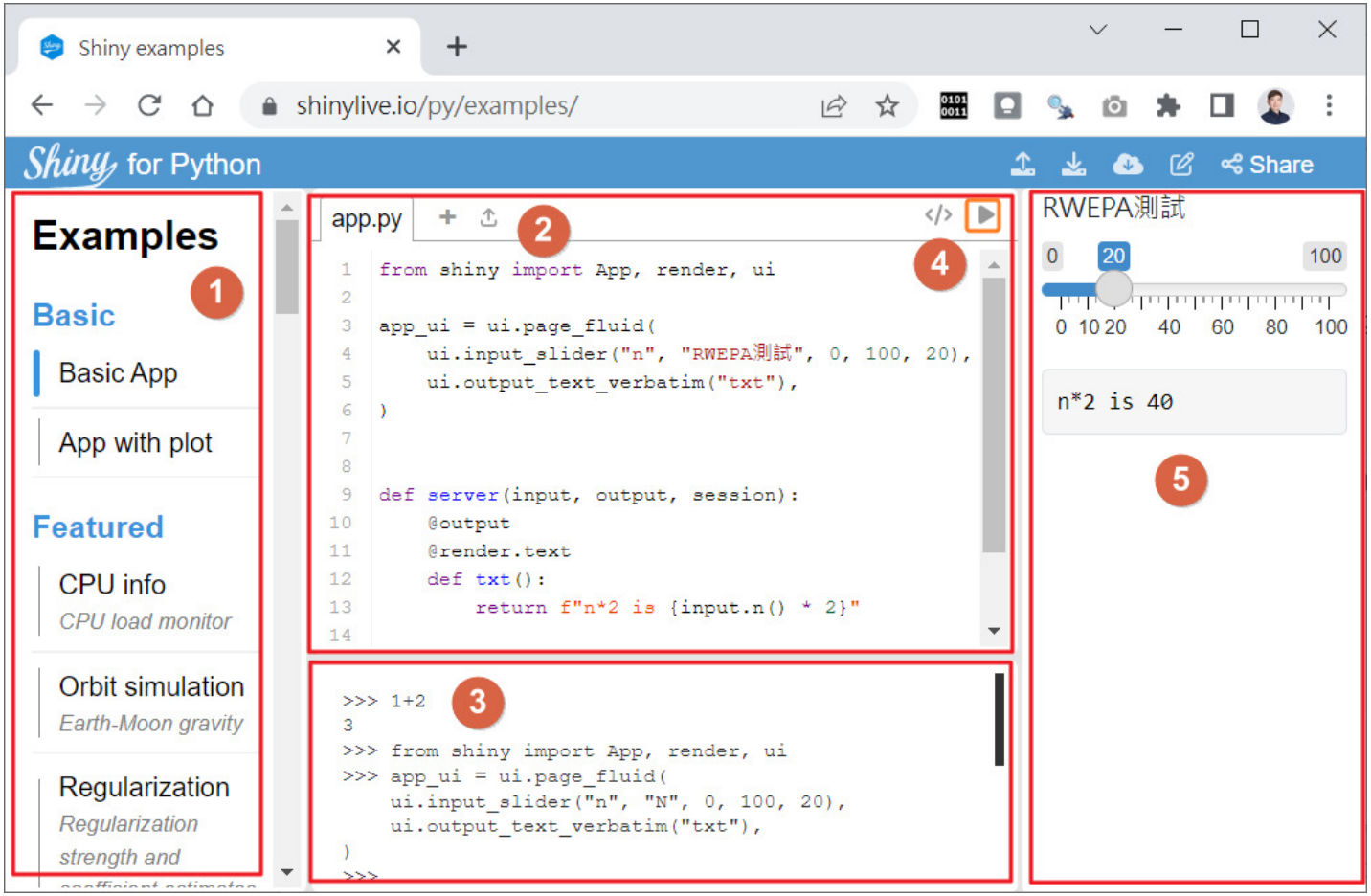
- shinylive 可以在用戶的 Web 瀏覽器中運行 Python，而不用在伺服端上運行 Python。 Shinylive 的二大元件：
  - WebAssembly (wasm)： 是一個編譯的二進位格式，可以在瀏覽器中以接近本機的速度執行，一般連結伺服端速度較慢。
  - Pyodide：提供許多相關模組，並將Python編譯為網頁組合（WebAssembly）。



