

物聯網與大數據的整合應用

李明昌 博士

2020年9月

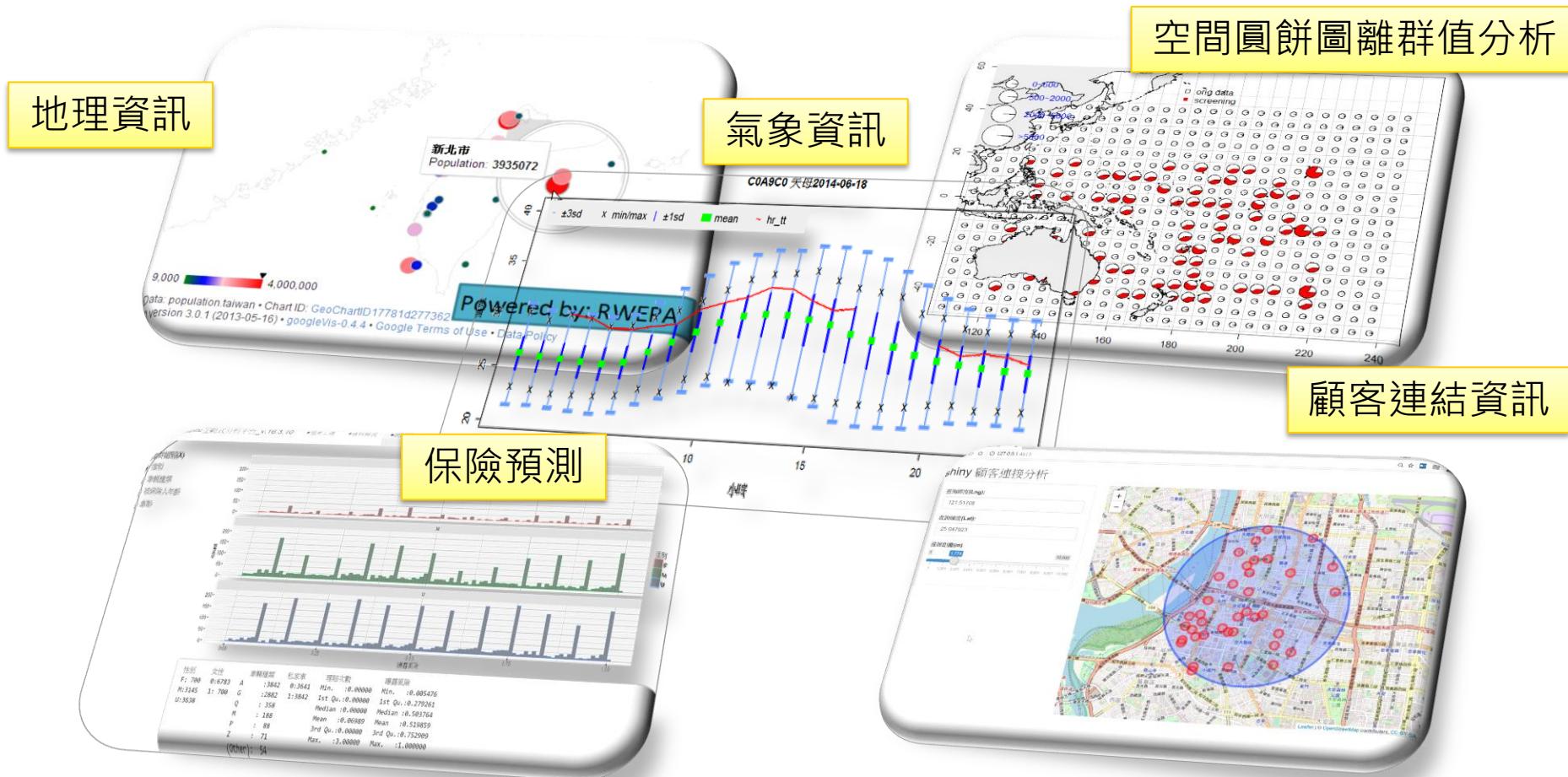
大綱

1. 資料分析/視覺化成果
2. 大數據簡介
3. 大數據分析工具與架構
4. R 簡介、下載與安裝
5. RStudio 簡介、下載與安裝
6. R 使用環境
7. 溫度感測案例分析

1. 資料分析/視覺化成果

資料分析/視覺化成果

Python + Plotly, Boken, Dash, Django
R + shiny, Plotly



網頁呈現

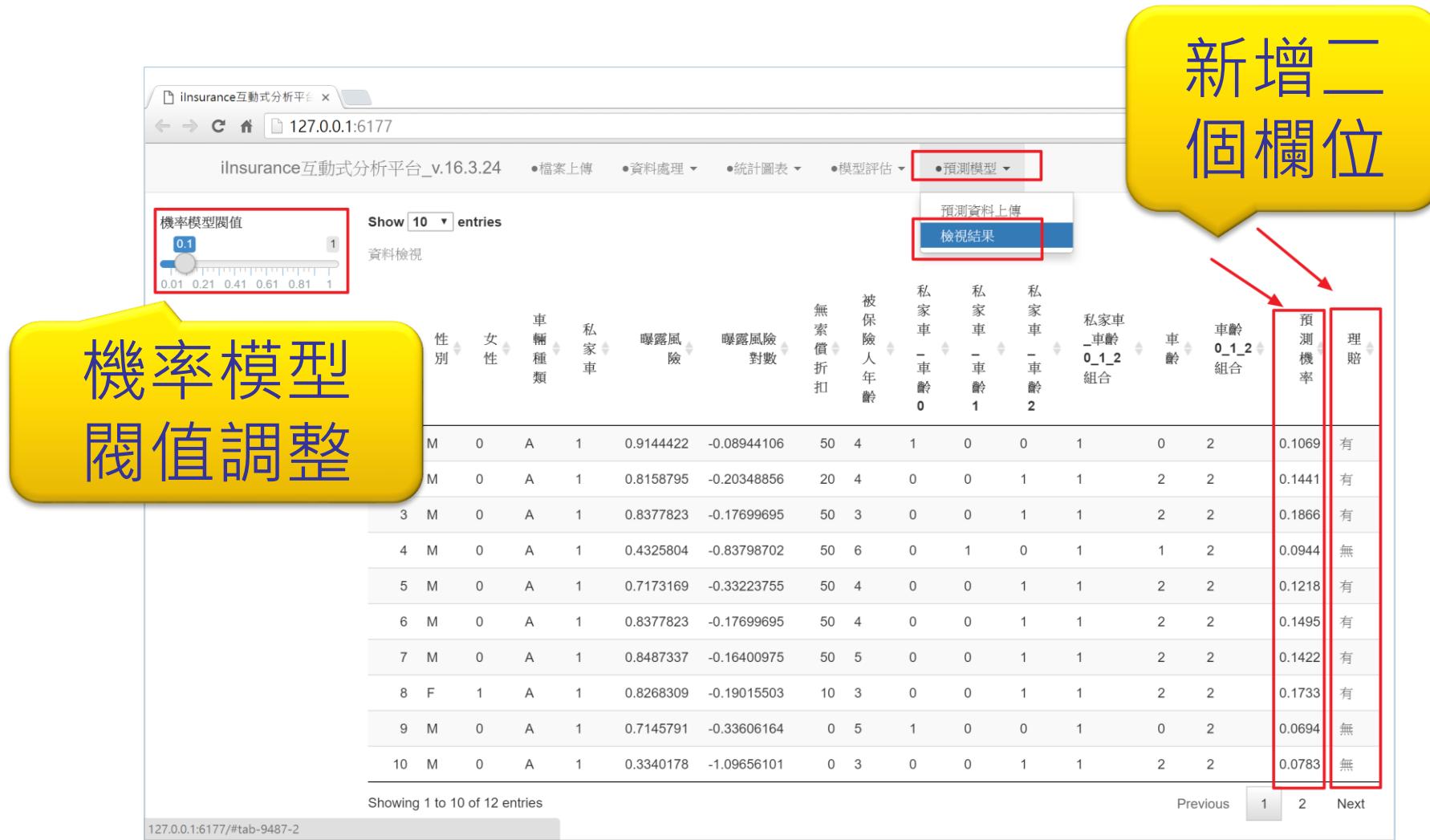
中央氣象局 1,600萬筆資料



客製化選單

R統計運算

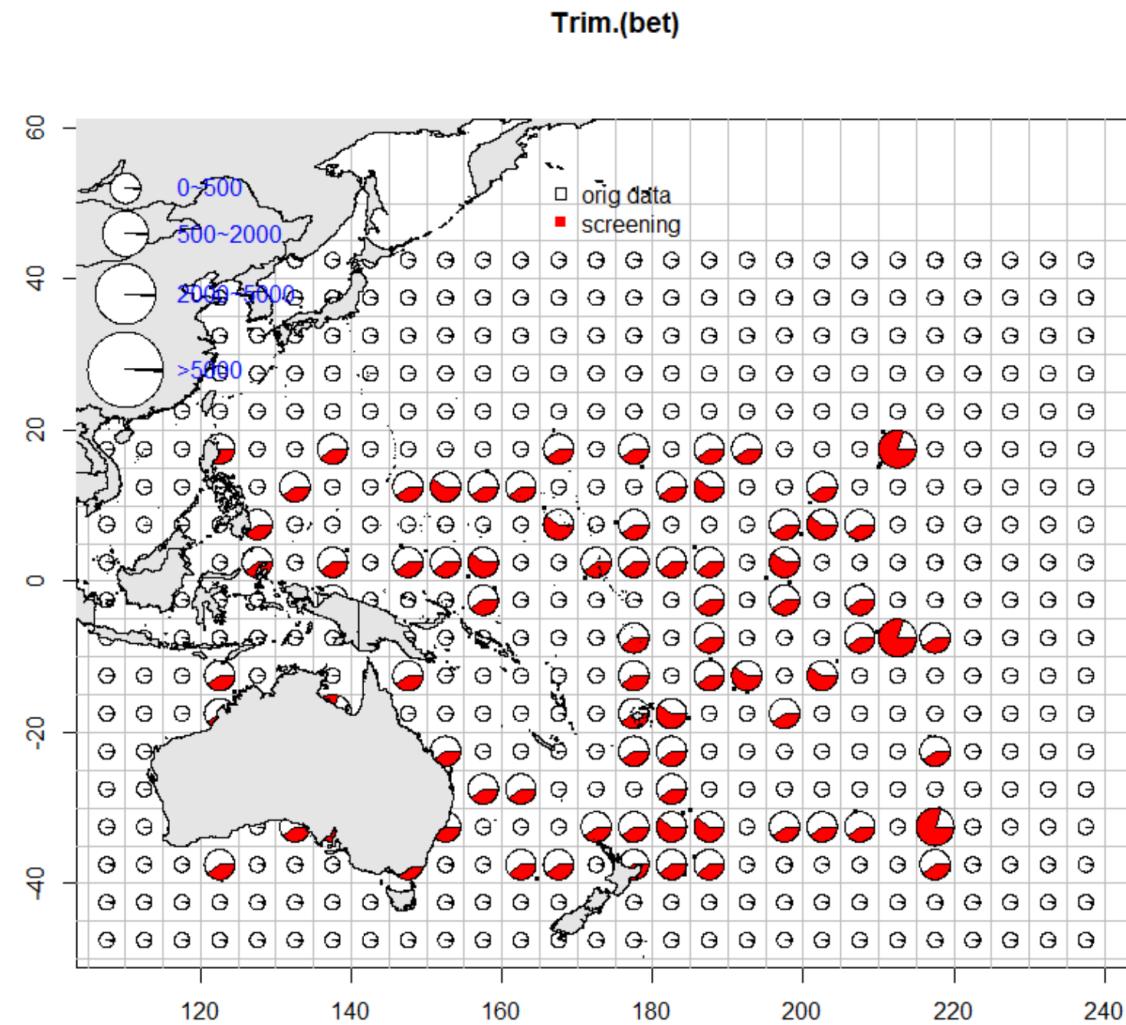
保險預測模型



The screenshot shows the iInsurance interactive analysis platform interface. A yellow callout bubble on the left says "機率模型閥值調整" (Probability Model Threshold Adjustment) pointing to a slider labeled "機率模型閥值" (0.1) with a range from 0.01 to 1. A yellow callout bubble on the right says "新增二個欄位" (Add two new columns) pointing to the last two columns of the table: "預測機率" and "理賠".

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 0_1_2 組合	預測機率	理賠
				曝露風險	對數	私家車 -車齡 0	私家車 -車齡 1									
M	0	A	1	0.9144422	-0.08944106	50	4	1	0	0	1	0	2	0.1069	有	
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

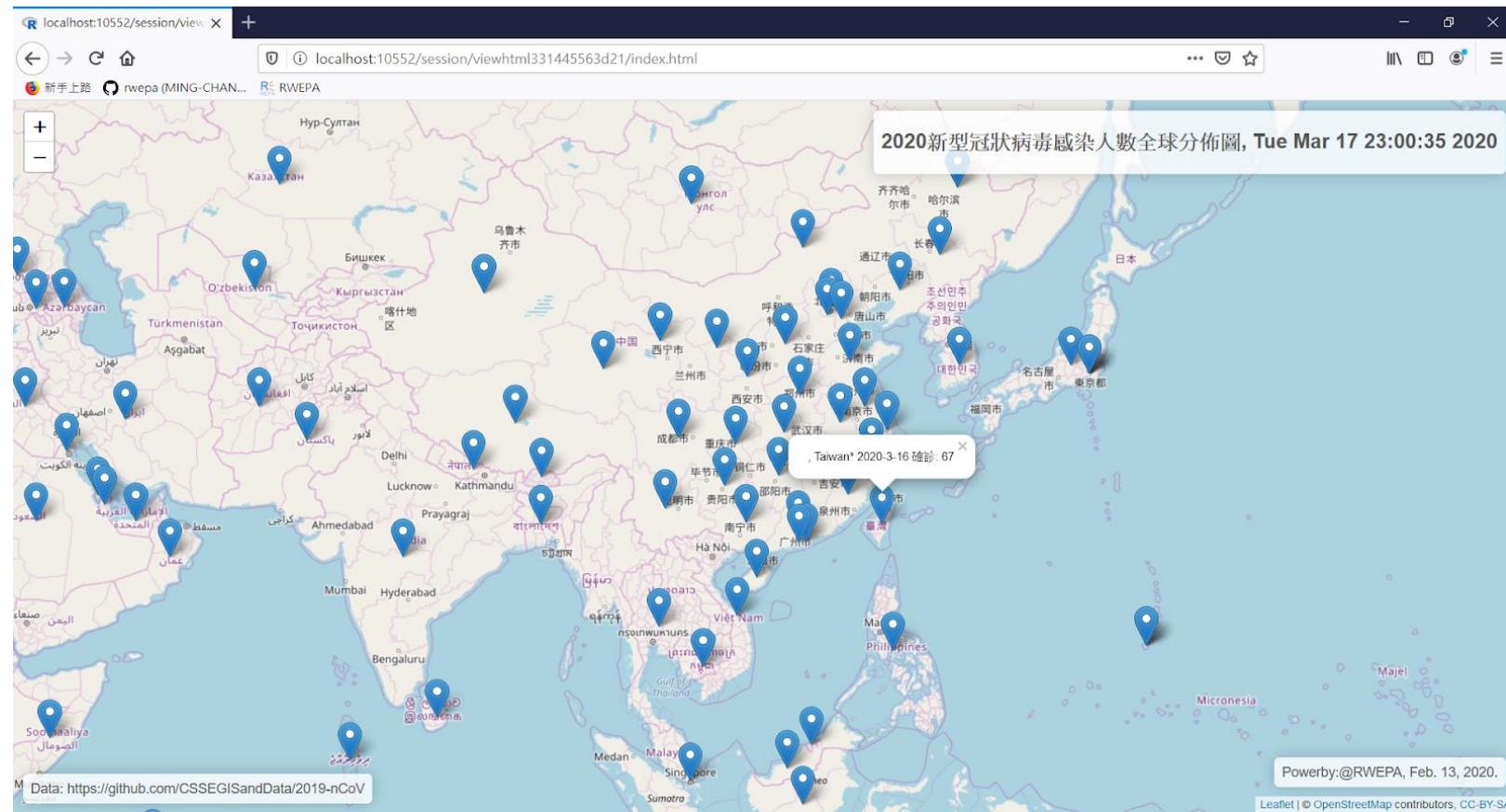
空間圓餅圖離群值分析



離子資料分析與視覺化應用



2020新型冠狀病毒視覺化



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

2.大數據簡介

- 大數據特性：「大、快、雜、疑」

何謂大數據

- 大數據(巨量資料, Big Data)：
 - 所涉及的資料量規模巨大到無法透過人工，
 - 在**合理時間內**達到擷取、管理、處理
 - 並整理成為人類所能解讀的形式的資訊

維基: https://en.wikipedia.org/wiki/Big_data

大數據

1546103 Virgin·Islands·(U.S.),VIR,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546104 Vietnam,VNM,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546105 Vanuatu,VUT,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546106 West·Bank·and·Gaza,WBG,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546107 World,WLD,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546108 Samoa,WSM,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546109 "Yemen,·Rep.",YEM,"Presence·of·peace·keepers·(number·of·peace·keepers)"

