



MAHARAJA AGRASEN INSTITUTE OF MANAGEMENT STUDIES

(A Unit of Maharaja Agrasen Technical Education Society)
Affiliated to GGS IP University; Recognized u/s 2(f) of UGC
Recognized by Bar Council of India; ISO 9001: 2015 Certified Institution
Maharaja Agrasen Chowk, Sector 22, Rohini, Delhi -110086, INDIA
Tel. Office: 8448186947, 8448186950 www.maims.ac.in

Report on

“DATA ANALYSIS USING R”

FDP on “DATA ANALYSIS USING R”

Theme: Data Analysis using R

Organizing College/Department: P.G.D.A.V COLLEGE (EVE.), University of Delhi
Department of Commerce, MAIMS, Delhi

Head of the department: Prof. (Dr.) Manju Gupta

Programme Head: Dr. Ruchira Pathak, Associate Professor, Department of Commerce, PGDAV
College (Eve.)
Prof. (Dr.) Manju Gupta, Head Department of Commerce, MAIMS

Student Beneficiary: 99

Convener- Dr. Uday Sharma, Assistant Professor, P.G.D.A.V. College (Eve.)
Mr. Praveen Kumar Singh, Assistant Professor, MAIMS

Date: January, 17 – 23 2023

Time: 10:00 am to 11:30 am & 12:00 pm to 01:30 pm

Venue: Online- Zoom

Resource Person: Dr. Uday Sharma, Assistant Professor, P.G.D.A.V. College (Eve.)
Dr. Gunjan Khurana, Associate Professor, I.P. College for Women, Delhi.

OBJECTIVES OF THE FDP

The objectives of this Faculty Development Programme in R programming are to:

- To provide the faculty with an understanding of R software with the statistics.
- Able to use R programming in statistical computing, data analytics and scientific research.
- To provide resources that will support their classroom teaching as well as in their research.
- To enhance the analytical skills in research.

REPORT

One week Faculty development programme on “**Data Analytics using R Software**” was organised by P.G.D.A.V COLLEGE (EVE.), University of Delhi, **Delhi** in collaboration with **MAHARAJA AGRASEN INSTITUTE OF MANAGEMENT STUDIES, Indraprastha University, New Delhi** from **January 17th – 23th 2023**. The FDP received 99 registrations across India covering 40+ institutions ranging from Jamia Milia Islamia, JNU to various colleges of Delhi University & Guru Gobind Singh Indraprastha University.

By 2020, the world economic forum forecasts that data analysts will be in demand due to increasing data collection and usage. Organizations view data analysis as one of the most crucial future specialties due to the value that can be derived from data. Data is more abundant and



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accessible than ever in today's business environment. In fact, 2.5 quintillion bytes of data are created each day. With an ever-increasing skill gap in data analytics, the value of data analysts is continuing to grow, creating new job and career advancement opportunities. So the aim of this FDP is to acquaint the participants with data analysis techniques and enhance the analytical skills in research. It also provides a hands-on experience of the models and tools used for conducting research in management of data. R is an open-source programming language used for statistical computing. It is one of the most popular programming languages today. R has various data structures and operators. It can be integrated with other programming languages like c, c++, java, and python. In this FDP, participant learned the analytics tools and techniques and data visualizations. Learn how to apply statistics and predictive analytics in research.

All the sessions were conducted through **Zoom Platform** and were also live streamed on you tube. The sessions are also available on the P.G.D.A.V. COLLEGE (Eve.) & MAIMS official you tube channel for future reference of the participants. After every session a feedback form was shared with the participants. This ensured active participation of the attendees. Every resource person made sure to provide hands on training so that participants could learn and share their doubts simultaneously.