Shiny for Python - Gallery

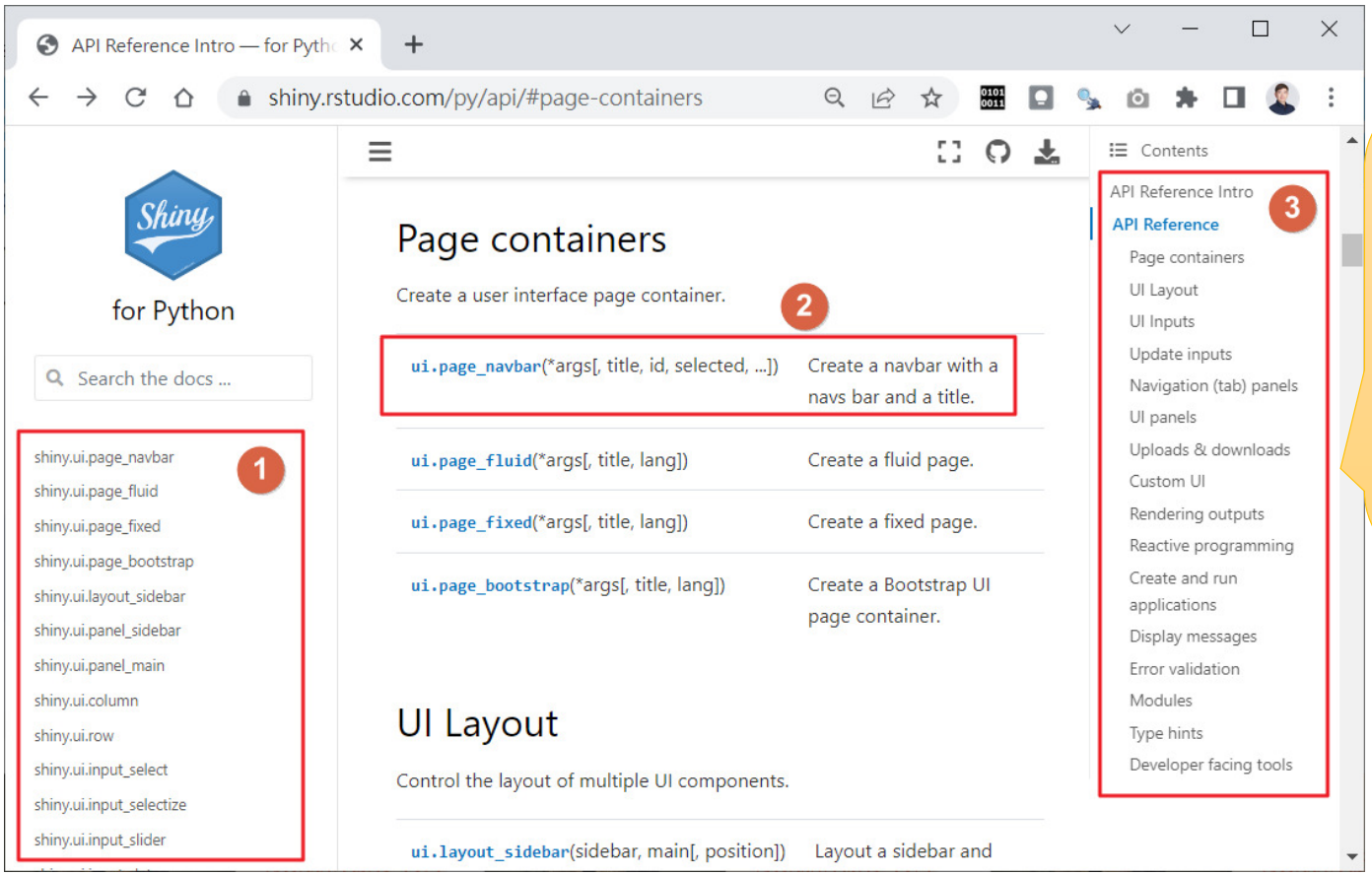


Shiny for Python - Examples



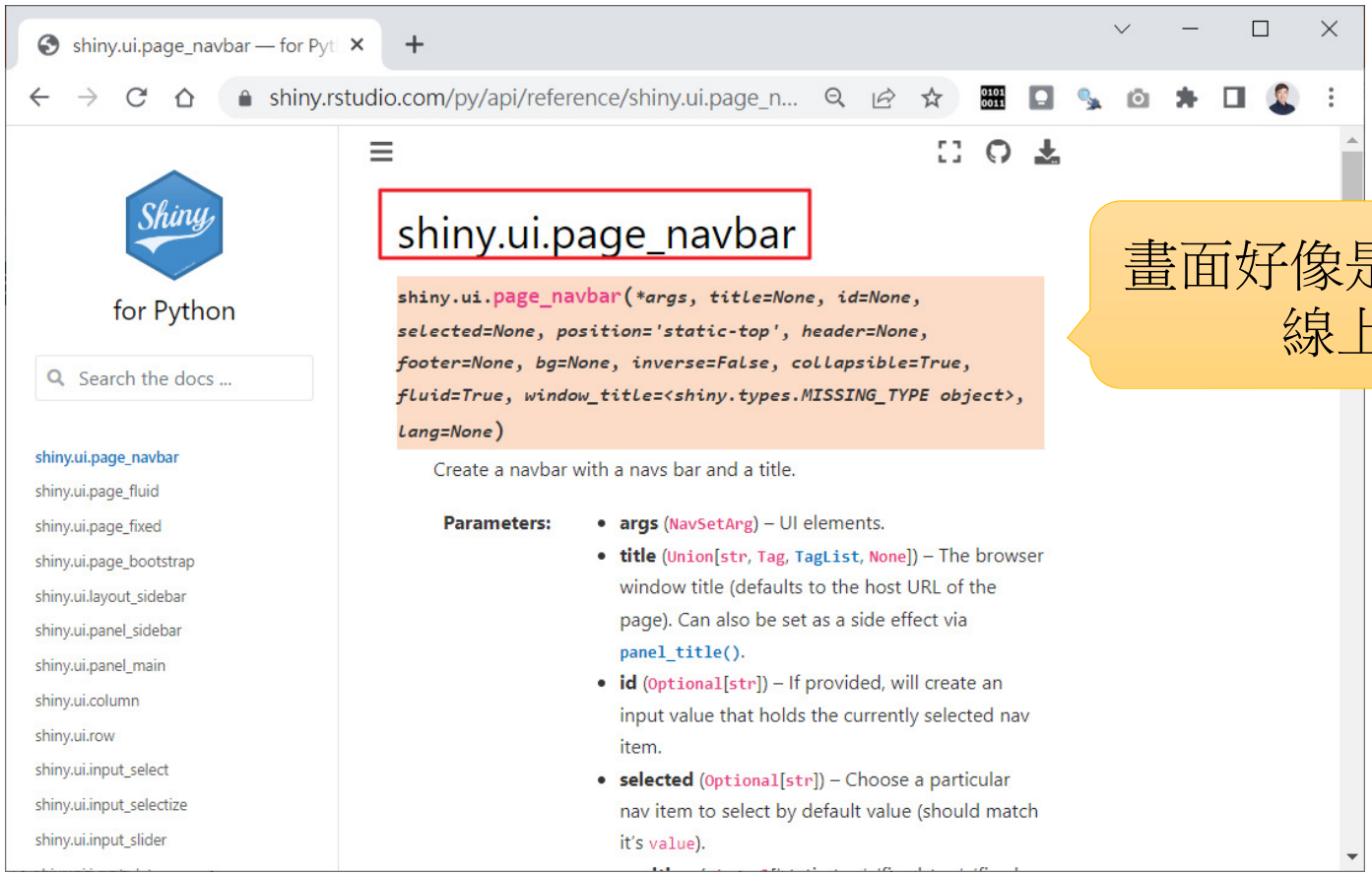
1. 範例選單
2. 程式碼編輯區
3. 控制台 (Console)
4. 執行App
   (Ctrl + Shift + Enter)
5. 執行 shiny 結果

Shiny for Python - API



1. 左側列出所有函數
2. 中間為函數說明
3. 右側API -17項:
   Page containers …
   Developer facing tools.