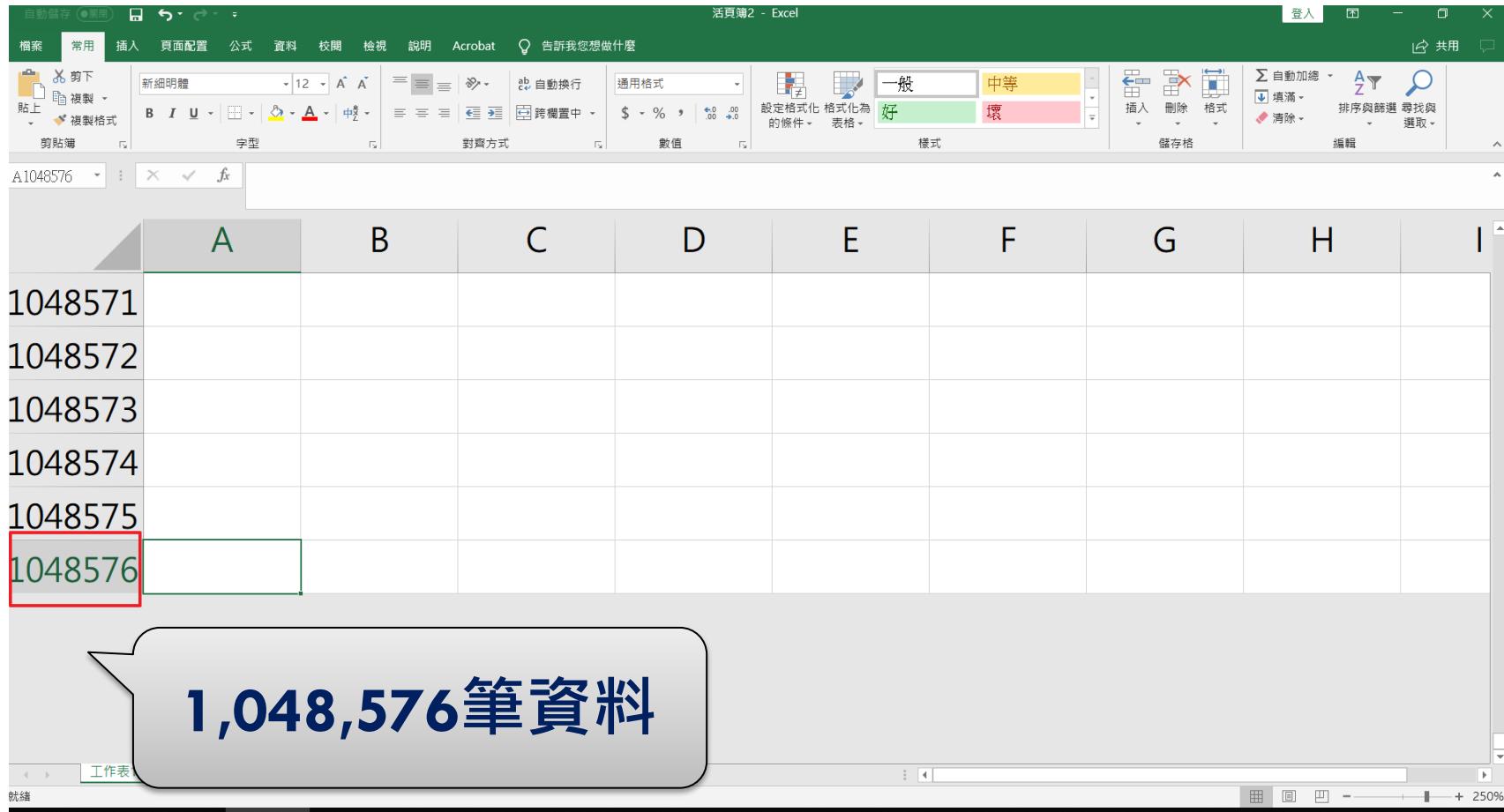
1546110 South·Africa,ZAF,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546111 "Congo,·Dem.·Rep.",ZAR,"Presence·of·peace·keepers·(number·of·peace·keepers)"

1546112 Zambia,ZMB,"Presence·of·peace·keepers·(number·of·peace·keepers)"

154萬筆資料

Excel 較難解決!



The screenshot shows a Microsoft Excel spreadsheet titled "活頁簿2 - Excel". The data consists of a single column of numbers from 1048571 to 1048576. The cell containing "1048576" is highlighted with a red border. A callout bubble in the bottom left corner displays the text "1,048,576筆資料" (1,048,576 rows of data).

A	B	C	D	E	F	G	H	I
1048571								
1048572								
1048573								
1048574								
1048575								
1048576								

巨量資料的3V定義

- 2001年Gartner 公司的分析師 Doug Laney 提出3V(三個關鍵挑戰)
 - 資料量 (Volume) : 資料總量很大
 - 速度 (Velocity) : 資料產生/更新的速度快
 - 多樣性 (Variety) : 資料種類繁多(非結構化資料)

參考: Lancy, D., 3D Data Management: Controlling Data Volume, Velocity, and Variety, Gartner, 2001.

IBM-3V

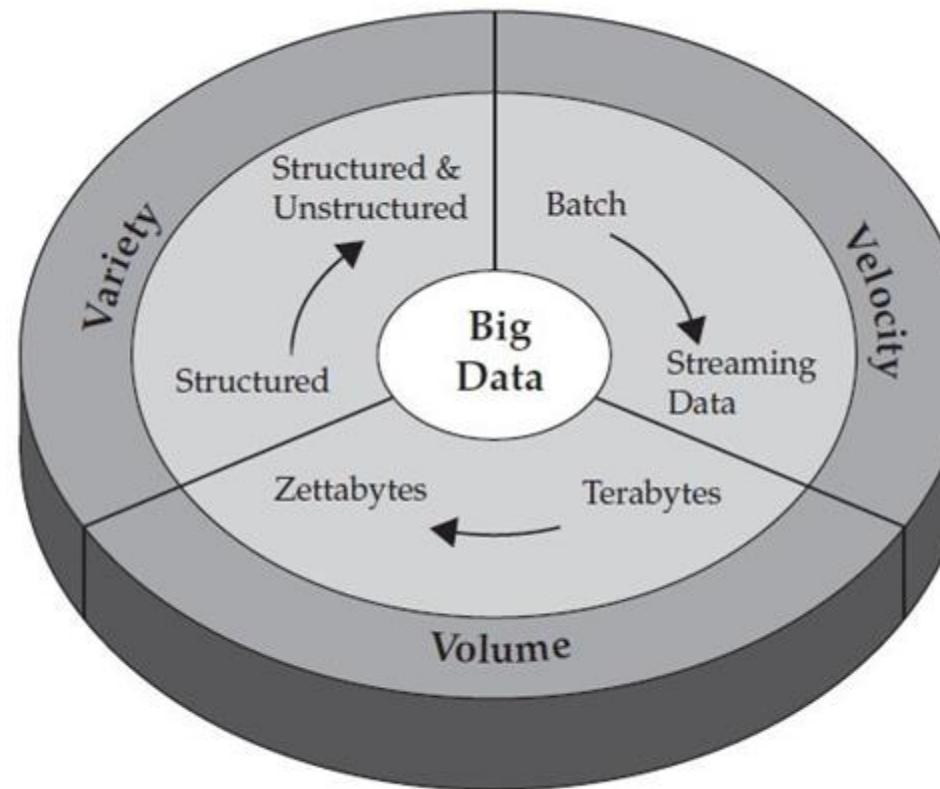
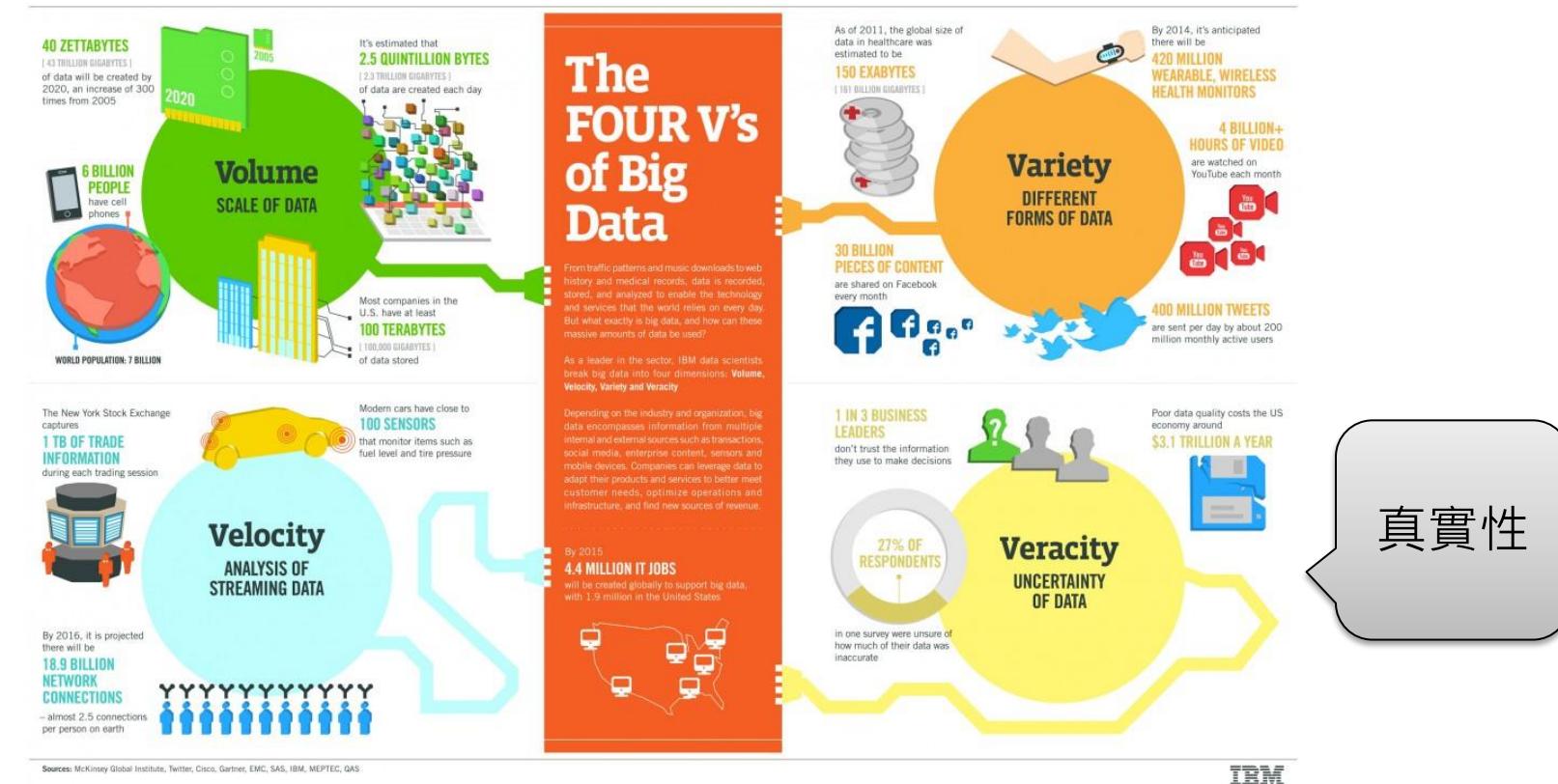


Figure 1-1 IBM characterizes Big Data by its volume, velocity, and variety—or simply, V³.

參考: IBM, Understanding Big Data, 2012.

IBM的4V定義

■ IBM 的 Big Data 4V: 新增 Veracity (真實性)

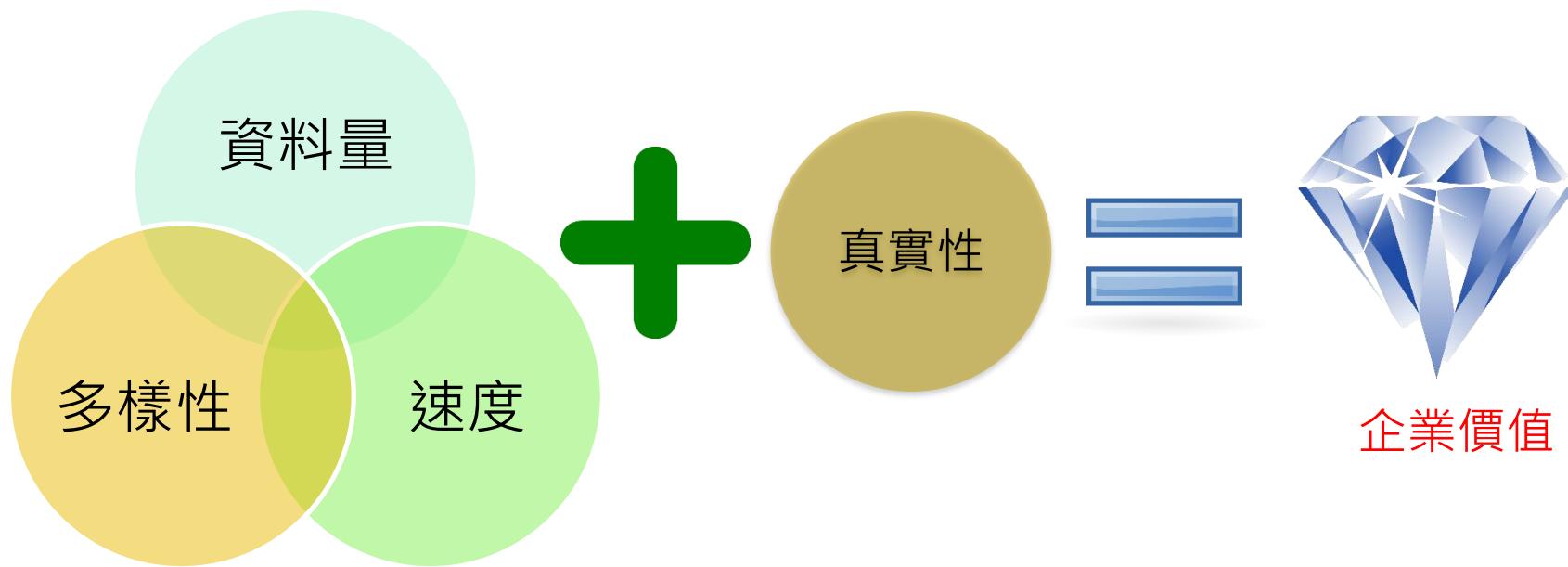


參考: <http://www.ibmbigdatahub.com/infographic/four-vs-big-data>

科技驅動與資料加值

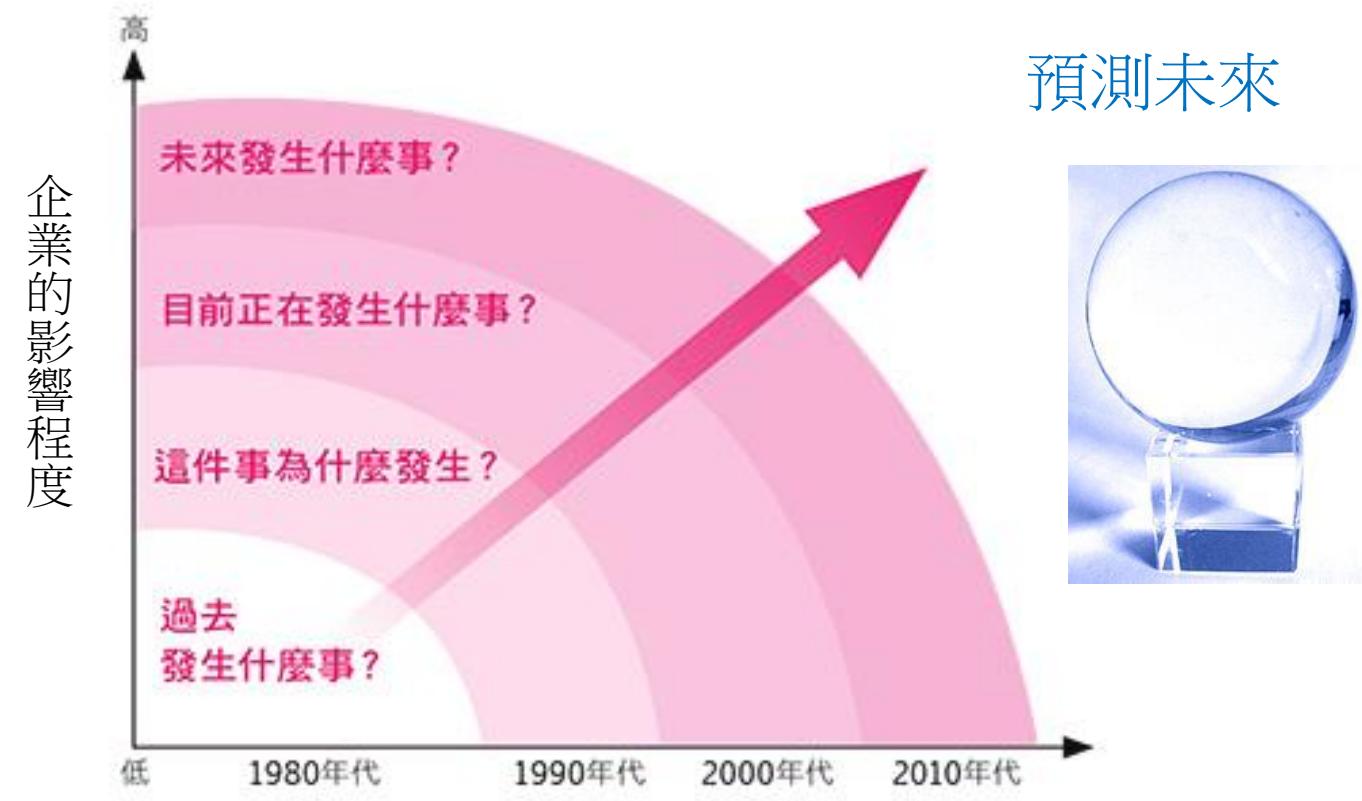


Value



大數據對企業影響

- 大數據則可根據目前發生了什麼事，**預測未來**將發生什麼事。例如：企業可即時監控銷售情況，預測顧客回購周期。



大數據生活應用 – 電子商務

- 利用大數據進行商品推薦。
- 從「交易平台」到「生態圈」服務
- 跨界運營，例如：分析進駐平台的小微企業的交易資料、信用資料、客戶評價資料，掌握其信用狀況，並對其借貸中的風險進行把控。