In our inaugural session, a warm welcome was given to all the participants by the FDP coordinators, **Dr. Uday Sharma**, Assistant Professor, P.G.D.A.V. College (Eve.) followed by welcome note from the esteemed dignatories **Prof. (Dr.) Rajni Malhotra Dhingra**, Director, MAIMS; and **Prof. Dr. R.K. Gupta**, Principal, PGDAV College (evening); **Dr. Ruchira Pathak**, Associate Professor, PGDAV College (evening). They addressed and welcomed the attendees and gave their best wishes for success of the eFDP. The inaugural session was ended with a vote of thanks given by **Prof. (Dr.) Manju Gupta**, Head, Department of Commerce, MAIMS.

Inaugural session was followed by **session 1** on “**Introduction to R**” by **Dr. Gunjan Khurana**, Associate Professor, I.P. College for Women, University of Delhi. She gave the introduction to big data and its evolution. She focused on different sources of data, how to work with data, what can be the future challenges, data fusion, Big Data Architecture and technologies in use. She explained the Different between R and R Studios and helps all the participants to download the software. In the **session 2**, **Dr. Gunjan Khurana** continued from where she left the morning session on “**Introduction to R**”. She discussed the graphical user Interfaces for Rstudio, operators in R and built in functions in R. She demonstrated the various features and functions of RStudio using live illustrations.

On **Day 2**, **session 3** was on the topic “**Data Visualization in R**” by **Dr. Gunjan Khurana**, Associate Professor, I.P. College for Women, University of Delhi. She provided the participants with detailed knowledge and information on Data Visualization in R. She explained how we can plot our big data in Rstudio and how easily we can analysis that big data using plots. Individual doubts and queries were welcomed and answered. Hands On training was provided to the participants. The event proceeded with the **session 4** of the day by resource person, **Dr.**



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Uday Sharma, Assistant Professor,

P.G.D.A.V. College (Eve.) on “**Exploring Objects of R –Part I**”. He explained how to explore objects of R. He discussed the types of data, data structures in Rstudio and the indexing of data. The overall session was very engaging; topics were explained in a simple yet detailed way.

Coming to **Day 3, session 5**, **Dr. Uday Sharma**, Assistant Professor, P.G.D.A.V. College (Eve.) continue the previous session on “**Exploring Objects of R -Part II**”. He provided the participants with detailed knowledge on indexing and slicing of vectors, data frames and matrices using examples. Then, he discussed how to manipulate data from the lists, vectors, matrices (2D and 3D), arrays and data frames. The FDP proceeded with the **session 6** on “**Exploring popular packages – Part I**” by **Dr. Gunjan Khurana**, Associate Professor, I.P. College for Women, University of Delhi. She explained the ggplot2 packages of Rstudio in detail. Then, she helped all the participants to install the packages. She explained that ggplot2 is based on the “Grammar of Graphics”, which is a popular data visualization library. Graphs with one variable, two variables, and three variables, along with both categorical and numerical data, can be built.

Day 4, session 7, was delivered by **Dr. Gunjan Khurana** on “**Exploring popular packages – Part II**”. She explained that dplyr package is used for data manipulation by providing different sets of verbs like select, arrange and mutate. Then she helps participants to download the dplyr package. The event proceeded with **session 8** on “**Exploring popular packages – Part III**” by **Dr. Gunjan Khurana**. She explained that tidyr package provides three main functions for tidying your messy data: gather() , separate() and spread(). She discussed that it is easy to munge (with dplyr), visualise (with ggplot2) and model (with R’s hundreds of modelling packages). The session was delivered in a very simplified way; doubts and queries were answered simultaneously.

The last **session 9** of e-FDP was delivered by **Dr. Gunjan Khurana**, on “Types of Data Distribution in R”. She discussed the various probability distributions like beta, binomial, Cauchy, chi-square, gamma etc. At the last of the session, 20 minute test based on the FDP syllabus was taken.

Valedictory session was organized in the end to smoothly end the e-FDP. **Prof. (Dr.) R.K. Gupta, Principal, PGDAV College, (Eve.), Prof. (Dr.) S.K. Garg, Director General, MAIMS**, graced the session and congratulated the participants on successful completion of the FDP. The Valedictory session was ended with a vote of thanks given by **Prof. (Dr.) Manju Gupta, Head, Department of Commerce, MAIMS**.

