The R Project

A programming language for statistical computing

Language Review By Darrin Miller

Overview

of the R language

- Designed for Statistical Computing
- A top choice in data science
- Fairly Easy to Use
- Vast ecosystem of packages and libraries

Motivation

Why R?

- Many Supported Machine Learning Models
- Popular for Data Science
- A common competitor to python in these fields

Aspects of the Language

- Interpreted Language
- Dynamically typed
- Supports main paradigms with stronger OOP heritage from S
- Syntax Similar to S with focus on simplicity and readability
- Integrates easily with other programming languages
- Turing Complete

Brief History

R was created by University of Auckland professors Robert Gentleman and Ross Ihaka, inspired by the S language.

It was made open source in 1995.

CRAN was founded in 1997 by Kurt Hornik to host R code and packages

R Foundation founded in 2003

Quick Peek at some R code

Variables

```
x <- 6

Mystr <- “Hello, World”

vec <- c(5, 55, 6)

mylist <- list(vec,2.5,sin)
```

Loops

```
v <- LETTERS[1:10]
for ( i in v) {
        cat(i," ")
}


i <- 0
while(i < 10) {
        cat(i," ")
        i = i+1
}
```

Functions

```
myfunc <-function(a, b){
   result <- a * b
   result
}
print(myfunc(2,2))


print(paste("Mean:",mean(25,50,75)))
print(paste("Sum:", sum(25,50,75)))
```

Data types

Data

Variables are assigned to R-objects

The Simplest of these objects is the vector object.

Note: Indexes start at 1 not 0

Types of R-Objects

Vectors

Lists

Matrices

Arrays

Factors

Data Frames

etc.

Contained Elements

These objects can hold elements of 6 different atomic classes or other R-objects

Element classes are:

Logical, Numeric, Integer, Complex, Character, raw

Packages

A major perk

- Like Python, R benefits from a large amount of high quality packages
- Access many through CRAN (Comprehensive R Archive Network)
- One of the major strengths of this language

Popular Packages

RMySQL, RSQLite - work with databases

ggplot2 - R's famous package for making beautiful graphics

shiny - web application framework

tidymodels - collection of packages for modeling and machine learning

jsonlit - work with json data tables

XML - read and create XML docs

xgboost - machine learning model and tools

Additional Information

- R files end in the .r extension
- Files can be ran from terminal using Rscript <file_name>.r
- Built using C, C++ and R itself
- Indexing starts at 1

Examples and Demo

Work Cited

Installation

https://cran.r-project.org/bin/linux/ubuntu/fullREADME.html

Syntax and Structure

https://www.tutorialspoint.com/r/index.htm

XGBoost

https://xgboost.readthedocs.io/en/stable/R-package/xgboostPresentation.html#