CSB
COMPUTER SOCIETY OF BOTSWANA

BUILDING
TOMORROW
TODAY

R-Ladies
Gaborone

R for Data Science

247/293,
University of Botswana,
5pm - 6pm,
3rd Thursday March 2022

An introduction to R statistical computing for the growing trend of data science,
- R uses,
- capabilities,
- community,
- resources &
- a demonstration in RStudio

Open to data analyst enthusiasts

GitHub rladies/meetup-presentations-gaborone

@RladiesGaborone

Overview

What is data science
What is R
How data science is used
R for data science
R for research
R vs Python
RStudio
Where R is used
RStudio Demonstration

Acknowledgments

Who we R

Ontiretse Ishmael

R-Ladies co-organizer
Demonstrator since 2017,
Msc in Computer Science
Department of Computer Science,
University of Botswana
Msc Computer Science

@RladiesGaborone / @ontizy

Simisani Ndaba

R-Ladies Gaborone co-organiser,

Teaching Assistant since 2016,
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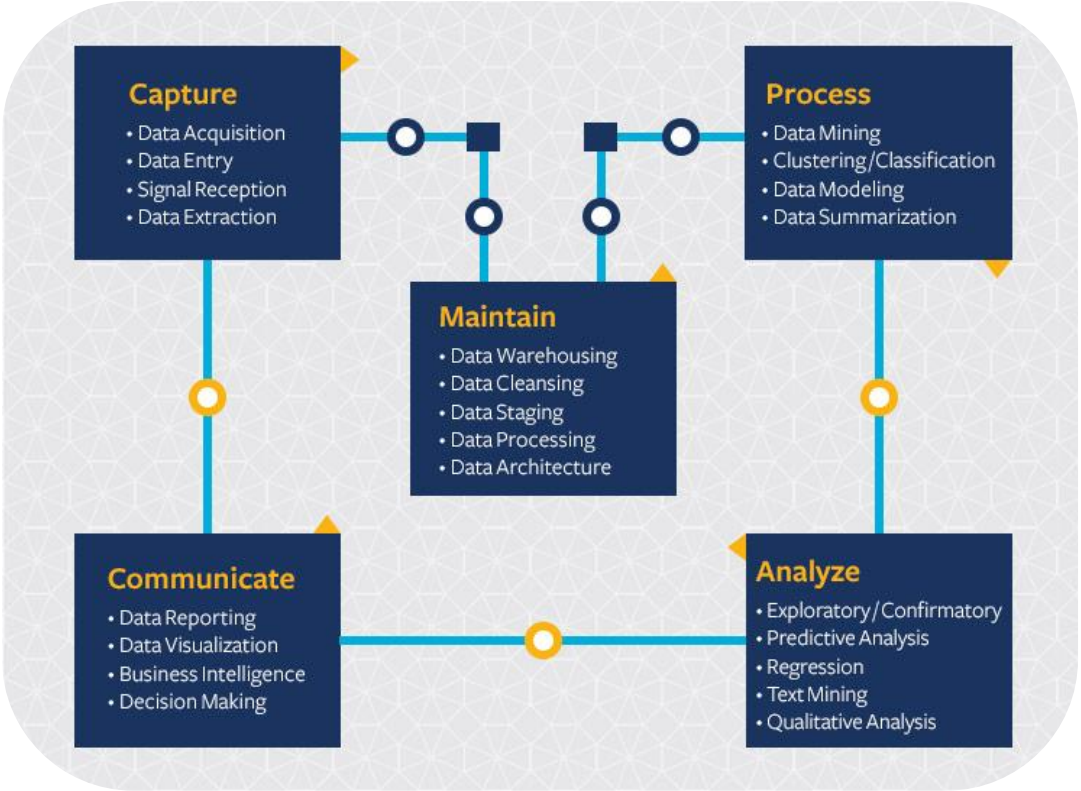
Data Science



How Data Science is used

2019 Liverpool F.C.

Liverpool's research team
General Strategy and Recruitment

Proprietary model= probability+risk analysis

tinder

prioritizes matches between active users, users near each other and users who seem like each other's "types" based on their swiping history.