參考: <https://kknews.cc/zh-tw/tech/jj4ym2e.html>

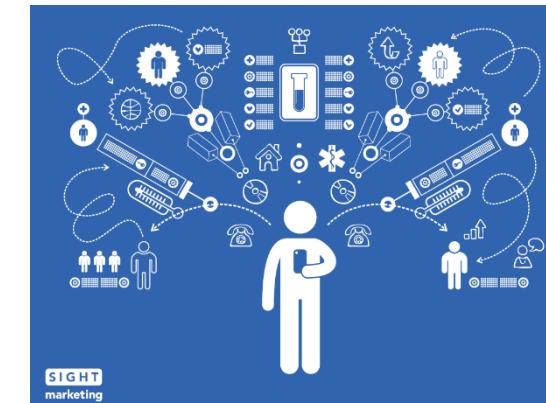
大數據生活應用 - 金融行業

- 精準行銷：建立顧客全方位形象 (Profile)，即可對細分的客戶進行精準營銷、實時營銷等個性化智慧營銷。
- 風險控制：應用大數據技術，可以統一管理金融企業內部多源異質數據與外部數據，提供更好的完善風控體系。
- 改善經營：通過大數據分析方法改善經營決策，為管理層提供可靠的數據支撐，使經營決策更加高效、敏捷，精確性更高。



大數據生活應用 - 醫療行業

- 醫療行業的應用包括病歷、影像、遠程醫療等都會產生大量數據並形成電子病歷和健康檔案。
- 基於這些巨量資料，醫院能精準地分析病人的體徵、治療費用和療效數據，可避免過度及副作用較為明顯的治療。
- 同時，還可以利用這些大量數據實現遠程監護、管理慢性病等。



大數據生活應用 - 電信行業

電信運營商大數據應用



參考: https://blog.dcplus.com.tw/marketing-knowledge/analytic_optimization/24474

IOT
INTERNET
OF THINGS

3. 大數據分析工具與架構



大數據分析免費工具



軟體	Python	R	Julia
Released	1991	2000	2012
用途	程式語言 系統結合	統計,繪圖,視覺化 程式語言	科學計算 程式語言
版本	自由軟體 物件導向	自由軟體 物件導向	自由軟體 物件導向
附加功能	免費模組	免費套件	免費模組
使用者	工科+ 商管	商管+ 工科	商管+ 工科

R語言

<https://www.r-project.org/>



[Home]

Download
CRAN

R Project

About R
Logo
Contributors
What's New?
Reporting Bugs
Conferences
Search
Get Involved: Mailing
Lists
Developer Pages



The R Project for Statistical Computing

Getting Started

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To [download R](#), please choose your preferred [CRAN mirror](#).

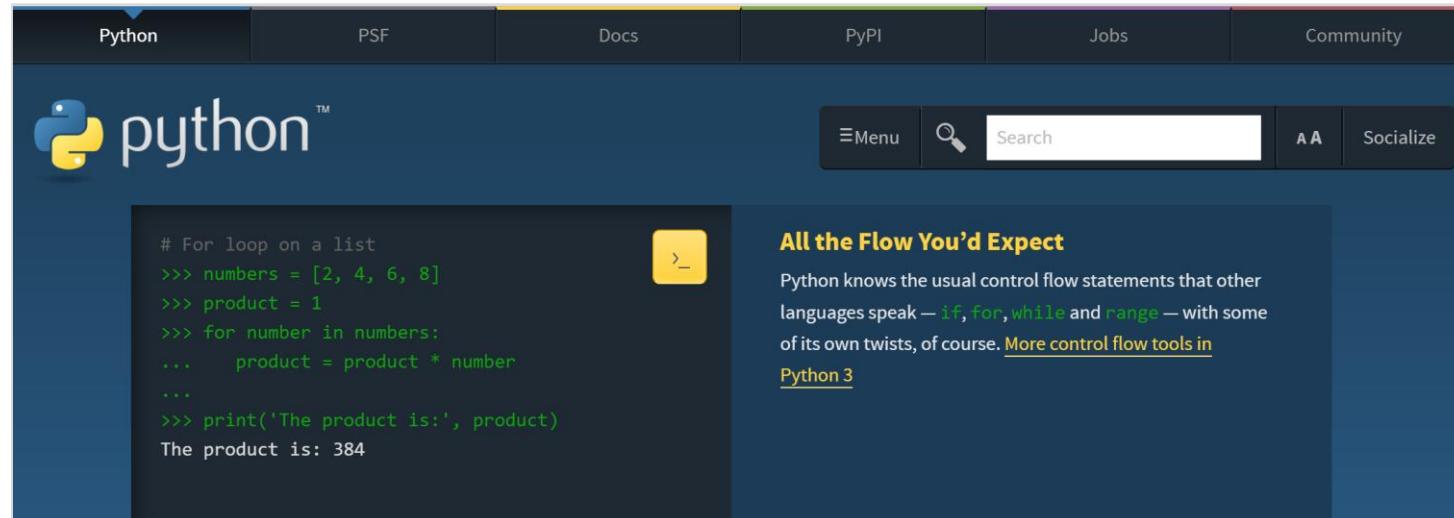
If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

News

- [R version 4.0.2 \(Taking Off Again\)](#) has been released on 2020-06-22.
- [useR! 2020 in Saint Louis has been cancelled](#). The European hub planned in Munich will not be an in-person conference. Both organizing committees are working on the best course of action.

Python語言

<https://www.python.org/>



The screenshot shows the Python.org homepage. At the top, there's a navigation bar with tabs for Python, PSF, Docs, PyPI, Jobs, and Community. Below the navigation bar is the Python logo and a search bar. The main content area features a code snippet in a terminal window and a text block titled "All the Flow You'd Expect". A red arrow points to the "Download" button in the footer menu.

For loop on a list
>>> numbers = [2, 4, 6, 8]
>>> product = 1
>>> for number in numbers:
... product = product * number
...
>>> print('The product is:', product)
The product is: 384

All the Flow You'd Expect

Python knows the usual control flow statements that other languages speak — `if`, `for`, `while` and `range` — with some of its own twists, of course. [More control flow tools in Python 3](#)

Python is a programming language that lets you work quickly and integrate systems more effectively. [»» Learn More](#)

Get Started
Whether you're new to programming or an experienced developer, it's easy to learn and use Python.
[Start with our Beginner's Guide](#)

Download  Python source code and installers are available for download for all versions! Not sure which version to use? [Check here](#).
Latest: Python 3.6.2 - Python 2.7.14

Docs
Documentation for Python's standard library, along with tutorials and guides, are available online.
[docs.python.org](#)

Jobs
Looking for work or have a Python related position that you're trying to hire for? Our [relaunched community-run job board](#) is the place to go.
[jobs.python.org](#)

Julia語言

<https://julialang.org/>



Julia in a Nutshell

Fast

Julia was designed from the beginning for [high performance](#). Julia programs compile to efficient native code for [multiple platforms](#) via LLVM.

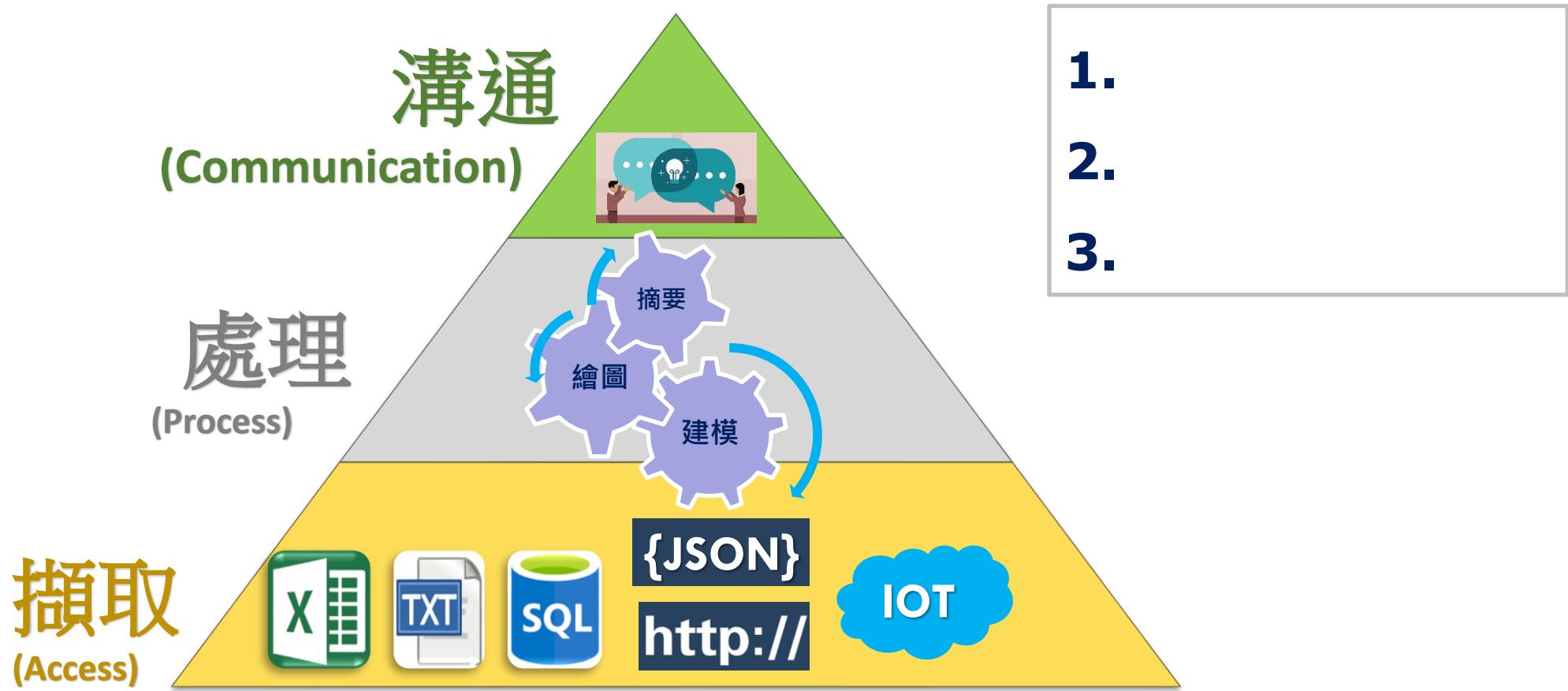
Dynamic

Julia is [dynamically typed](#), feels like a scripting language, and has good support for [interactive use](#).

Reproducible

[Reproducible environments](#) make it possible to recreate the same Julia environment every time, across platforms, with [pre-built binaries](#).

資料分析架構→APC方法



```
read.table || help length summary str class aggregate for apply lapply || plot save write.table
```

大數據案例

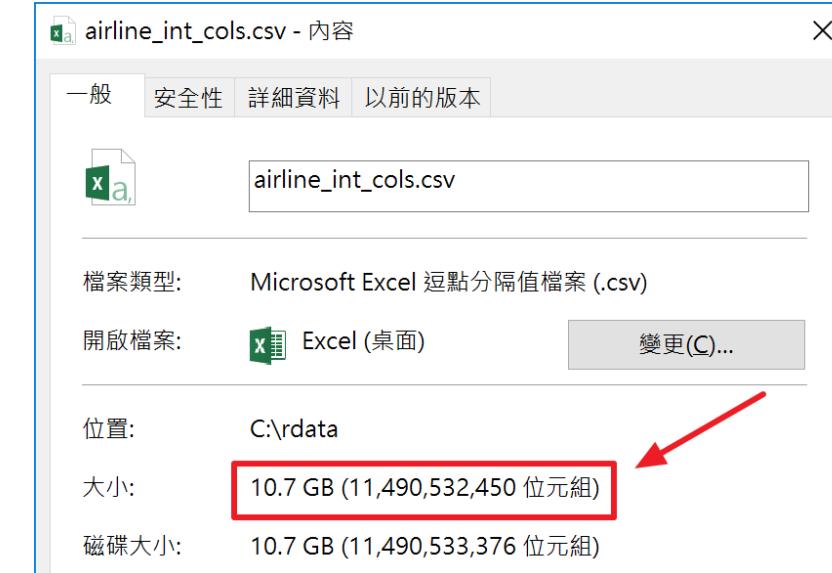
```
> # using bigmemory package  
> system.time(airline <- read.big.matrix("airline_int_cols.csv",  
+                                         header = TRUE,  
+                                         backingfile = "airline.bin",  
+                                         descriptorfile = "airline.desc",  
+                                         type = "integer"))
```

34.23分

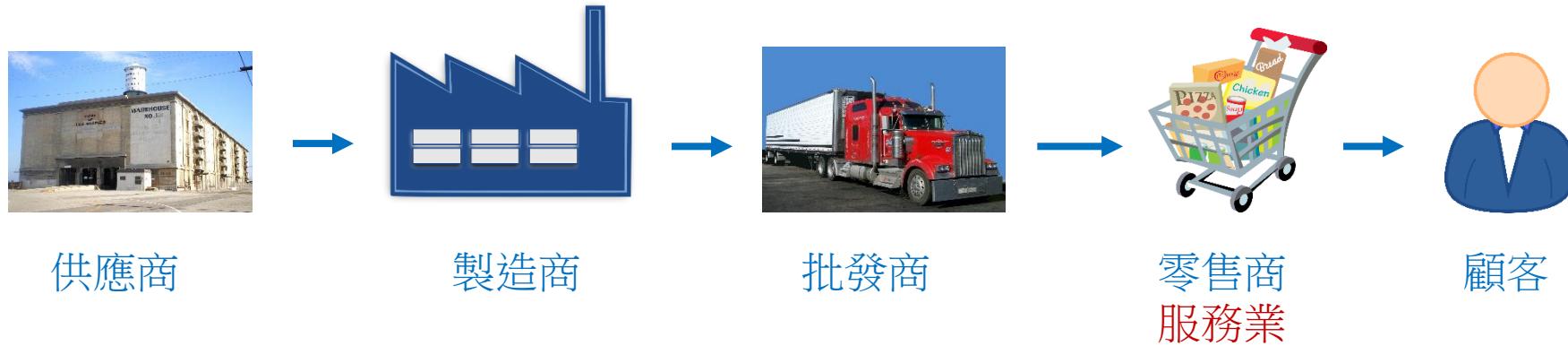
```
  user  system elapsed  
1777.96  100.34 2053.52
```

```
>  
> dim(airline)  
[1] 123534969 29  
>
```