Learning Outcome

- R is a programming language that helps in statistical computing, data analytics and scientific research.
- Provide resources that support in the teaching learning process.
- Help in developing R programs.



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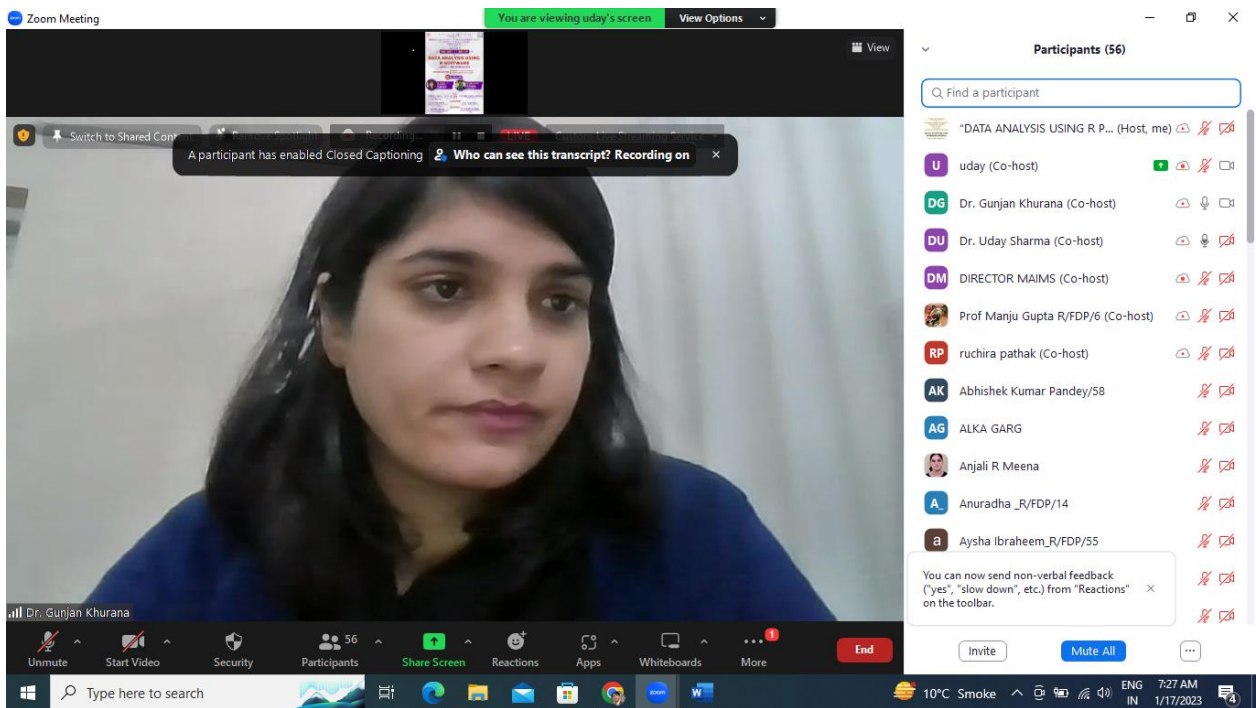
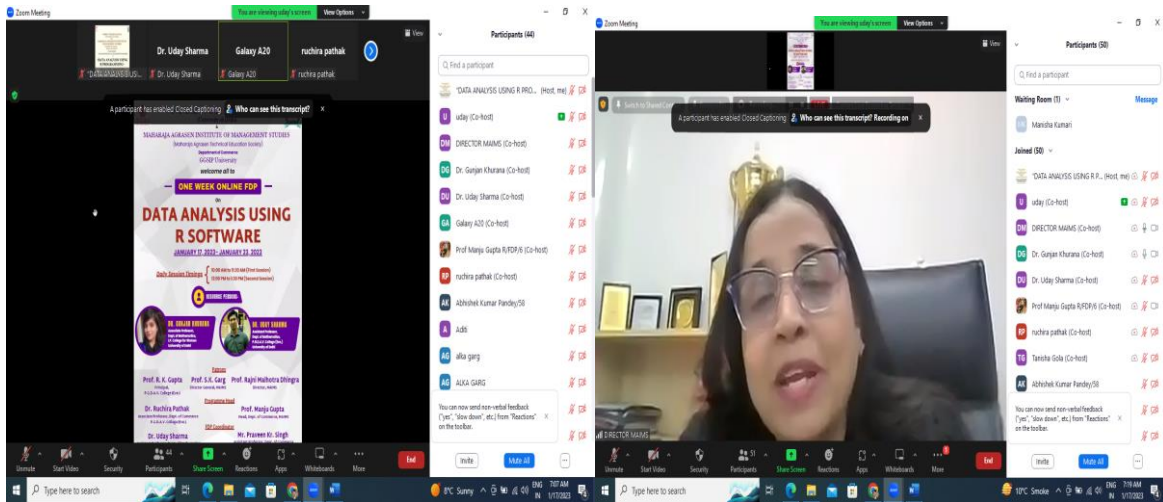
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- Learn how to utilize the Data science infrastructure in a better and Productive way