Plots from data coordinates

What is 

R is a language and environment for statistical computing and graphics.

The primary uses of R is and will always be, statistic, visualization, and machine learning.

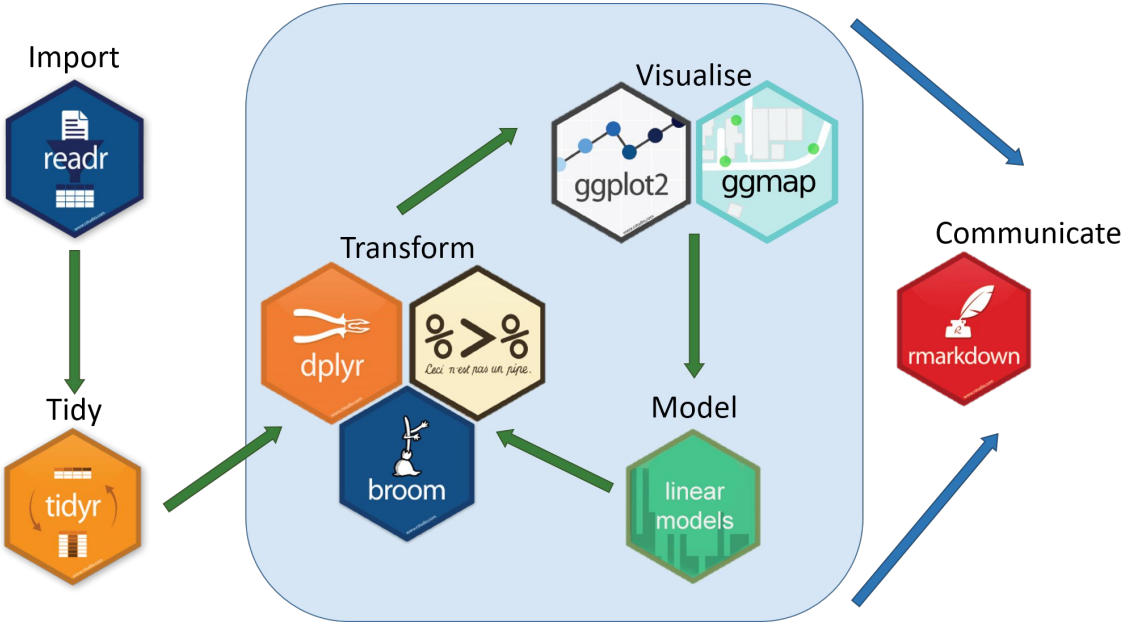
R is developed by academics and scientist.

R possesses an extensive catalog of statistical and graphical methods. It includes;

machine learning algorithms,deep learning linear regression, time series, statistical inference, data mining

https://www.r-project.org/about.html

R for Data Science



R Data science workflow, (Hadley Wickham) R for Data Science

R for Research

The most important task in data science research is the way you deal with the data: import, clean, prep, feature engineering, feature selection.

R part of The Carpentries, teaches foundational coding and data science skills to researchers

F A I R data principles - Findable Accessible Interoperability Reproducible

R vs Python

Python

Open Source
data manipulation and graphing
Machine learning interfaces
more general programming language

web development, and software development

R

Open Source
data manipulation and graphing
Machine learning interfaces

typically used in statistical computing

R

```
library(purrr)
ibrary(dplyr)
ba %>%
 select_if(is.numeric) %>%
 map_dbl(mean, na.rm = TRUE)
```

```
player NA
os NA
ge 26.5093555093555
ref_team_id NA
output truncated]
```

Python

```
nba.mean()
```

```
age 26.509356
 53.253638
s 25.571726
output truncated]
/code>
```

Finding Averages for Each Statistic

R

```
library(randomForest)
redictorColumns <- c("age", "mp", "fg", "trb", "stl", "blk")
f <- randomForest(train[predictorColumns], train$ast, ntree=100)
redictions <- predict(rf, test[predictorColumns])
```