1億2353萬筆資料



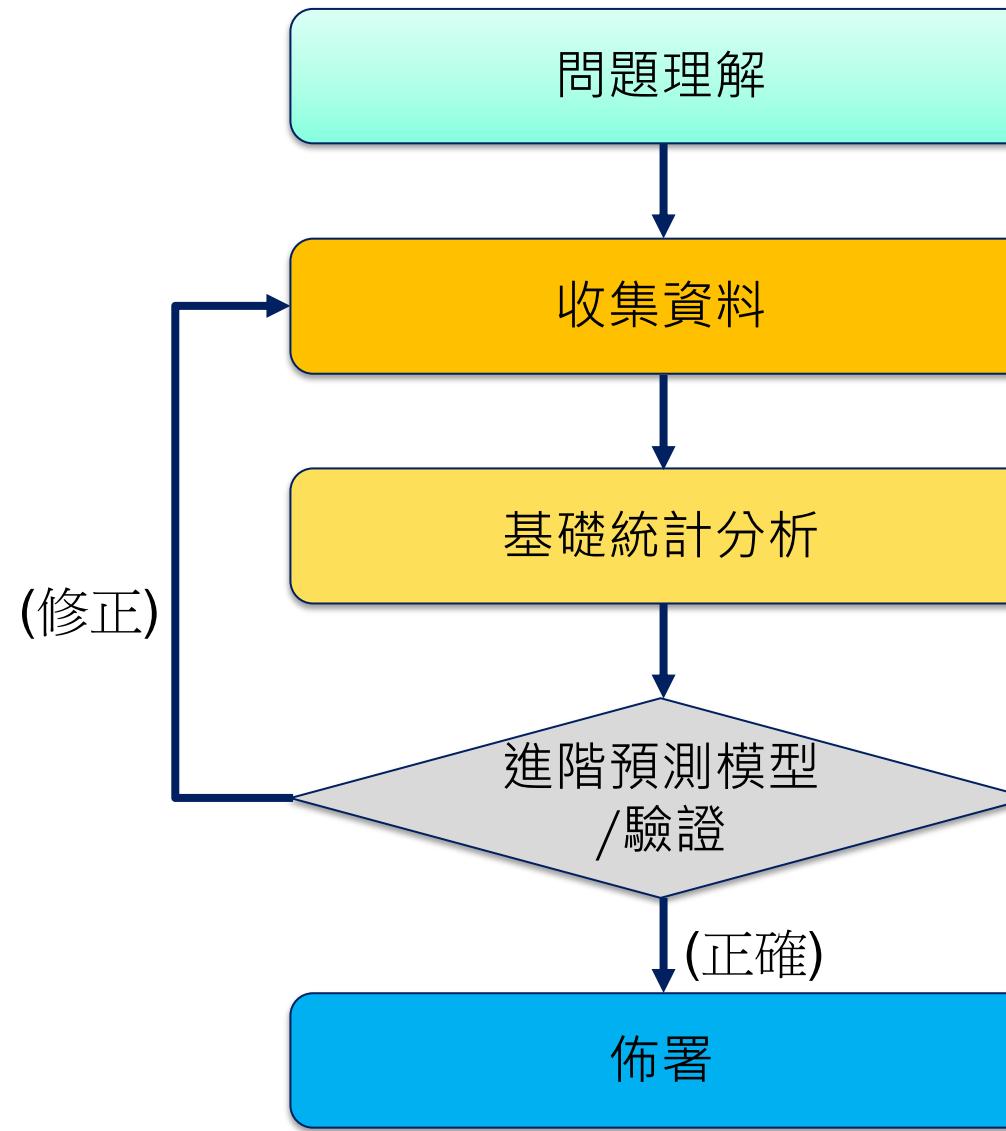
物聯網大數據應用



- | | | | | |
|-----------|-----------|----------|---------|---------|
| • 原物料價格預測 | • 供應鏈優化 | • 最佳批發路線 | • 銷售分析 | • 顧客集群 |
| • 品質監控 | • 設備異常監控 | • 通路最佳化 | • 購物藍分析 | • 顧客分類 |
| • 生產履歷 | • 製程參數最佳化 | | • 推薦系統 | • 客製化行銷 |
| | • 機台異常預測 | | • 預測應用 | |
| | • 提升良率 | | | |
| | • 統計品管 | | | |



預測應用五大步驟



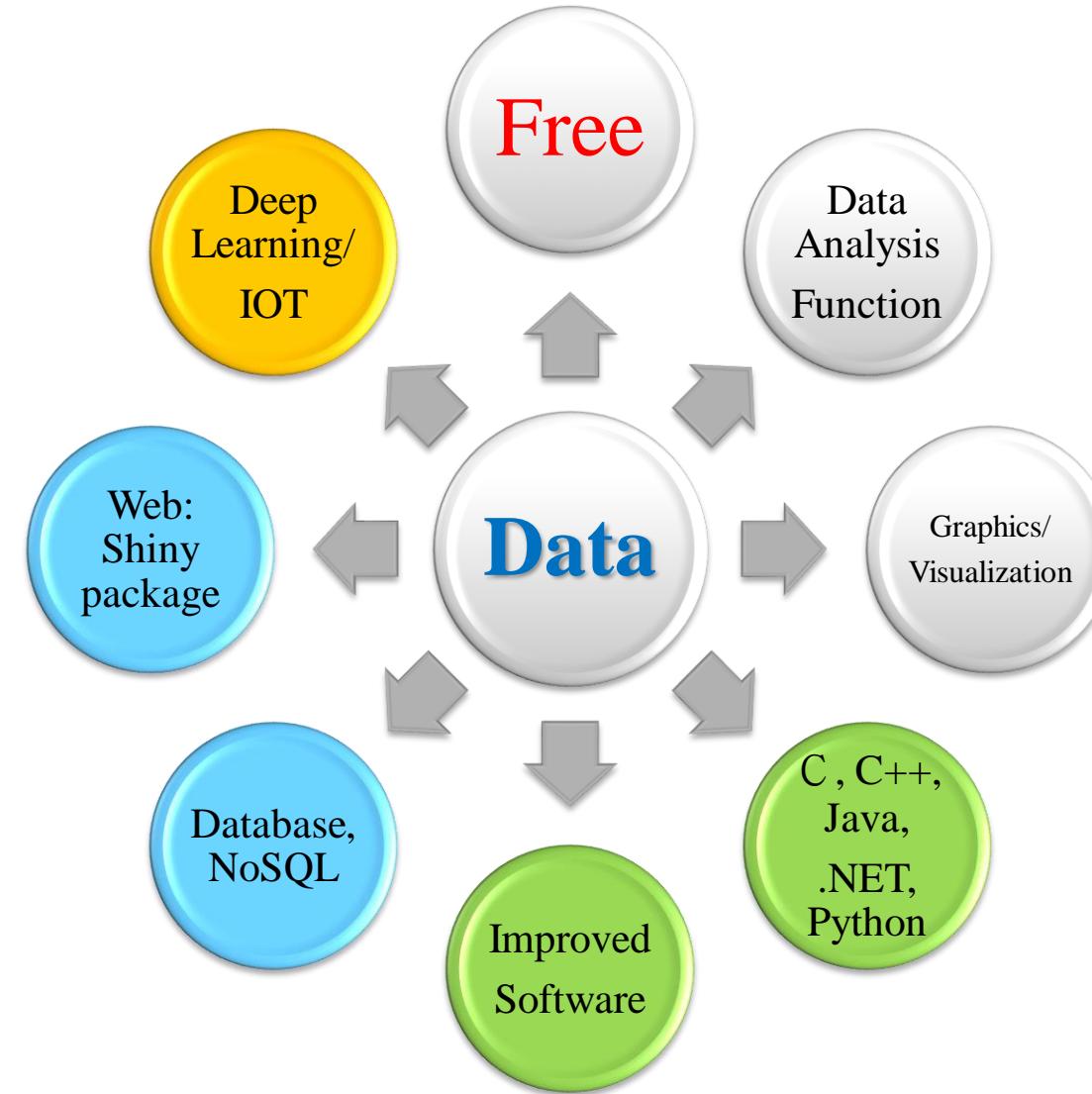
4.R簡介、下載與安裝

認識 R

- 1976 - 貝爾實驗室 John Chambers, Rick Becker, and Allan Wilks 研發 S 語言。
- 1993 - Ross Ihaka and Robert Gentleman, University of Auckland, New Zealand 研發 R 語言。
 - R 是一種基於 S 語言所發展出具備統計分析、繪圖與資料視覺化的程式語言。
- 1997年 - R 的核心開發團隊 (R development core team) 成立，專責 R
 -   
 - 2000年2月 - R 1.0.0
 - 2013年3月 - R 2.15.3
 - 2020年6月 - R 4.0.2



R-八大功能



R-下載

- 官網: <http://www.r-project.org/>
- 選取左側 Download \ CRAN
- 選取 Taiwan CRAN

Taiwan
<https://cran.csie.ntu.edu.tw/>

- 選取 Download R for Windows

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)



R-下載 (續)

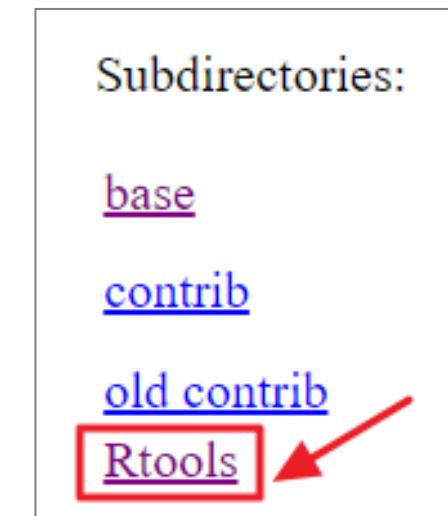
- 選取 base → 下載 [R-4.0.2-win.exe]



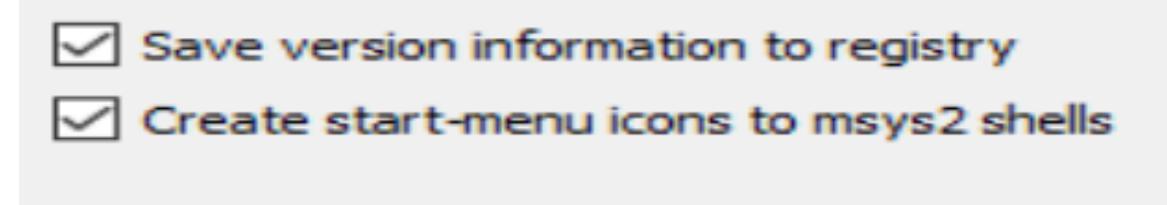
- R安裝路徑: 建議保留原路徑,不要修改
- https://github.com/rwepa/DataDemo/blob/master/windows_intall_R.pdf

下載並安裝 Rtools

- Rtools for Windows: 一定要保留原路徑 C:\rtools40



On Windows 64-bit: [rtools40-x86_64.exe](#) (recommended: includes both i386 and x64 compilers)



R官方網頁



The R Project for Statistical Computing

Getting Started

統計計算

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To download R, please choose your preferred CRAN mirror.

If you have questions about R like how to download and install the software, or what the license terms are, please read our answers to frequently asked questions before you send an email.

R Manuals

The R Manuals

edited by the R Development Core Team.

The following manuals for R were created on Debian Linux and may differ from the manuals for Mac or Windows on platform-specific pages, but most parts version of the manuals for each platform are part of the respective R installations. The manuals change with R, hence we provide versions for the most recent version for the patched release version (R-patched) and finally a version for the forthcoming R version that is still in development (R-devel).

Here they can be downloaded as PDF files, EPUB files, or directly browsed as HTML:

Manual	R-release	R-patched
An Introduction to R is based on the former "Notes on R", gives an introduction to the language and how to use R for doing statistical analysis and graphics.	HTML PDF EPUB	HTML PDF EPUB
R Data Import/Export describes the import and export facilities available either in R itself or via packages which are available from CRAN.	HTML PDF EPUB	HTML PDF EPUB
R Installation and Administration	HTML PDF EPUB	HTML PDF EPUB
Writing R Extensions covers how to create your own packages, write R help files, and the foreign language (C, C++, Fortran, ...) interfaces.	HTML PDF EPUB	HTML PDF EPUB
A draft of The R language definition documents the language <i>per se</i> . That is, the objects that it works on, and the details of the expression evaluation process, which are useful to know when programming R functions.		
R Internals : a guide to the internal structures of R and coding standards the core team working on R itself.		
The R Reference Index : contains all help files of the R standard and recommended packages in printable form. (9MB, approx. 3500 pages)		

contributed documentation
(貢獻文件, 免費啦)

Translations of manuals into other languages than English are available from the [contributed documentation](#) section (only a few translations are available).

R Manuals (續)

Contributed Documentation

[English](#) --- [Other Languages](#)

Manuals, tutorials, etc. provided by users of R. The R core team does not take any responsibility for contents, but we appreciate the effort very much and encourage everybody to contribute to this list! To submit, follow the submission instructions on the [CRAN main page](#). All material below is available directly from CRAN, you may also want to look at the list of [other R documentation](#) available on the Internet.

Note: Please use the [directory listing](#) to sort by name, size or date (e.g., to see which documents have been updated lately).

English Documents

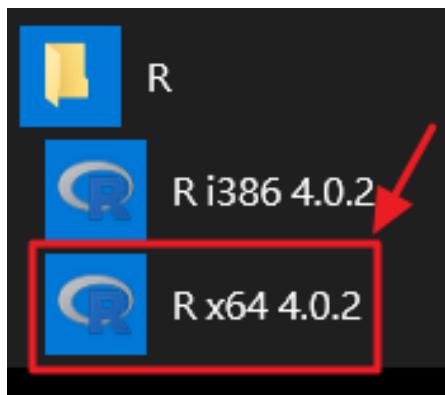
Documents with more than 100 pages:

好書!

- “**Visual Statistics. Use R!**” by Alexey Shipunov ([PDF](#), 2016-06-06, 301 pages) are accessible from [Alexey Shipunov's English R page](#) .
- “**Using R for Data Analysis and Graphics - Introduction, Examples and Commentary**” by John Maindonald ([PDF](#), data sets and scripts are available at [JM's homepage](#)).
- “**Practical Regression and Anova using R**” by Julian Faraway ([PDF](#), data sets and scripts are available at the [book homepage](#)).



(實作練習)



R 執行畫面 - Windows

```
R Gui (64-bit)
檔案 命令歷程 重設大小 視窗
R Console
R version 3.0.3 (2014-03-06) ...
Copyright (C) 2014 The R Foundation
Platform: x86_64-w64-mingw32::R

R 是免費軟體，不提供任何擔保。
在某些條件下您可以將其自由散布
用 'license()' 或 'licence()'

R 是個合作計劃，有許多人為之做
用 'contributors()' 來看詳細的
用 'citation()' 會告訴您如何在
用 'demo()' 來看一些示範程式，
用 'help.start()' 透過 HTML 滾
用 'q()' 離開 R。

> plot(runif(100), type="l")
```

plot(runif(100), type="l")

demo(graphics)

demo(persp)

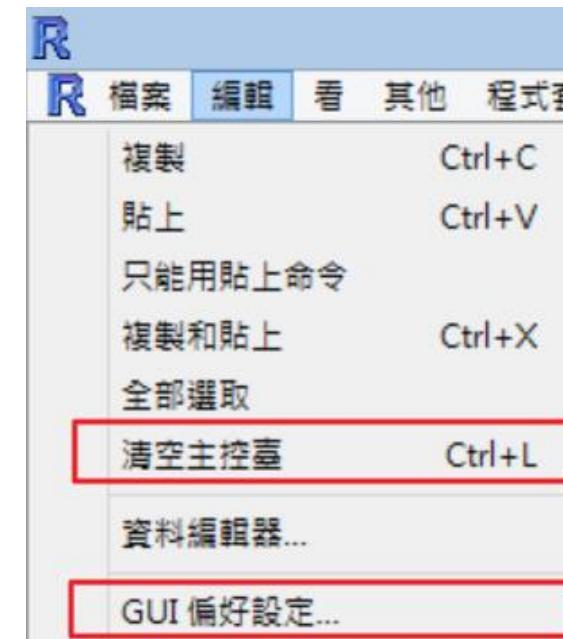
大小寫
須一致

R 功能表

檔案



編輯



輔助





R for Mac

- <https://youtu.be/72MYRBNo5Bk>

Mac OS X 安裝 R 軟體

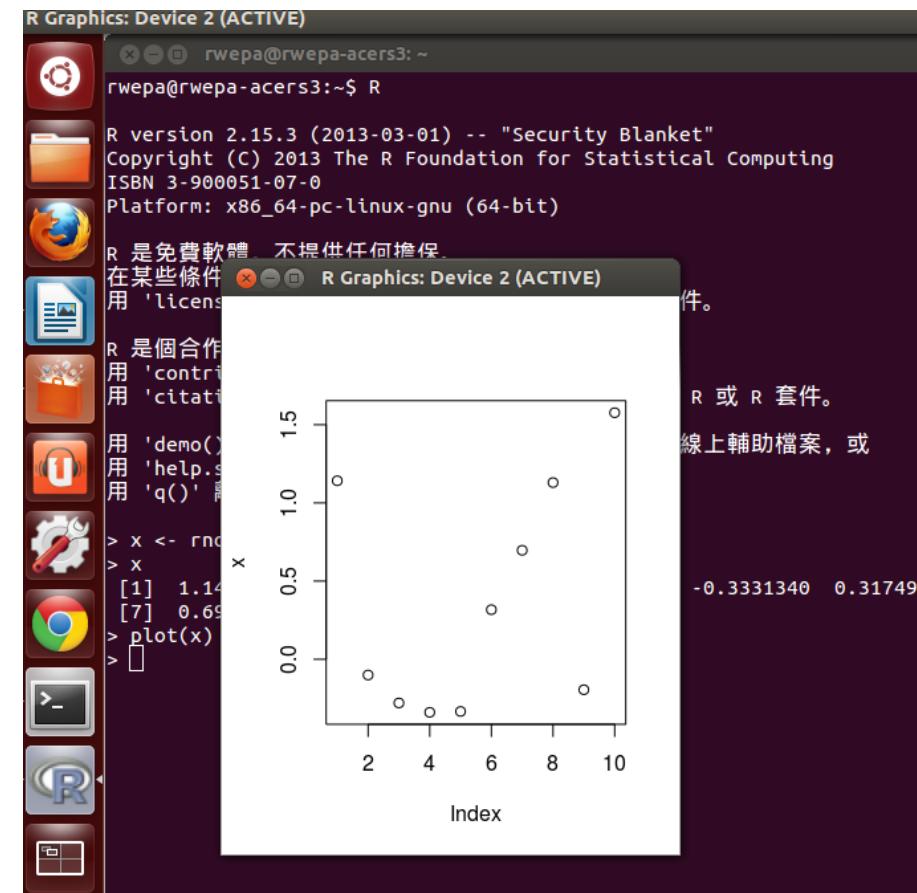
育達科技大學
資訊管理系
李明昌
alan9956@gmail.com

R
WEPA
Since 2013

更多訊息 <http://rwepa.blogspot.tw/>

R for Ubuntu

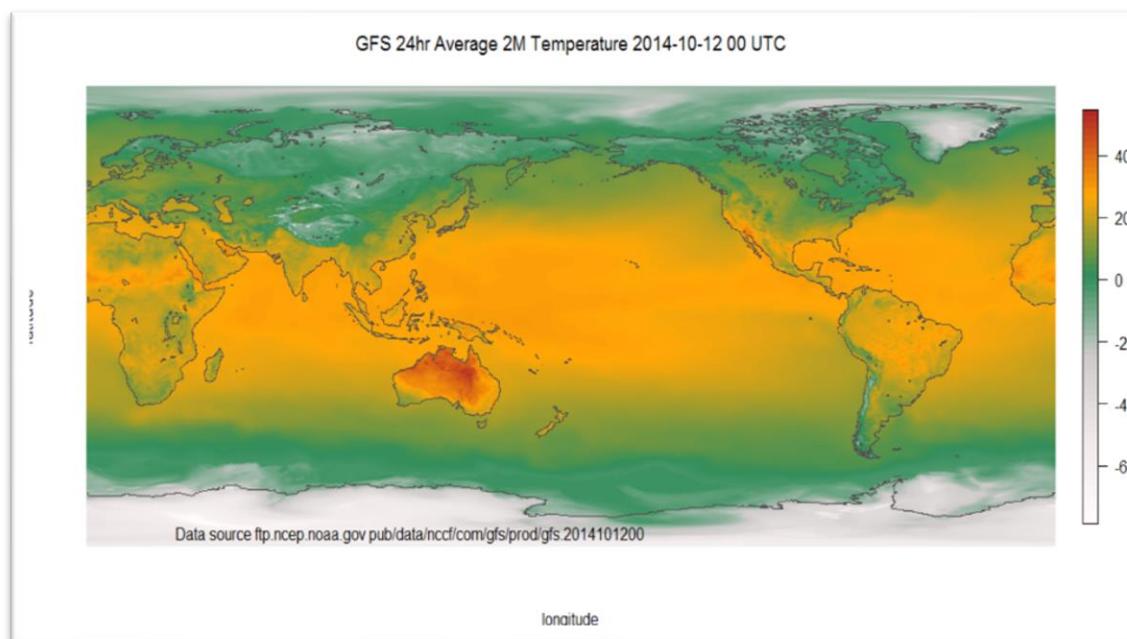
- <http://rwepa.blogspot.com/2013/05/ubuntu-r.html>