線上說明 - shiny.ui.page_navbar

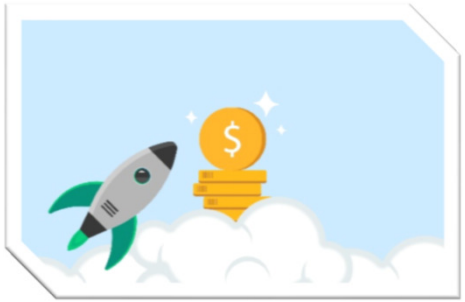


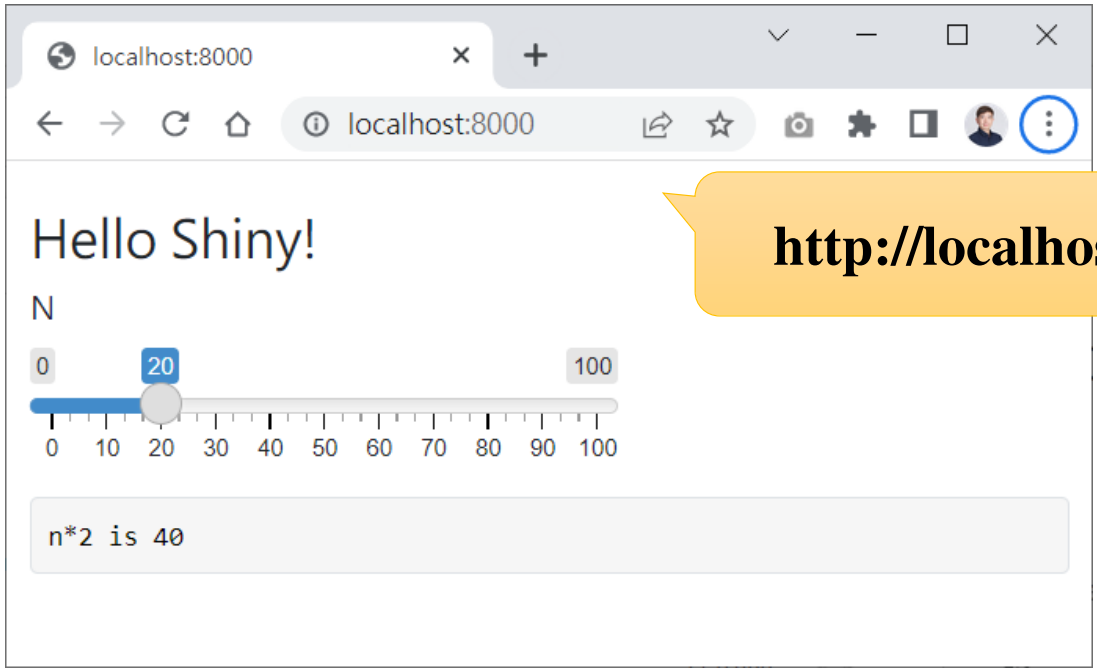
畫面好像是 scikit-learn 線上說明

5.shiny for Python 實作篇1 - my_app

3行指令建立 my_shiny

- pip install shiny (或 conda install -c conda-forge shiny)
- shiny create my_app
- shiny run --reload my_app/app.py





http://localhost:8000/

app.py 包括四大區塊

app.py

```
1  from shiny import App, render, ui
2
3  app_ui = ui.page_fluid(
4      ui.h2("Hello Shiny!"),
5      ui.input_slider("n", "N", 0, 100, 20),
6      ui.output_text_verbatim("txt"),
7  )
8
9
10 def server(input, output, session):
11     @output
12     @render.text
13     def txt():
14         return f"n*2 is {input.n() * 2}"
15
16
17 app = App(app_ui, server)
```