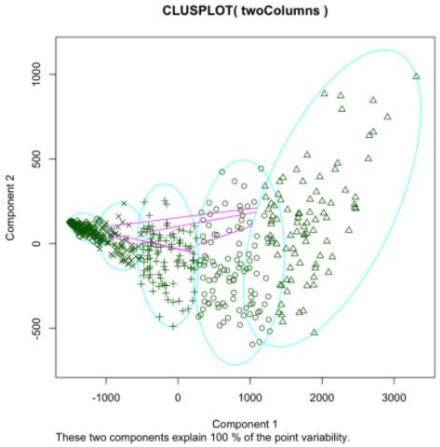
Python

```
from sklearn.ensemble import RandomForestRegressor
redictor_columns = ["age", "mp", "fg", "trb", "stl", "blk"]
f = RandomForestRegressor(n_estimators=100, min_samples_leaf=3)
f.fit(train[predictor_columns], train["ast"])
redictions = rf.predict(test[predictor_columns])
```

Fit a random forest model

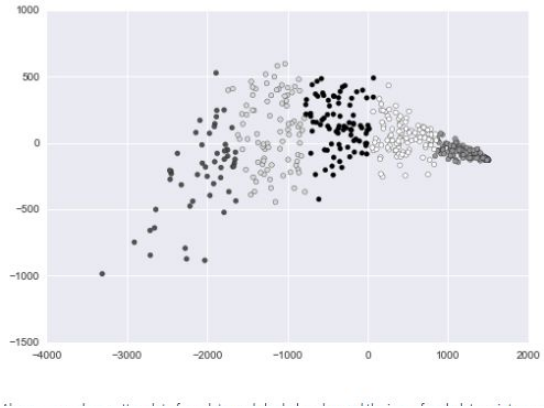
R

```
nba2d <- prcomp(nba[,goodCols], center=TRUE
woColumns <- nba2d$x[,1:2]
lusplot(twoColumns, labels)
```



Python

```
from sklearn.decomposition import PCA
ca_2 = PCA(2)
lot_columns = pca_2.fit_transform(good_columns)
lt.scatter(x=plot_columns[:,0], y=plot_columns[:,1], c=labels)
lt.show()
```



Plotting Players by Cluster

Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins | Project: (None)

Terminal | Jobs

```
ion 4.1.2 (2021-11-01) -- "Bird Hippie"
ght (C) 2021 The R Foundation for Statistical Computing
rm: x86_64-w64-mingw32/x64 (64-bit)

ree software and comes with ABSOLUTELY NO WARRANTY.
e welcome to redistribute it under certain conditions.
license()' or 'licence()' for distribution details.

collaborative project with many contributors.
contributors()' for more information and
ion()' on how to cite R or R packages in publications.

demo()' for some demos, 'help()' for on-line help, or
start()' for an HTML browser interface to help.
q()' to quit R.

pace loaded from ~/.RData]

("AirPassengers")
(airquality$Ozone)
```