5.RStudio 簡介、下載與安裝

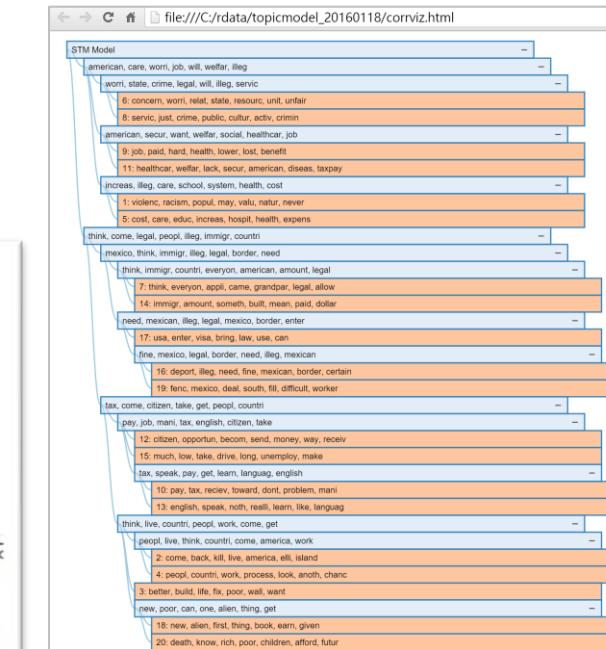
整合式開發環境 - RStudio

- <http://www.rstudio.com/>



視覺化應用

(全球2M氣溫圖)

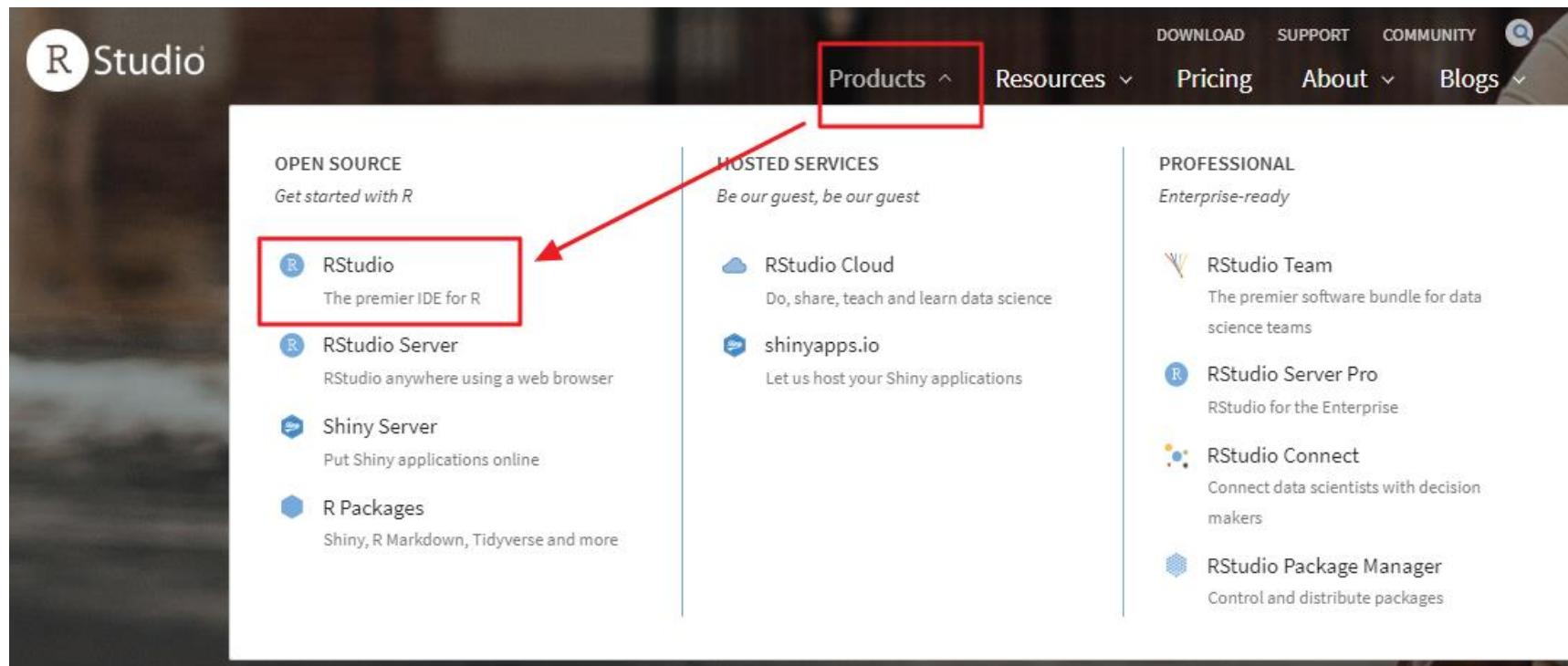


RStudio – 特性

- 支援智慧輸入 (按Tab)
- 高亮度顯示程式碼
- 整合R程式, 控制台, 變數清單, 繪圖視窗
- 整合資料庫匯入 SQL, Spark
- 整合R套件: shiny, rmarkdown
- 安裝注意:
 - 先安裝R, 再安裝 RStudio
 - 安裝 RStudio時, 請先關閉R

RStudio 下載

- <http://www.rstudio.com/>



RStudio 下載 (續)

RStudio Desktop

Open Source License

Free

RStudio Desktop

Commercial License

\$995

RStudio Server

Open Source License

Free

RStudio Server Pro

Commercial License

\$4,975**單機版****DOWNLOAD****BUY****免費版**

Integrated Tools for R

Priority Support

Access via Web Browser

Enterprise Security

Project Sharing

伺服器版本**DOWNLOAD****BUY**

Learn more

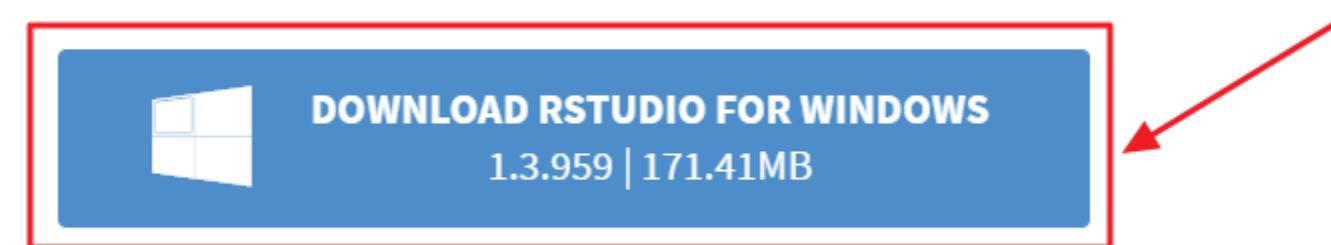
Evaluation | Learn more



RStudio 下載 (續)

RStudio Desktop 1.3.959 - [Release Notes](#)

1. Install R. RStudio requires [R 3.0.1+](#).
2. Download RStudio Desktop. Recommended for your system:



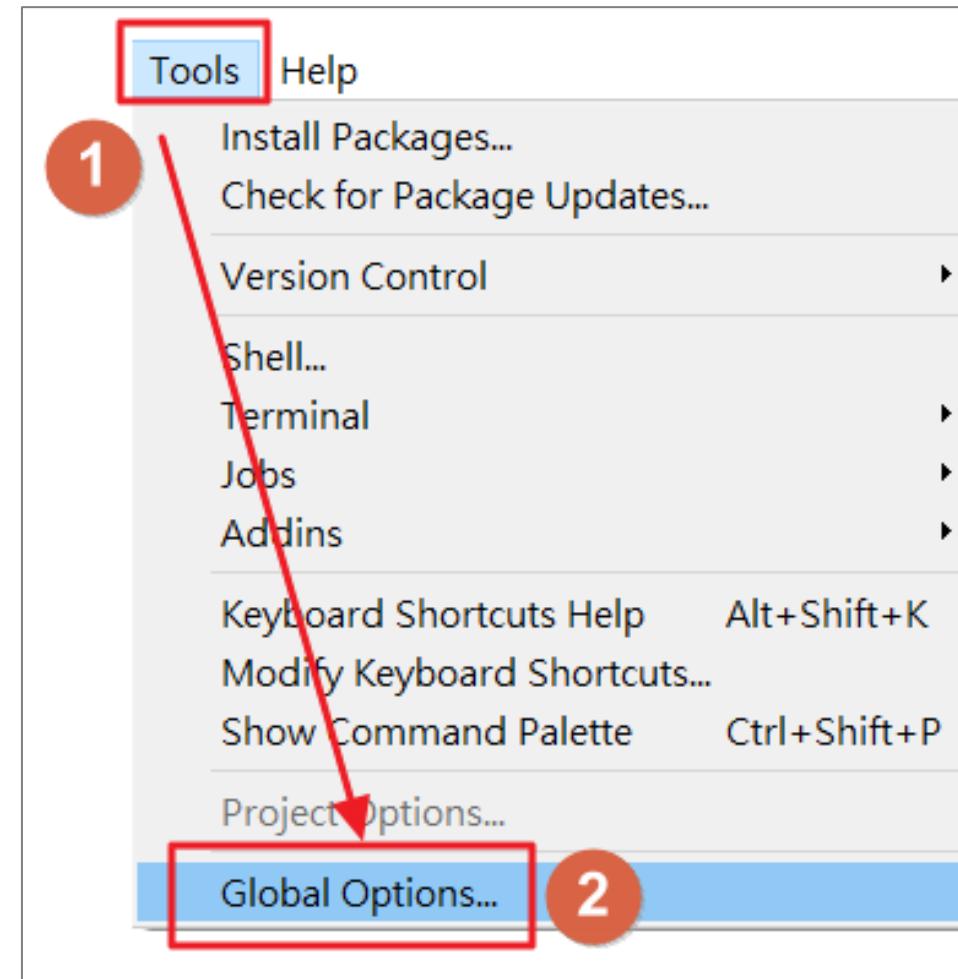
Requires Windows 10/8/7 (64-bit)