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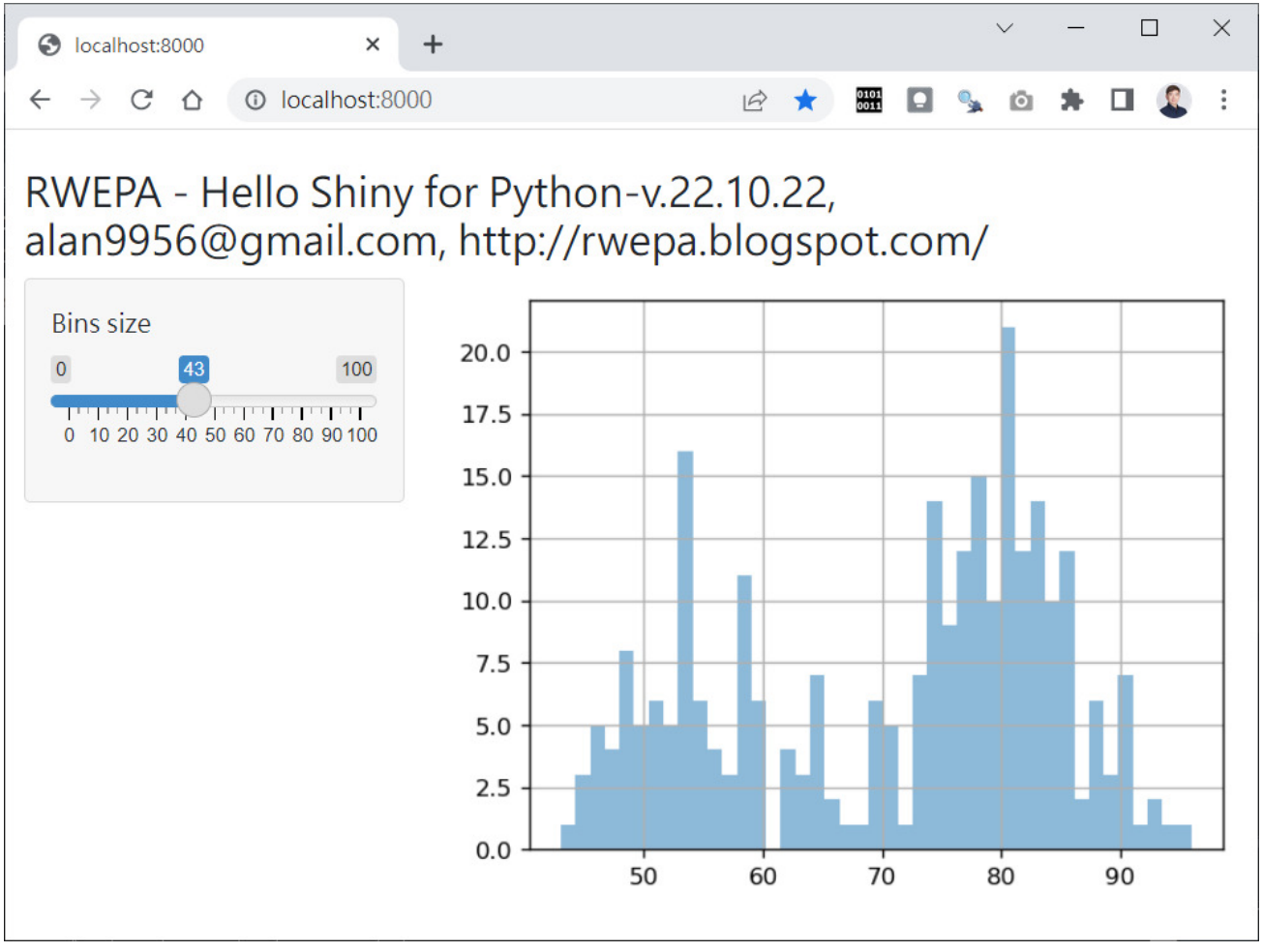
1. 載入模組
2. 宣告 ui
3. 宣告 server
4. 執行 App