Environment | History | Connections | Tutorial

Import Dataset | 79 MiB | List

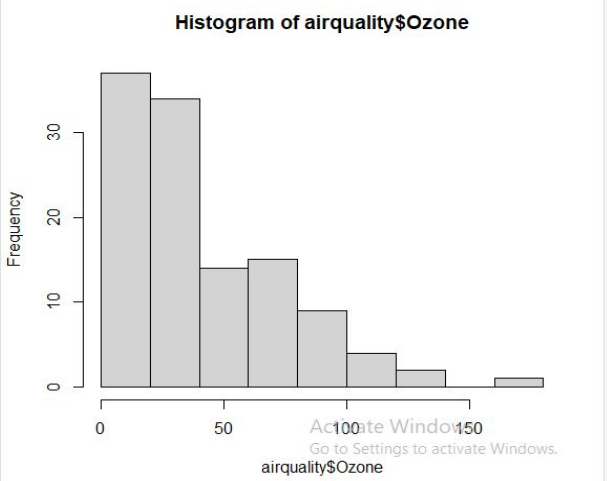
R | Global Environment

Values

AirPassengers	<Promise>

Files | Plots | Packages | Help | Viewer

Zoom | Export | Publish



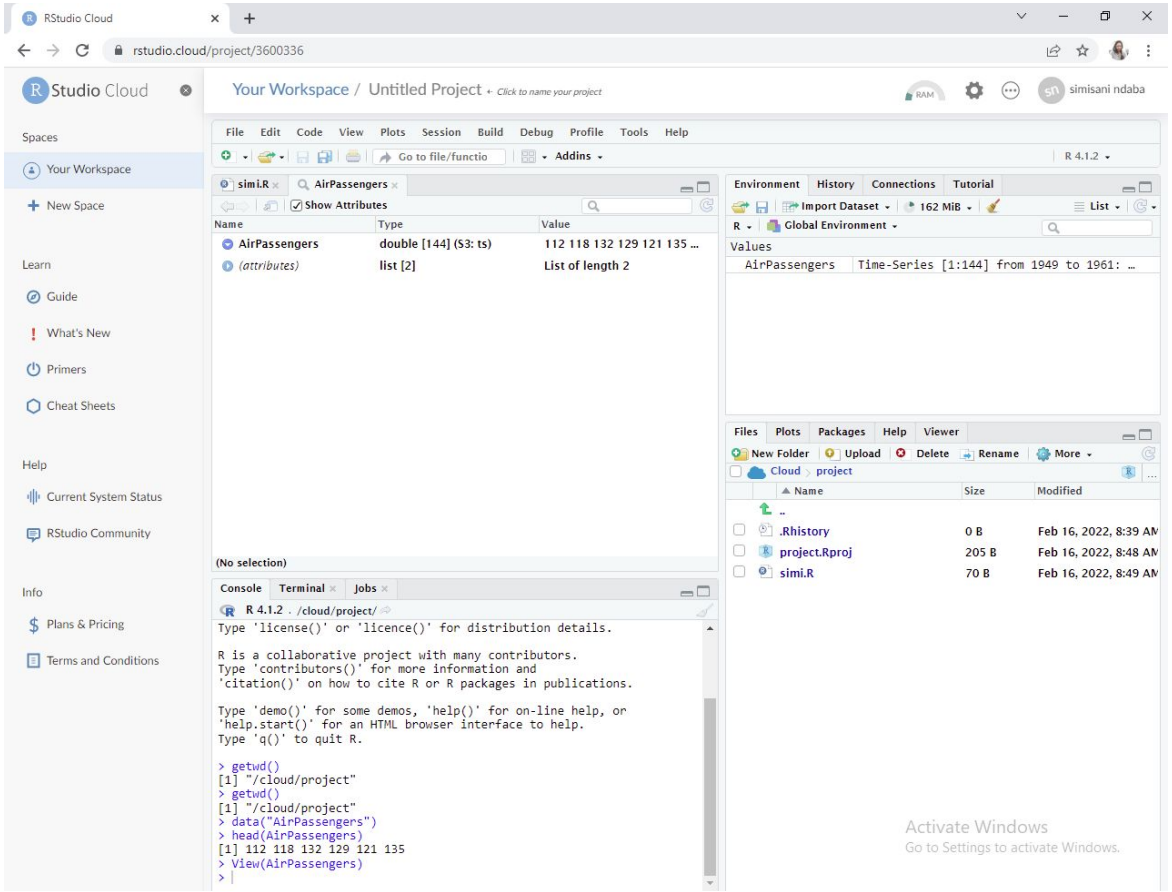
ality

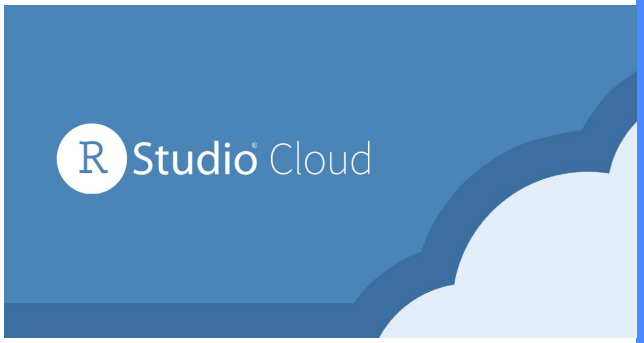