RStudio 安裝

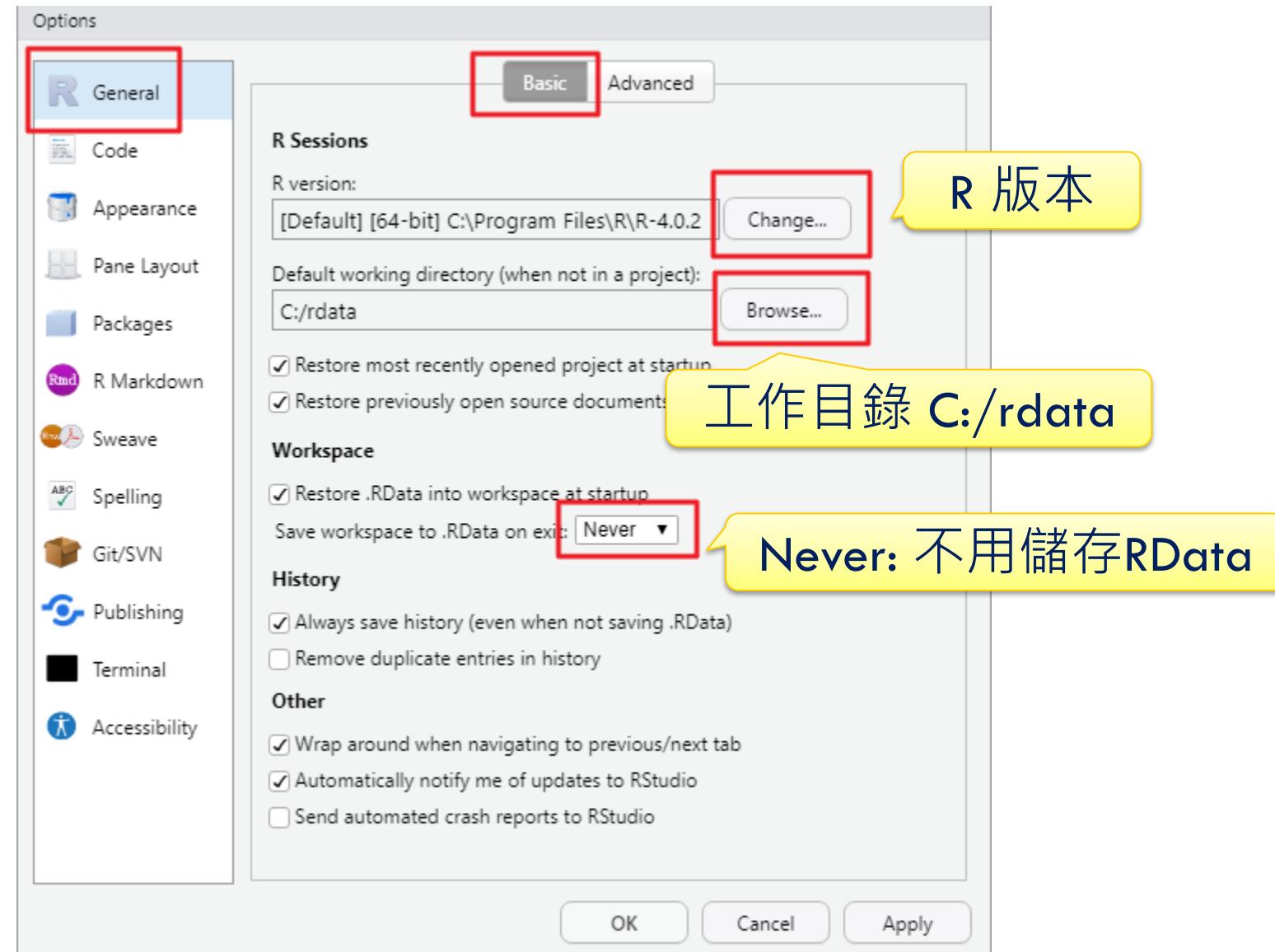


RStudio-選項設定

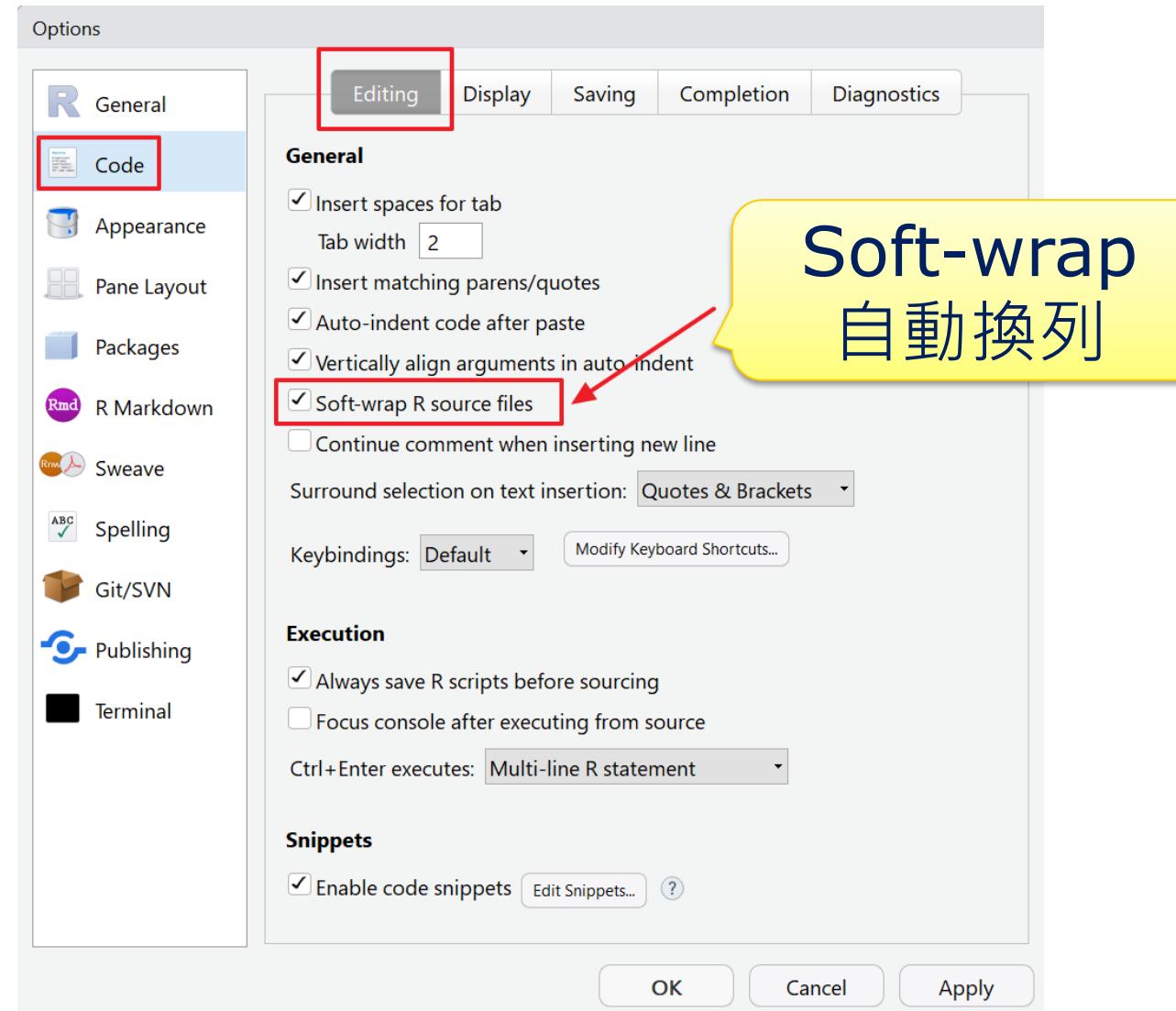
■ Tools \ Global Options



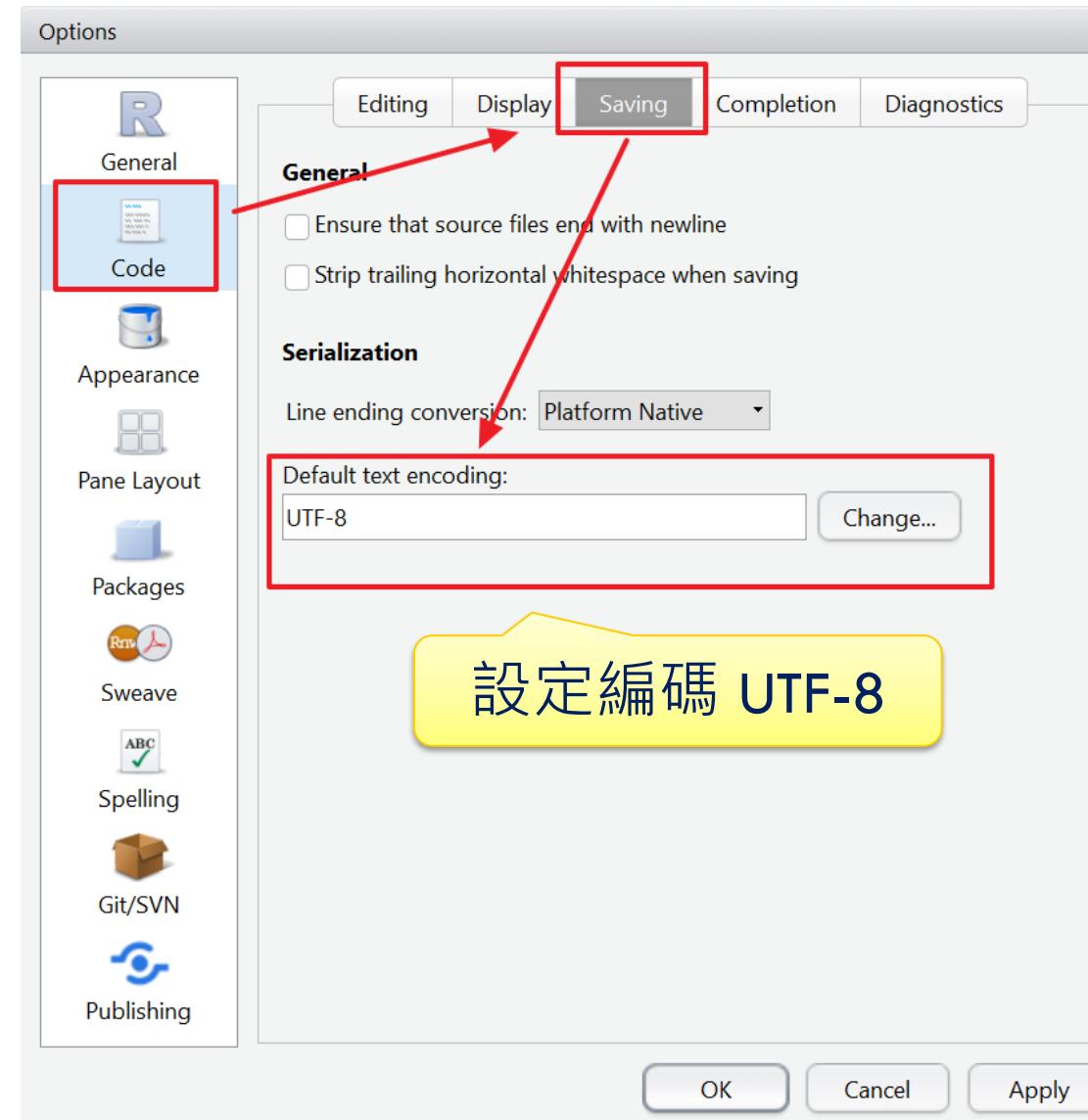
RStudio-選項設定(續)



RStudio-選項設定(續)



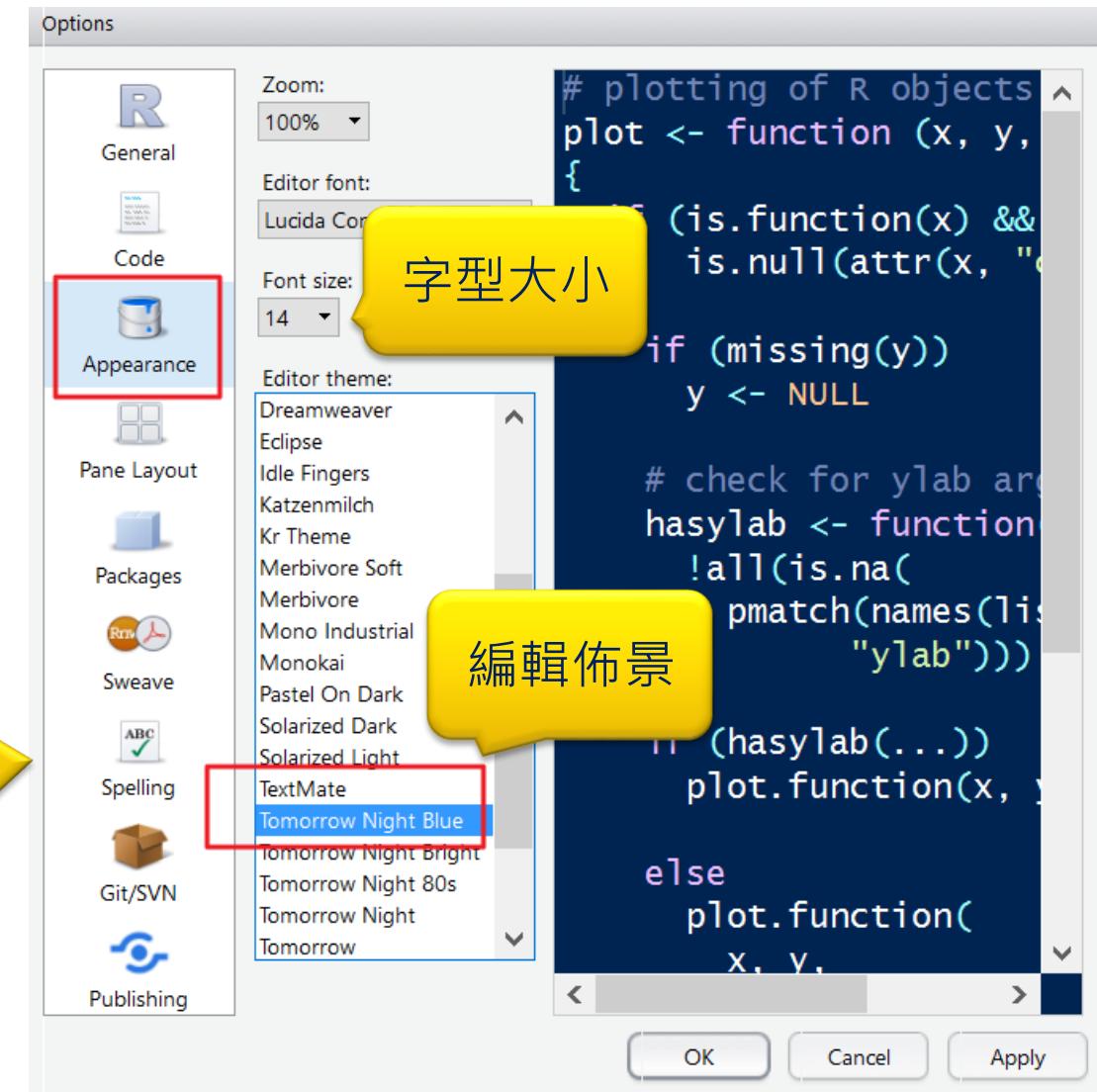
RStudio-選項設定(續)



RStudio-選項設定(續)

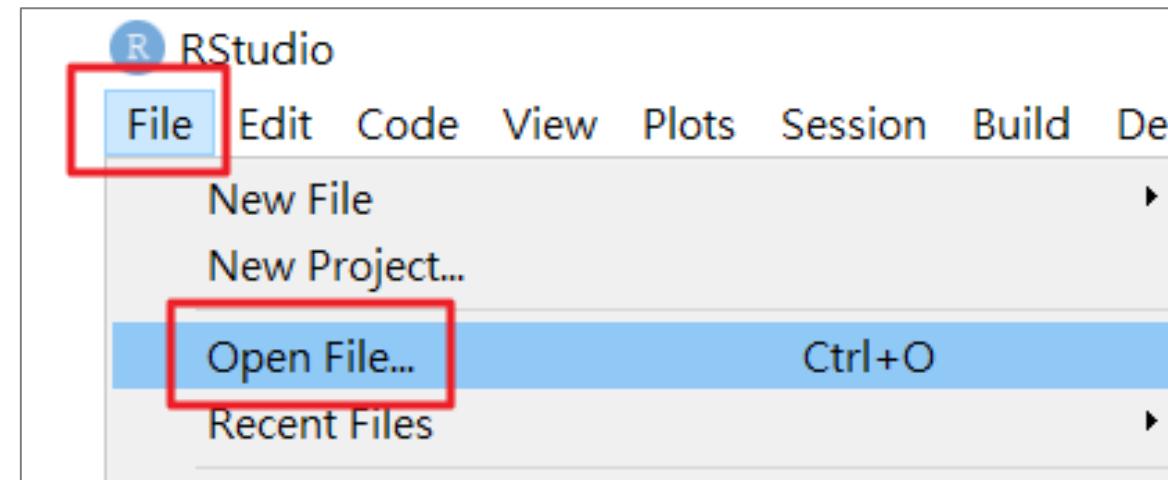
- Appearance \ Editor theme
- 預設值:
TextMate

設定完成,須重
新啟動RStudio

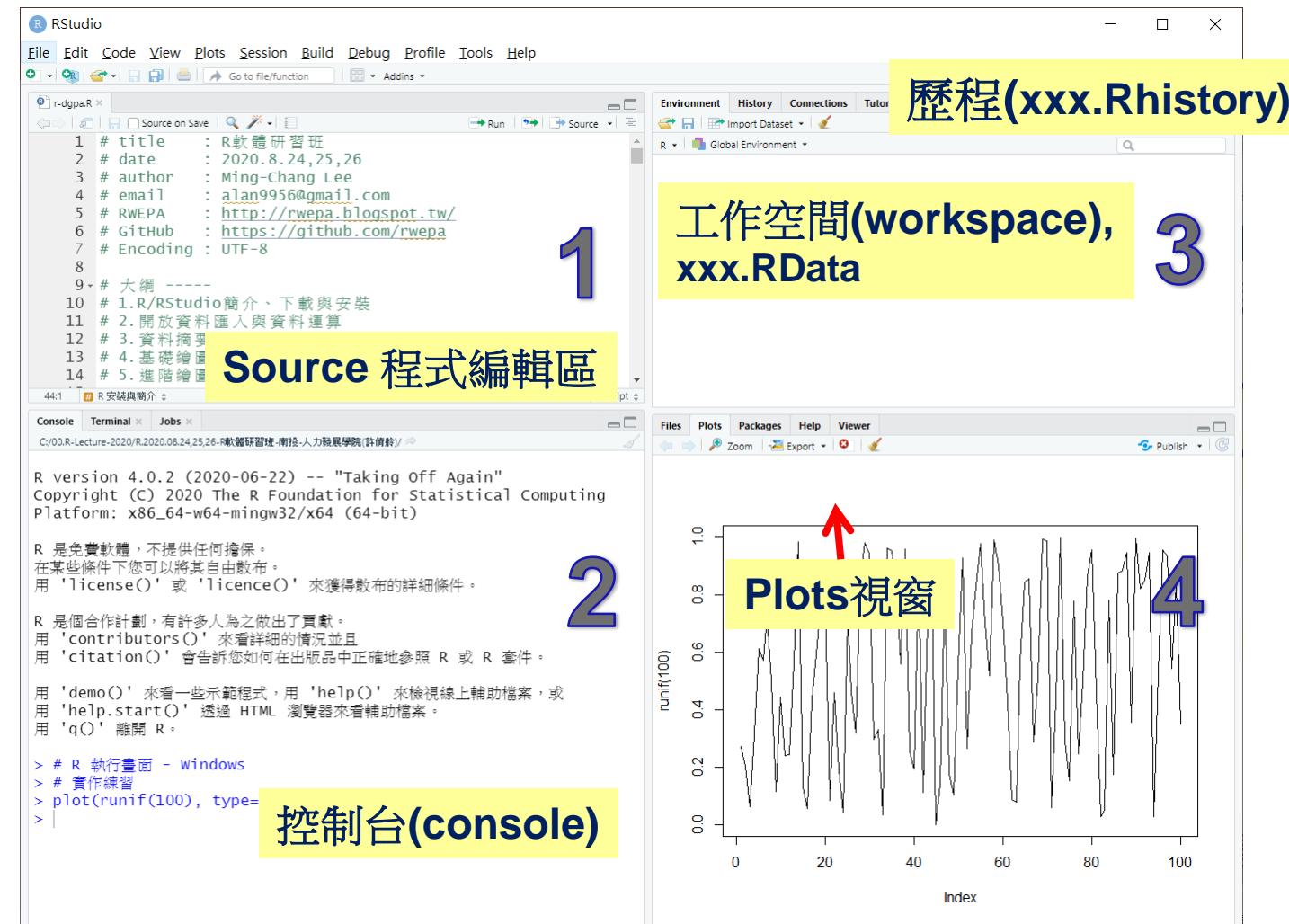


開啟檔案

- File \ Open File \
- File New File \



R/RStudio環境的基礎觀念



CTRL + SHIFT + F10: 重新啟動R

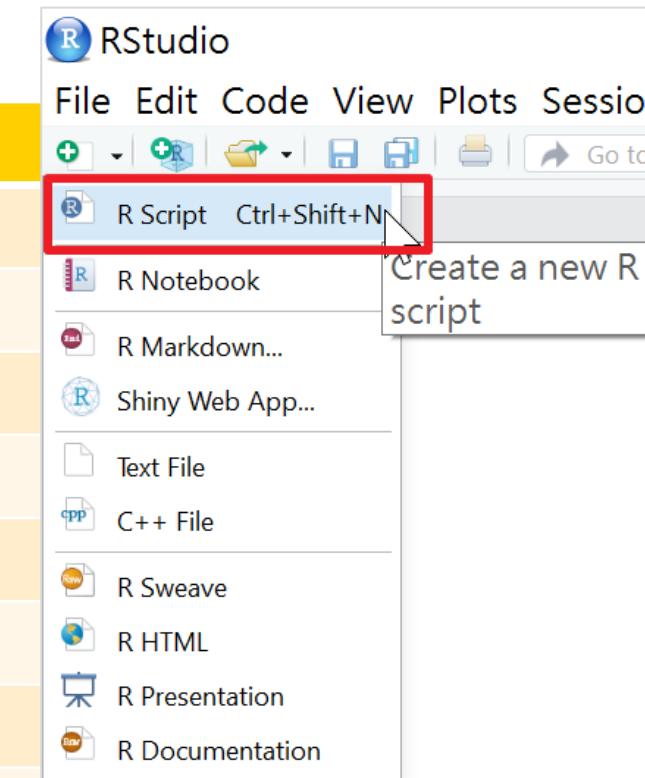
R + Editor

- R – 原生環境
- RStudio – IDE 整合介面
- Eclipse
 - StatET 4.0.0:
An Eclipse based IDE (integrated development environment) plug-in for R.
 - <http://www.walware.de/goto/statet>
- 如何安裝 Visual Studio R 工具
 - R Tools for Visual Studio