6.shiny for Python 實作篇2 – 01_hello

Hello Shiny for Python



pyshiny_01_hello.py

```
13  from shiny import App, render, ui
14  from rdatasets import data
15  # datasets list: https://vincentarelbundock.github.io/Rdatasets/datasets.html
16
17  df = data("faithful")
18
19  app_ui = ui.page_fluid(
20      ui.h3("RWEPA - Hello Shiny for Python-v.22.10.22, alan9956@gmail.com, http://rwepa.blogspot.com/"),
21      ui.layout_sidebar(
22          ui.panel_sidebar(ui.input_slider("bins", "Bins size", min=0, max=100, value=30)),
23          ui.panel_main(ui.output_plot("plot")),
24      ),
25  )
26
27  def server(input, output, session):
28      @output
29      @render.plot(alt="A histogram")
30      def plot():
31
32          # df['waiting'].plot(kind='hist', alpha=0.5, bins=30, title='Histogram of waiting times', grid=True)
33          myplot = df['waiting'].plot(kind='hist', alpha=0.5, bins=input.bins(), title='Histogram of waiting times', grid=True)
34          return myplot
35
36  app = App(app_ui, server)
```

1

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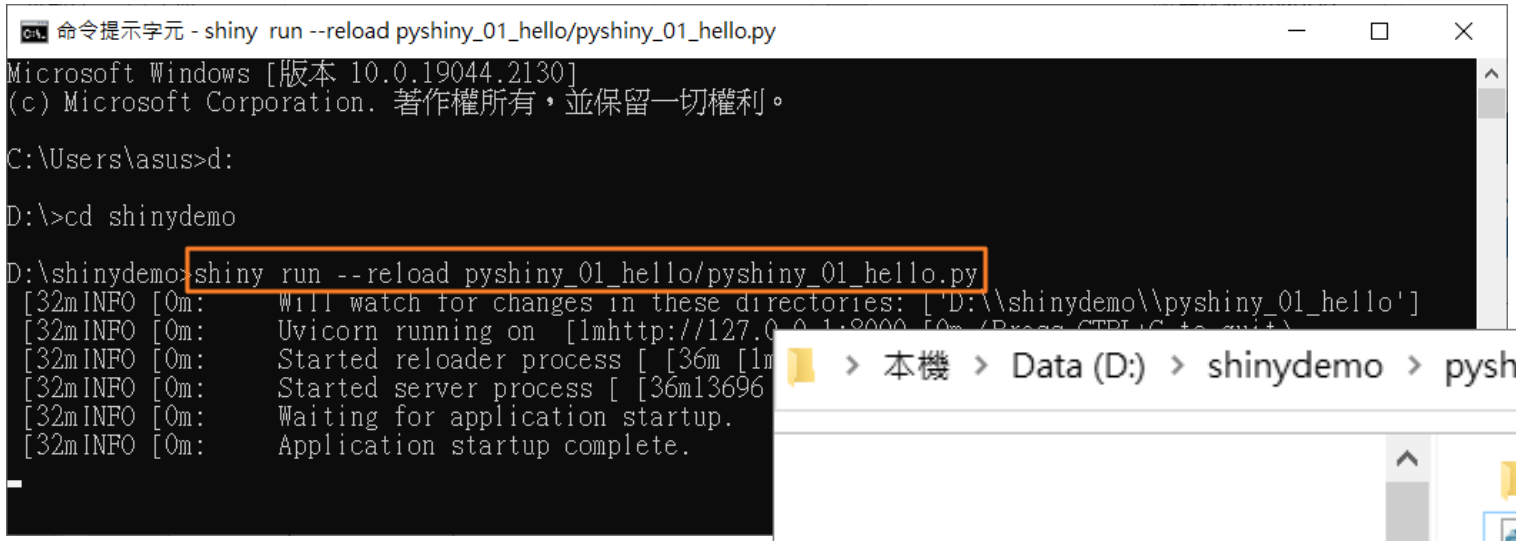
3

4

Hello Shiny for Python – 執行

- d:
- cd shinydemo
- shiny run --reload pyshiny_01_hello/pyshiny_01_hello.py
- 瀏覽器: http://localhost:8000/



檔案架構

7.結論

結論

- shiny 功能: 產銷人發財,學術,Python研究
- shiny + Python
- 實作範例1 - my_app
- 實作範例2 - 01_hello

參考資料

1. RWEPA: http://rwepa.blogspot.com/
2. RWEPA shiny: http://rwepa.blogspot.com/search?q=shiny
3. Shiny for R: https://shiny.rstudio.com/
4. Shiny for Python: https://shiny.rstudio.com/py/
5. shiny for Python 實作篇2 – 01_hello 程式碼: https://github.com/rwepa/shiny_python

謝謝您的聆聽

Q & A

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