

Nagaon Education Society's
GANGAMAI COLLEGE OF ENGINEERING (DHULE)
Nagaon, Dist- 05.
Dept of Computer

Name.....

Year:.....Branch/Course:.....

Roll No:.....Expt No:.....

Date of Performance:.....Date of Completion.....

Sign and grade:

Experiment No. 4

Aim: Implementation of web Application using R.

1. Objective: Development of web Application using R.

2. Background:

R: It is a programming language and software environment for statistical analysis, graphics representation and reporting. R was created by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand, and is currently developed by the R Development Core Team. The core of R is an interpreted computer language which allows branching and looping as well as modular programming using functions. R allows integration with the procedures written in the C, C++, .Net, Python or FORTRAN languages for efficiency. R is freely available under the GNU General Public License, and pre-compiled binary versions are provided for various operating systems like Linux, Windows and Mac. R is free software distributed under a GNU-style copy left, and an official part of the GNU project called GNU S. As stated earlier, R is a programming language and software environment for statistical analysis, graphics representation and reporting.

The following are the important features of R:

-] R is a well-developed, simple and effective programming language which includes conditionals, loops, user defined recursive functions and input and output facilities.
-] It has an effective data handling and storage facility,

-] It provides a suite of operators for calculations on arrays, lists, vectors and matrices.
-] It provides a large, coherent and integrated collection of tools for data analysis.
-] It provides graphical facilities for data analysis and display directly on the computer.

R is world's most widely used statistics programming language. It's the first choice of data scientists and supported by a vibrant and talented community of contributors. R is taught in universities and deployed in mission critical business applications.

Why use R Programming?

There are several tools available in the market to perform data analysis. Learning new languages is time taken. The data scientist can use two excellent tools, i.e., R and Python. We may not have time to learn them both at the time when we get started to learn data science. Learning statistical modeling and algorithm is more important than to learn a programming language. A programming language is used to compute and communicate our discovery.

The important task in data science is the way we deal with the data: clean, feature engineering, feature selection, and import. It should be our primary focus. Data scientist job is to understand the data, manipulate it, and expose the best approach. For machine learning, the best algorithms can be implemented with R. Keras and TensorFlow allow us to create high-end machine learning techniques. R has a package to perform Xgboost. Xgboost is one of the best algorithms for Kaggle competition.

R communicate with the other languages and possibly calls Python, Java, C++. The big data world is also accessible to R. We can connect R with different databases like **Spark** or **Hadoop**. In brief, R is a great tool to investigate and explore the data. The elaborate analysis such as clustering, correlation, and data reduction are done with R. There are several applications available in real-time. Some of the popular applications are: Facebook, Google, Twitter, HRDAG, Sunlight Foundation, RealClimate, NDAA, etc.

3. Pre-lab Task:

Installation of R-base for windows

1. Goto link <http://cran.r-project.org>
2. Select "Download for Windows" & Click on "Base"
3. Select "Download R 3.3.2 for Windows(62 megabytes, 32/64 bit)"
4. Click on "Save file"
5. After downloading double click on "R 3.3.2-win.exe" file
6. Click 'next'...'Finish'.

Installation of R-studio for windows

1. Go to RStudio website (<https://www.rstudio.com/products/rstudio/download/>),
2. Select Platform “[Rstudio 1.0.136-windows vista/7/8/10](#)”
3. Double click on “[Rstudio 1.0.136-windows vista/7/8/10](#)”
4. Click next to continue when the install wizard opens.
5. Click next to accept the default install location.
6. Click Install to accept the default start menu folder and install RStudio!Click Finish to close the wizard.

Installation of R-base for Ubuntu

1. `sudo apt-get install r-base`
2. if require- `sudo apt-get update`
3. Then run R by executing R in the Terminal.

Installation of R-studio for Ubuntu

1. Go to RStudio website choose and download the Rstudio Desktop version for your system (www.rstudio.com/products/rstudio/download/)
2. Open this file in Ubuntu Software Center
3. Click install and you're done

Installation Open source R package (i.e. R-shiny) Run the

following command from an R console:

```
install.packages("shiny")
```

Data Types and R-Objects

In R programming language the variables are not declared as some data type. The variables are assigned with R-Objects. The data type of the R-object becomes the data type of the variable.

There are many types of R-objects. Following are some of the Data types and R-Objects.

Through Ubuntu Software Center:

1. Open Ubuntu Software Center.
2. Search for r-base & click Install.

Sr.No	Data types	R- Objects
1.	Logical	Vectors
2.	Numeric	Lists
3.	Integer	Matrices
4.	Character	Arrays
5.	Complex	Data Frames

Table: Data types and R-Objects

4. In-lab Task:

Create a simple app that displays text within the title panel, sidebar panel and main panel, where the sidebar panel is located on the right

Step 1: Install package & build framework

```
>install.packages("shiny")

>library(shiny)

>ui <- fluidPage()

>server <- function (input, output) { }

>shinyApp (ui =ui , server = server)
```

Step 2: Building the UI framework

```
>install.packages("shiny")

>library(shiny)

>ui <- fluidPage(
  titlePanel(title = "First
app....."), sidebarLayout(
  sidebarPanel ("Sidebar
panel, ....."),
  mainPanel("Main panel,
....."))
)

>server <- function (input, output) { }

>shinyApp (ui =ui , server = server)
```

Step 3: Adjusting the UI framework

```
>install.packages("shiny")
```

```

>library(shiny)

>ui <- fluidPage(
  titlePanel(title = "First
  app....."), sidebarLayout(
    position
    = "right", sidebarPanel
    ("Sidebar panel, ....."),
    mainPanel("Main panel,
    ....."))
  ))

>server <- function (input, output) { }

  >shinyApp (ui =ui , server = server)

```

5. POST LAB TASK:

OUTCOME:

Student should able

3. To execute R script.
4. To implement web app using R

Web Resources:

1. <https://www.dezyre.com/projects/data-science-projects/data-science-projects-in-r>
2. <https://data-flair.training/blogs/data-science-projects-code/>
3. <https://machinelearningmastery.com/machine-learning-in-r-step-by-step/>

Questions:

1. what is R?
2. Write some of the functions of R?
3. What are the data structure in R that is used to perform statistical analysis and create graph?
4. Describe data types in R?
5. State various applications of R?