RStudio 快速鍵

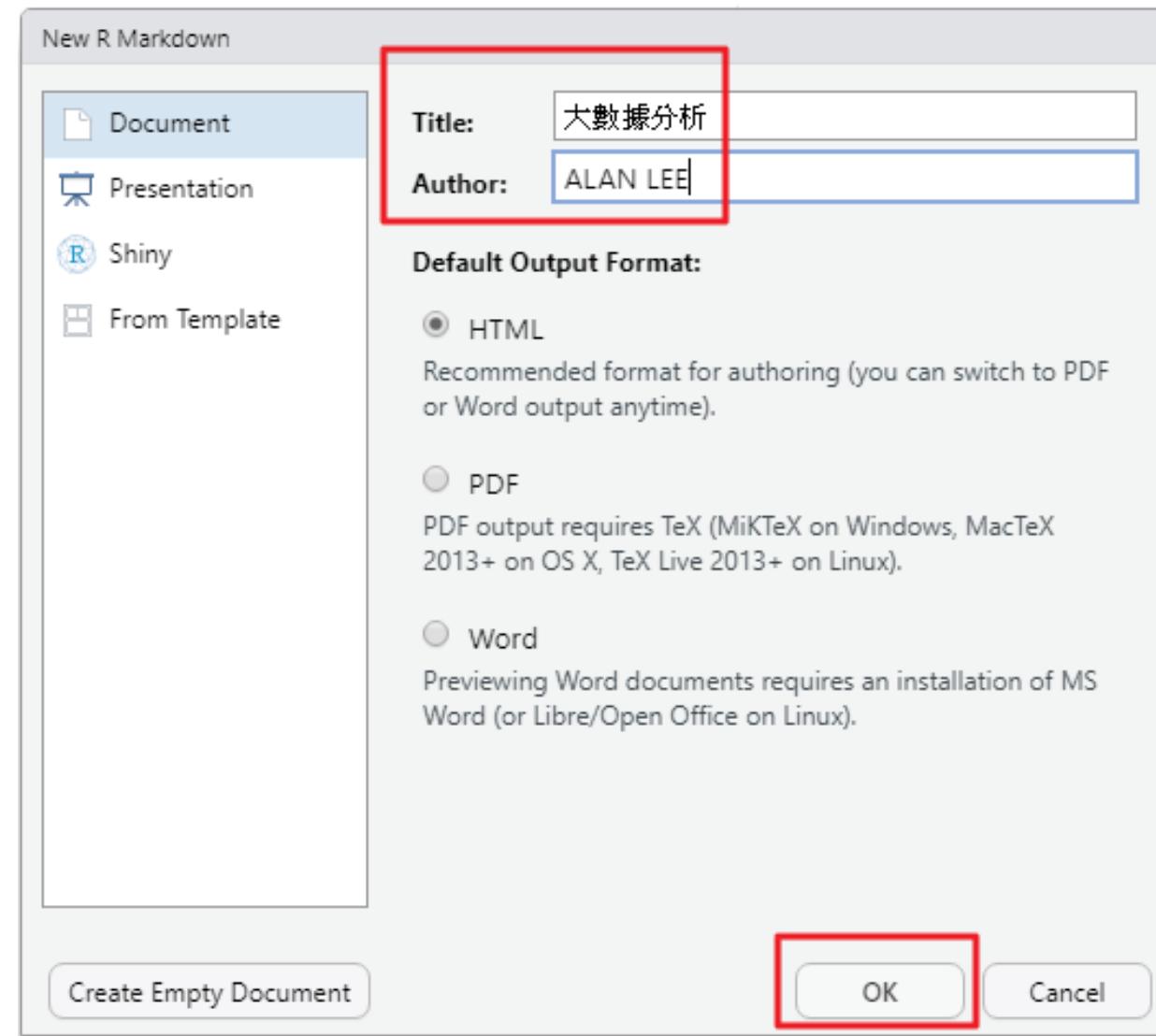
快速鍵功能	功能
Ctrl + Shift + N	建立新的R程式
Ctrl + S	儲存檔案
Ctrl + Shift + R	建立章節 (-----)
Alt + -	指派符號
Ctrl + Shift + C	註解
Ctrl + Enter	執行程式
Ctrl + Shift + F10	重新啟動R
Alt + Shift + K	快速鍵總表 (Esc 退出)



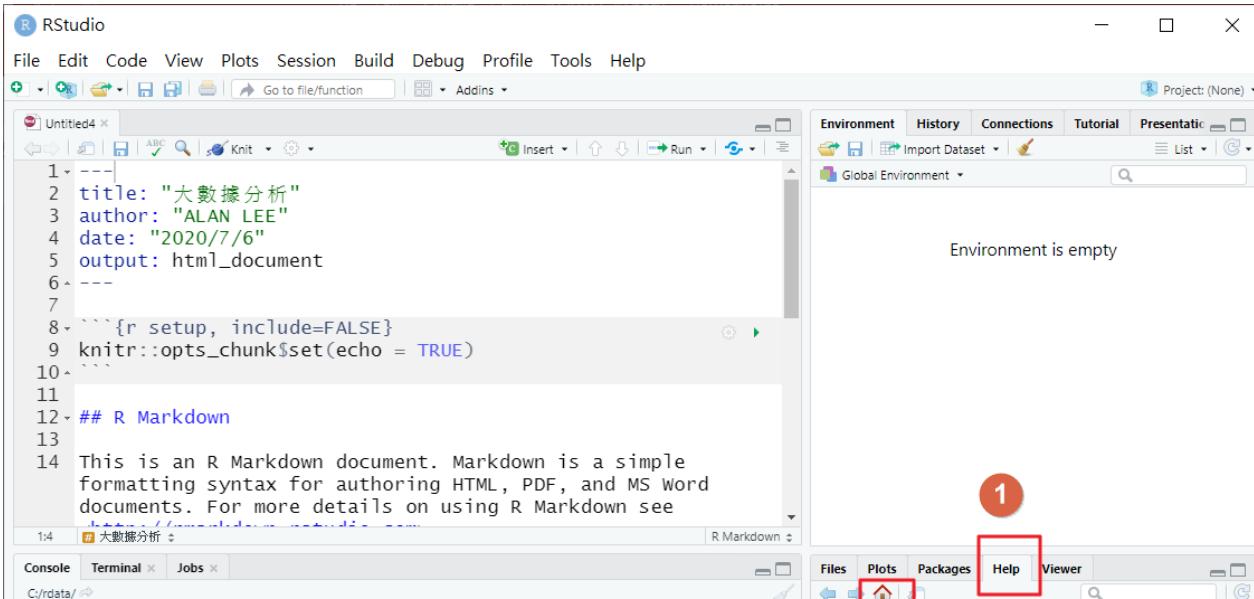
R Markdown

R標記語言

RStudio - Markdown

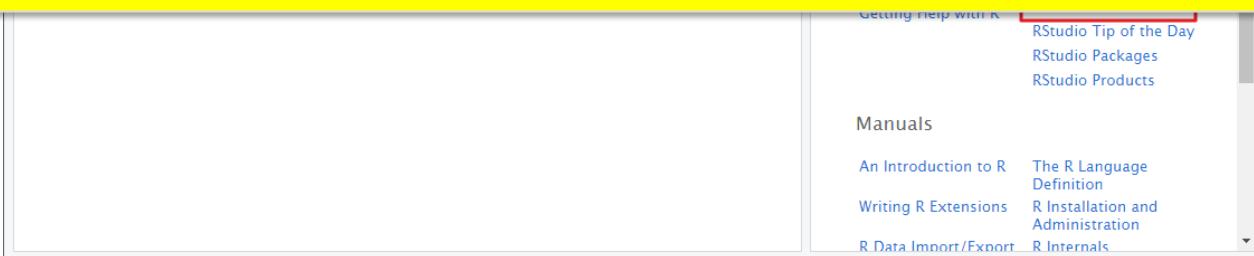


RStudio - Markdown (續)



The screenshot shows the RStudio interface with a Markdown file open in the left pane. The code includes YAML front matter and R Markdown syntax. A red box highlights the 'Help' menu item in the top navigation bar, which is also circled with a red marker labeled '1'. The right pane shows the Global Environment, which is currently empty.

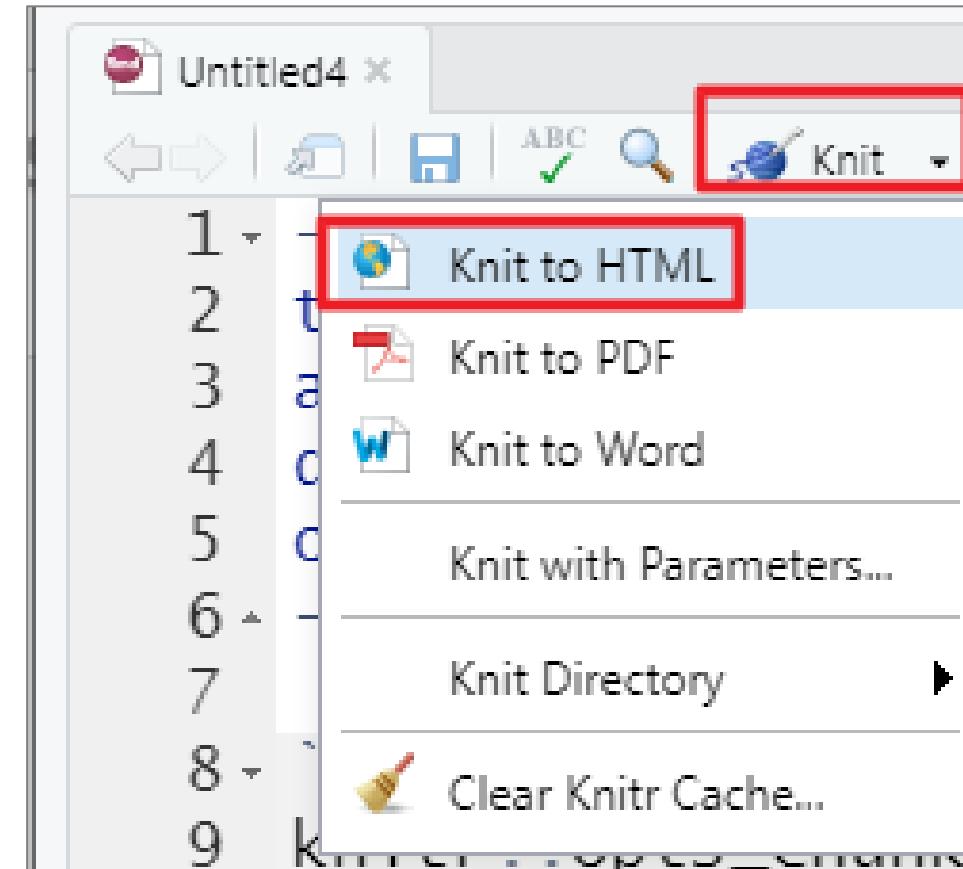
線上說明：
<https://www.rstudio.com/resources/cheatsheets/>



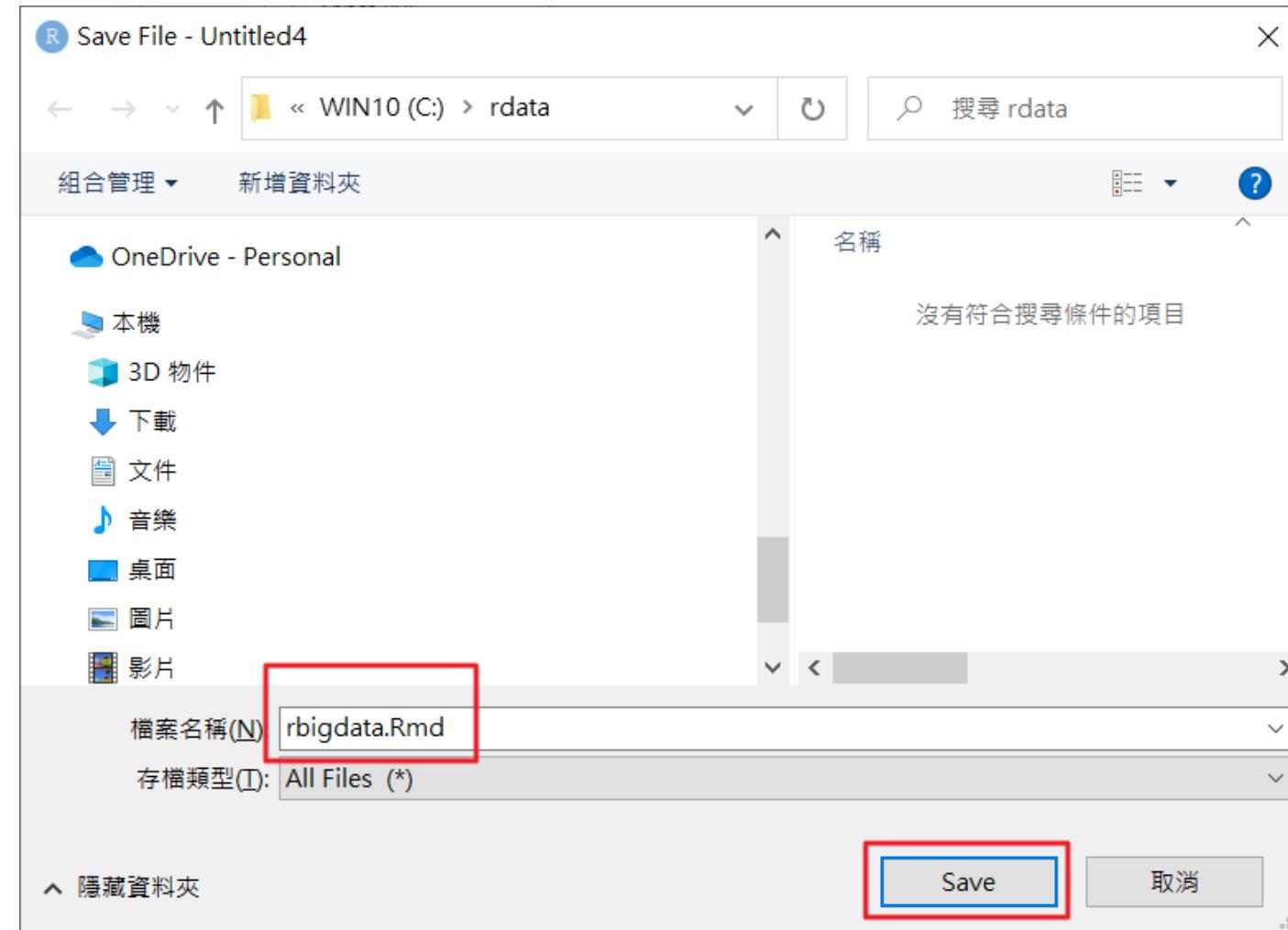
The screenshot shows the 'Getting Help with R' page in the RStudio Help menu. It includes sections for 'RStudio Tip of the Day', 'RStudio Packages', 'RStudio Products', and 'Manuals' with links to 'An Introduction to R', 'The R Language Definition', 'Writing R Extensions', 'R Installation and Administration', 'R Data Import/Export', and 'R Internals'.

RStudio - Markdown (續)

- Knit HTML
- Knit PDF
- Knit Word



RStudio - Markdown (續)



RStudio - Markdown : HTML



大數據分析
ALAN LEE
2020/7/6

R Markdown

This is an R Markdown document. You can use this document to generate various types of documents, including HTML, PDF, and MS Word documents. For more details on using R Markdown, please refer to the [R Markdown documentation](#).