Filter

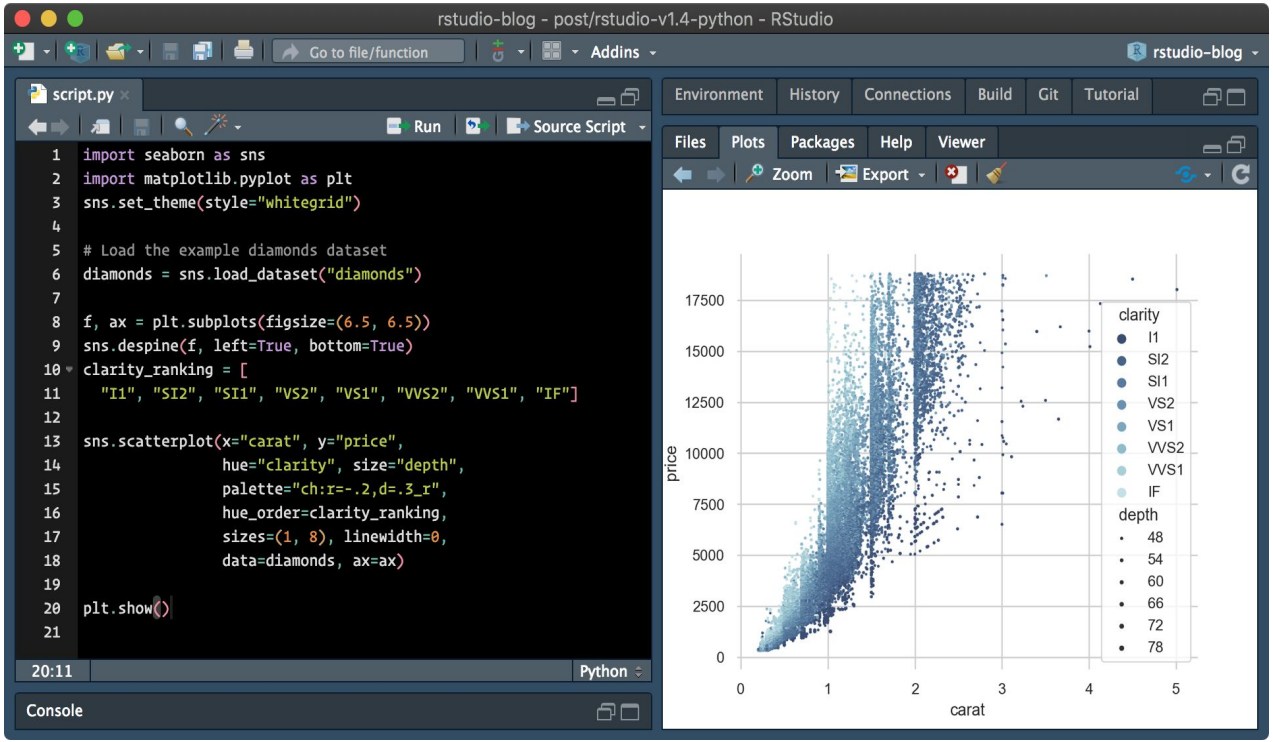
Ozone	Solar.R	Wind	Temp	Month	Day
41	190	7.4	67	5	1
36	118	8.0	72	5	2
12	149	12.6	74	5	3
18	313	11.5	62	5	4
NA	NA	14.3	56	5	5
28	NA	14.9	66	5	6
23	299	8.6	65	5	7
19	99	13.8	59	5	8
8	19	20.1	61	5	9
NA	194	8.6	69	5	10
7	NA	6.9	74	5	11
16	256	9.7	69	5	12
11	290	9.2	66	5	13
14	274	10.9	68	5	14