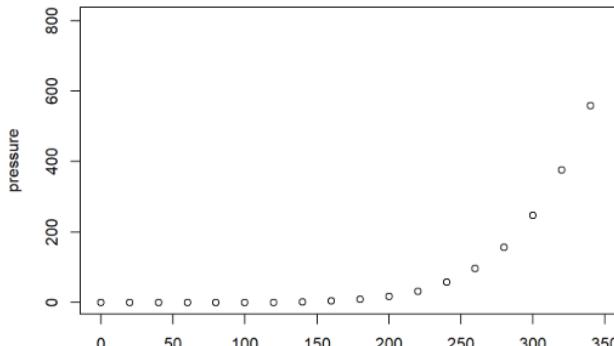
When you click the Knit button, a process known as "knitting" occurs. This involves rendering the document's content as well as the output of any embedded R code chunks.

```
summary(cars)
```

speed dist
Min. : 4.0 Min. : 2.00
1st Qu.:12.0 1st Qu.: 26.00
Median :15.0 Median : 36.00
Mean :15.4 Mean : 42.98
3rd Qu.:19.0 3rd Qu.: 56.00
Max. :25.0 Max. :120.00

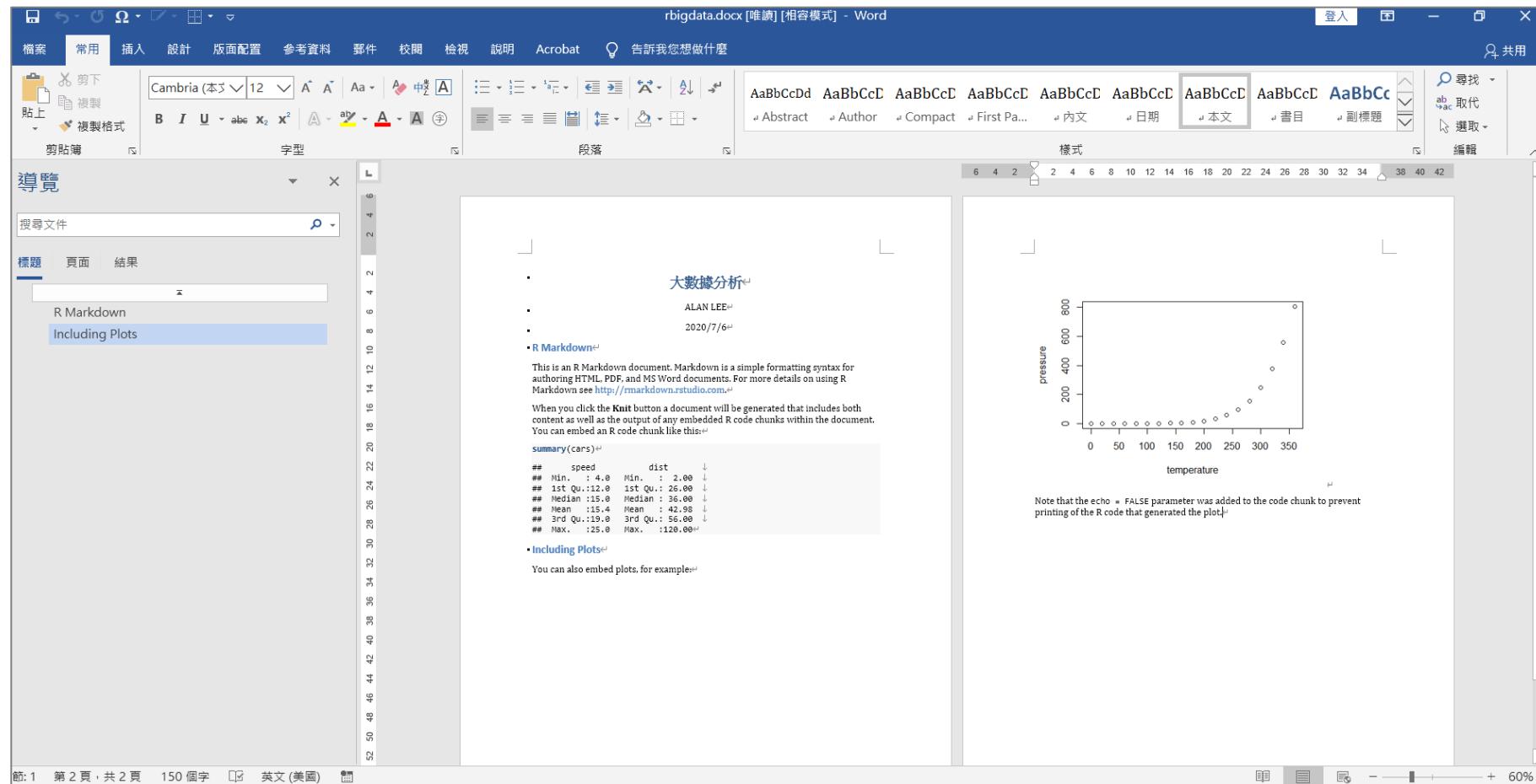
Including Plots

You can also embed plots, for example:



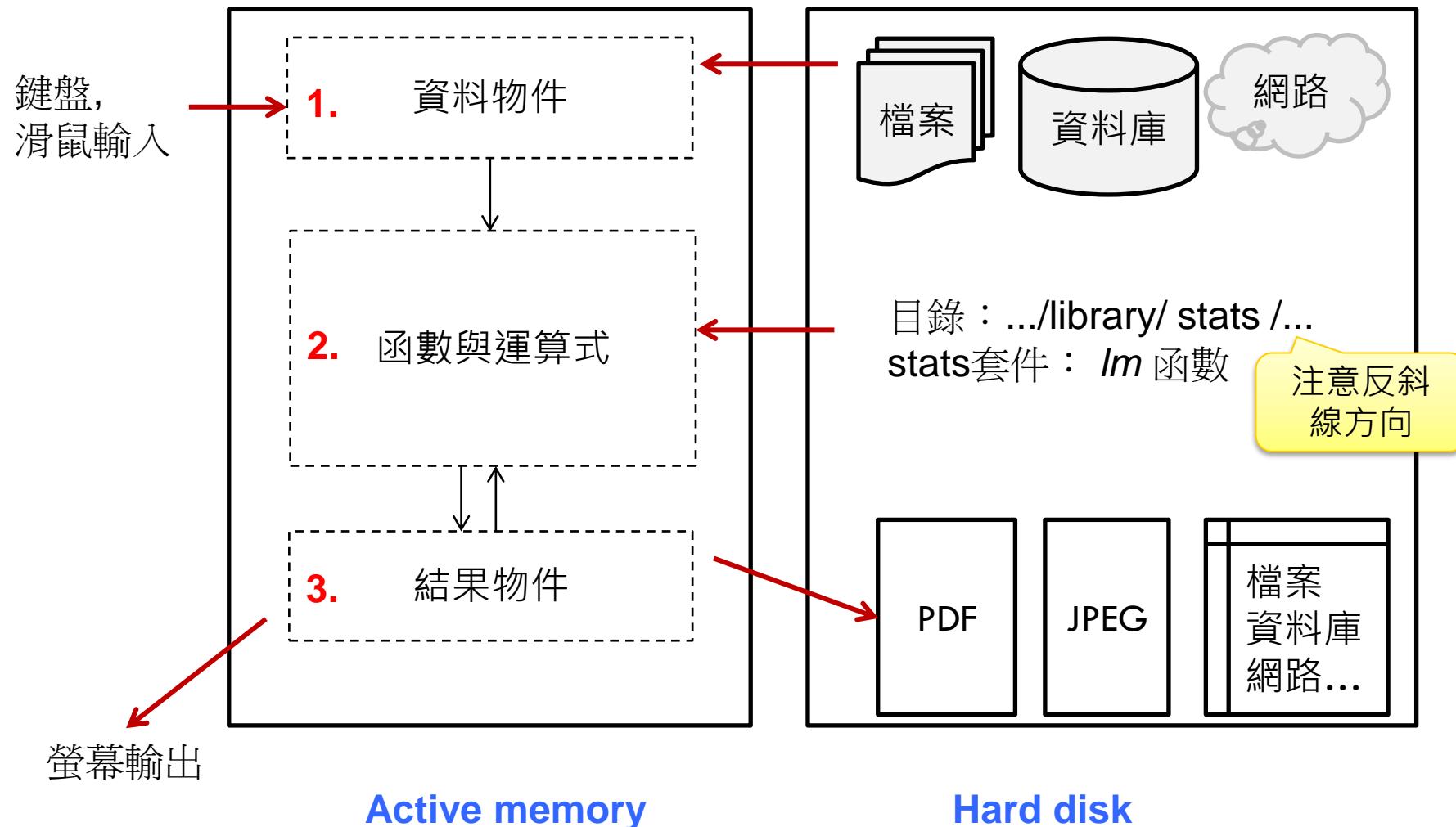
The scatter plot shows the relationship between speed (x-axis, ranging from 0 to 350) and pressure (y-axis, ranging from 0 to 800). The data points show a positive correlation, with pressure increasing as speed increases.

RStudio - Markdown : Word



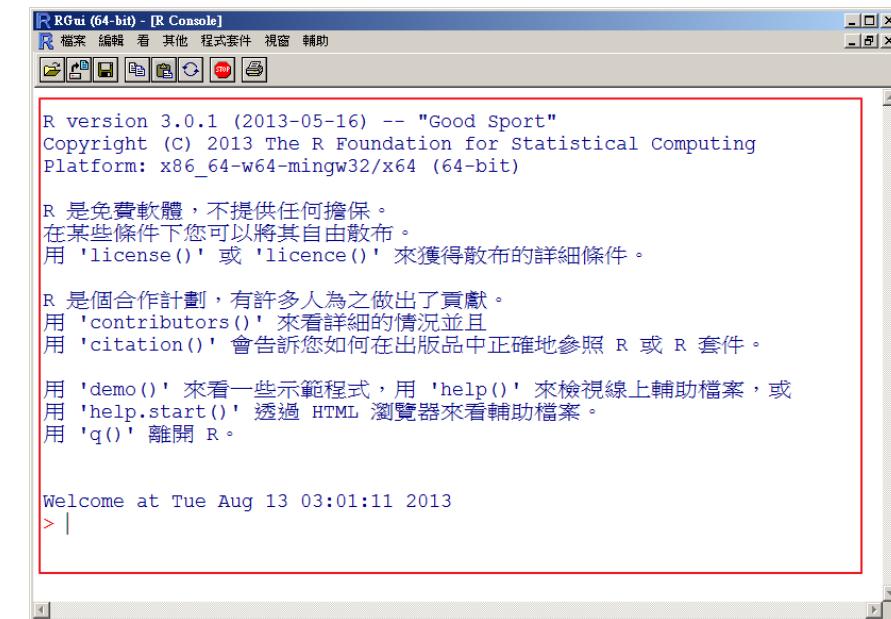
6.R使用環境

R運作方式



基本觀念

- 控制台(console)
- 歷程
 - xxx.Rhistory
- 套件(package)
- 工作空間(workspace)
 - xxx.RData
- 物件(object)



控制台的特定符號

- 命令提示字元 > (等待使用者輸入資料)
- 指令未完提示字元 + (表示尚未輸入完成)
- 註解提示字元 # (不會編譯註解)
- 結果行列顯示編號

物件命名原則

- R的大小寫有差異: *a* 與 *A* 是不同的物件
- R 也保留一些物件與指令人稱, 如 *c*, *C*, *T*, *F* 等為保留字 ("reserved words"), 命名時避免重覆, 以免引起**人類**困擾.
- 物件名稱起始位置須以文字或 ":" (句點)
- 如果物件名稱以 ":" (句點) 為起始, 名稱第二個位置需為文字, 物件名稱其餘位置, 以文字 (A-Z 或 a-z), 數字 (0-9), / . - , 皆可.
- 中間不可有空格

Google's R Style Guide

- <https://google.github.io/styleguide/Rguide.html>
- 函數使用 BigCamelCase

```
# Good
DoNothing <- function() {
  return(invisible(NULL))
}
```

- 不要使用 attach 函數
- 使用 `x <- 1`, 不要使用 `x = 1`
- `=` 用於函數之參數設定

7. 溫度感測案例分析

物聯網溫度資料

<https://github.com/rwepa/DataDemo>

IOT-temp.csv

資料說明: 物聯網溫度資料

資料來源: <https://www.kaggle.com/atulanandjha/temperature-readings-iot-devices>

資料筆數: 97606

欄位個數: 5

欄位說明: id, room_id/id, noted_date, temp, out/in

id : 編號 unique IDs for each reading, 如果有重複值, 須進行資料處理

room_id/id : 房間代碼 room id in which device was installed (inside and/or outside) -> currently 'admin room' only for example purpose.

noted_date : 日期 date and time of reading

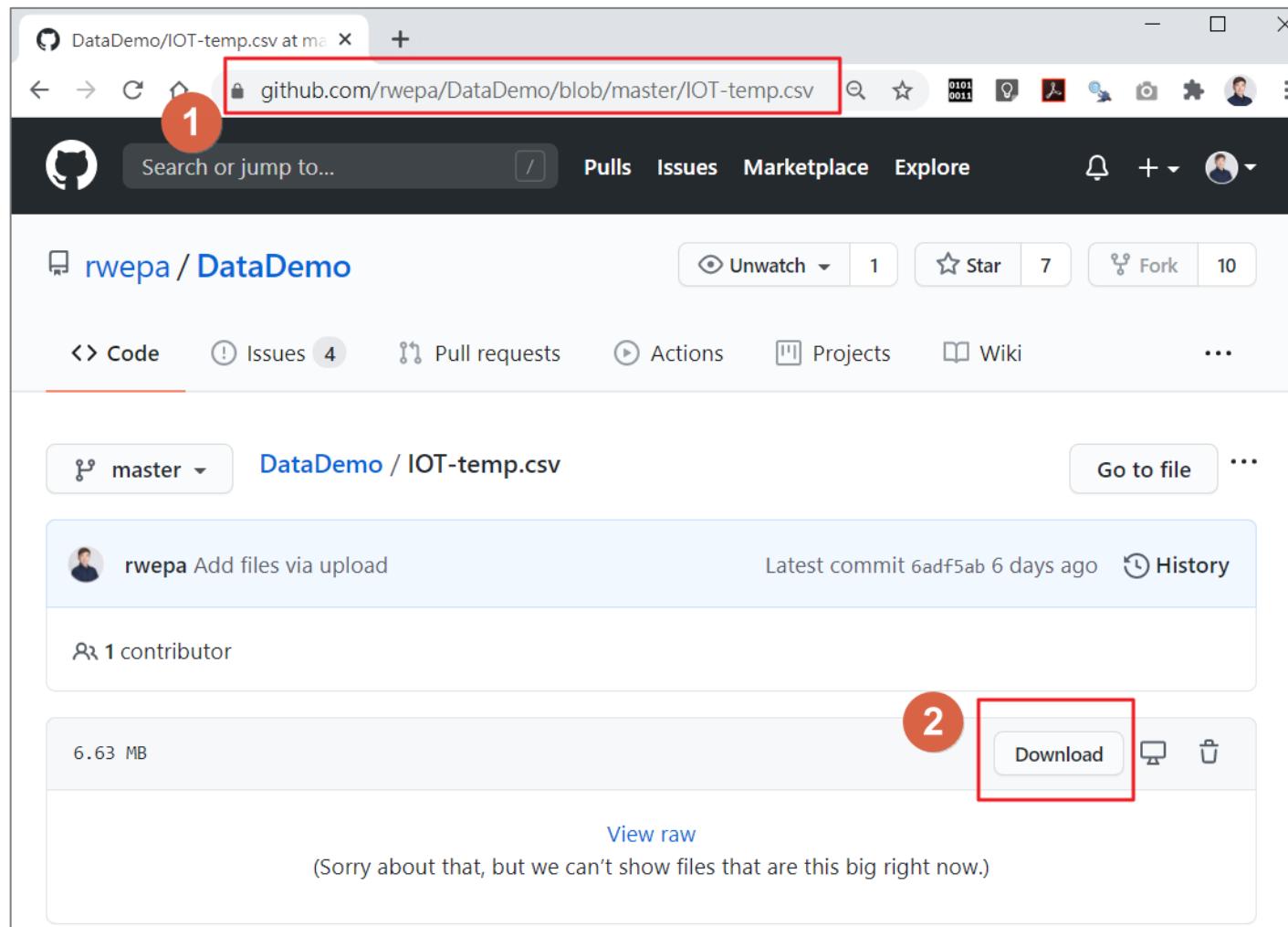
temp : 溫度 temperature readings

out/in : 房間內/外 whether reading was taken from device installed inside or outside of room?

任務

1. 最高和最低溫度是多少？
2. 室外溫度與室內溫度有何關係？
3. 室內和室外室溫的溫度變化如何？
4. 資料趨勢如何？
5. 您可以使用時間序列法來預測未來情況嗎？
6. 哪個月最熱/最冷？
7. 有找到來自氣候災難的警告信號(離群值)？

<https://github.com/rwepa/DataDemo/blob/master/IOT-temp.csv>



右鍵 \ 另存新檔



IOT-temp.csv

	A	B	C	D	E
1	id	room_id/id	noted_date	temp	out/in
2	__export__.temp_log_196134_bd201015	Room Admin	08-12-2018 09:30	29	In
3	__export__.temp_log_196131_7bca51bc	Room Admin	08-12-2018 09:30	29	In
4	__export__.temp_log_196127_522915e3	Room Admin	08-12-2018 09:29	41	Out
5	__export__.temp_log_196128_be0919cf	Room Admin	08-12-2018 09:29	41	Out
6	__export__.temp_log_196126_d30b72fb	Room Admin	08-12-2018 09:29	31	In
7	__export__.temp_log_196125_b0fa0b41	Room Admin	08-12-2018 09:29	31	In



IOT-temp.csv



R demo

謝謝您的聆聽

Q & A



李明昌

alan9956@gmail.com

<http://rwepa.blogspot.tw/>