1 to 14 of 153 entries, 6 total columns

RStudio®


RStudio Cloud
rstudio.cloud/project/3600336
Studio Cloud
Your Workspace / Untitled Project
simisani ndaba
Spaces
Your Workspace
New Space
Learn
Guide
What's New
Primers
Cheat Sheets
Help
Current System Status
RStudio Community
Info
Plans & Pricing
Terms and Conditions
File Edit Code View Plots Session Build Debug Profile Tools Help
Addins
R 4.1.2
simi.R
AirPassengers
Show Attributes
Name Type Value
AirPassengers double [144] (S3: ts) 112 118 132 129 121 135 ...
(attributes) list [2] List of length 2
(No selection)
Environment History Connections Tutorial
Import Dataset
162 MiB
List
Global Environment
Values
AirPassengers Time-Series [1:144] from 1949 to 1961: ...
Files Plots Packages Help Viewer
New Folder
Upload
Delete
Rename
More
Cloud project
Name Size Modified
.Rhistory 0 B Feb 16, 2022, 8:39 AM
project.Rproj 205 B Feb 16, 2022, 8:48 AM
simi.R 70 B Feb 16, 2022, 8:49 AM
Console Terminal Jobs
R 4.1.2 · /cloud/project/
Type 'license()' or 'licence()' for distribution details.
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
> getwd()
[1] "/cloud/project"
> getwd()
[1] "/cloud/project"
> data("AirPassengers")
> head(AirPassengers)
[1] 112 118 132 129 121 135
> View(AirPassengers)
Activate Windows
Go to Settings to activate Windows.


RStudio Cloud



install.packages(“reticulate”)

Where R is used in Botswana

Stanbic Bank

Develop custom data models and algorithms to apply datasets using statistical computer language to build machine learning models

FnB

Data analysis

Old Mutual

Actuarial Support

Mascom

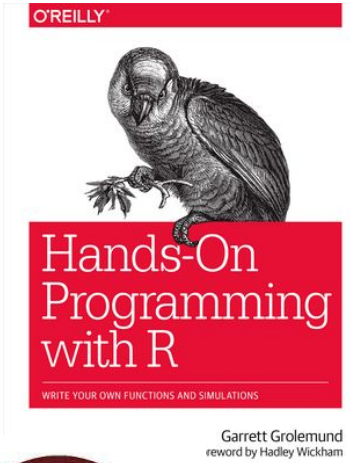
Data analysis

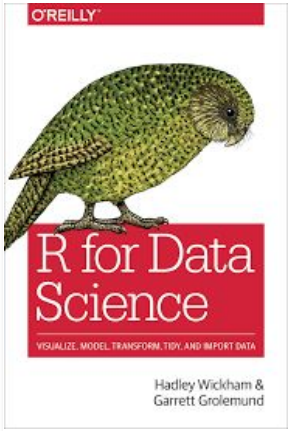
BIHL

Machine Learning models

R Community & Resources

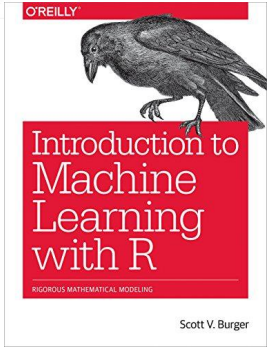
RStudio Community



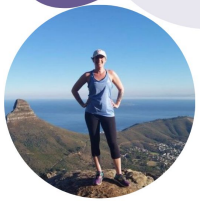


consortium

-bloggers



R-Ladies Gaborone



Using R as an epidemiologist: assessment of real-world data with Brianna Linday,PhD

https://www.meetup.com/rladies-gaborone/events/283714367/

10am (CAT) Saturday 12th March, 2022
R-Ladies Dammam and R-Ladies Gaborone

An Introduction to R Shiny with Mohamed EL Fodil Ihaddaden, Ph.D, Shiny developer

19:00pm 25th Friday March,2022

https://www.meetup.com/rladies-gaborone/events/283964083/

How To Time Travel with your Code:
foundations of version control, useful git commands and connections with RStudio
with Gracielle Higino, a computational ecologist

10am - 11:30am CAT Saturday 30th April 2022

https://www.meetup.com/rladies-gaborone/events/284115113/

Next Presentation on:

10th Thursday March, 5pm - 6pm
293/247

RStudio Demonstration

Example;
install.packages(“ggplot2”)
install.packages(“dplyr”)
install.packages(“ggmap”)

library(ggplot2)
library(dplyr)
library(ggmap2)

Thank you

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