Glimpses:



DAY1:17/0/2023



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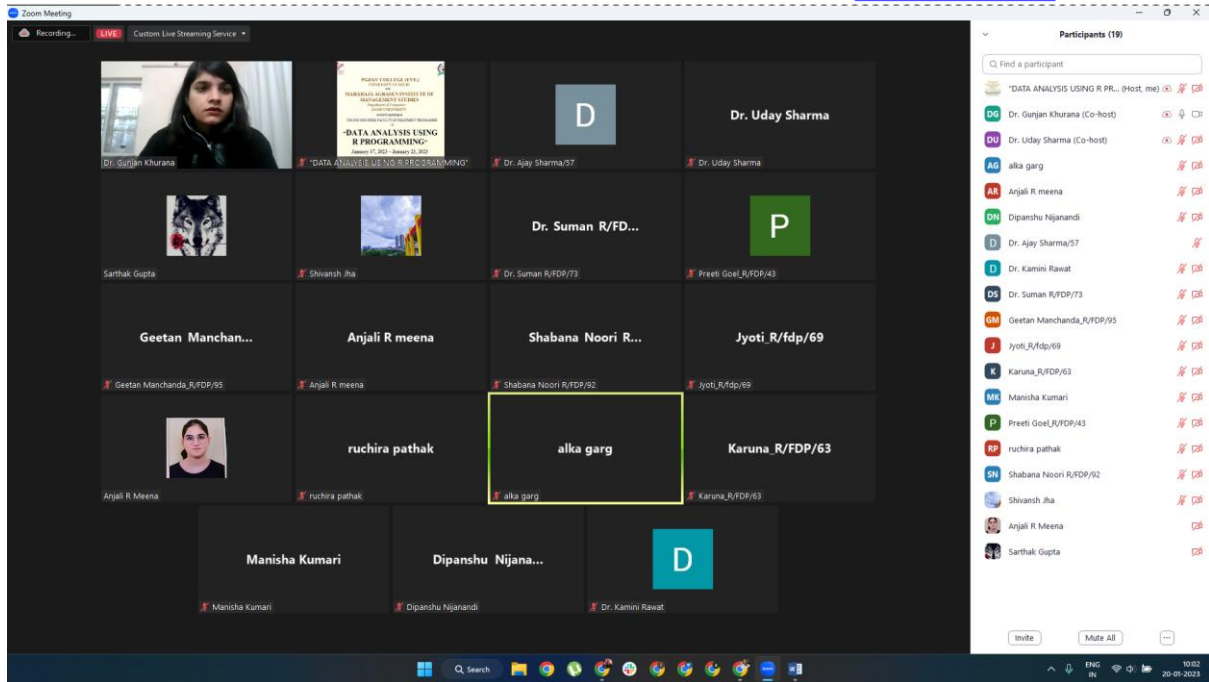
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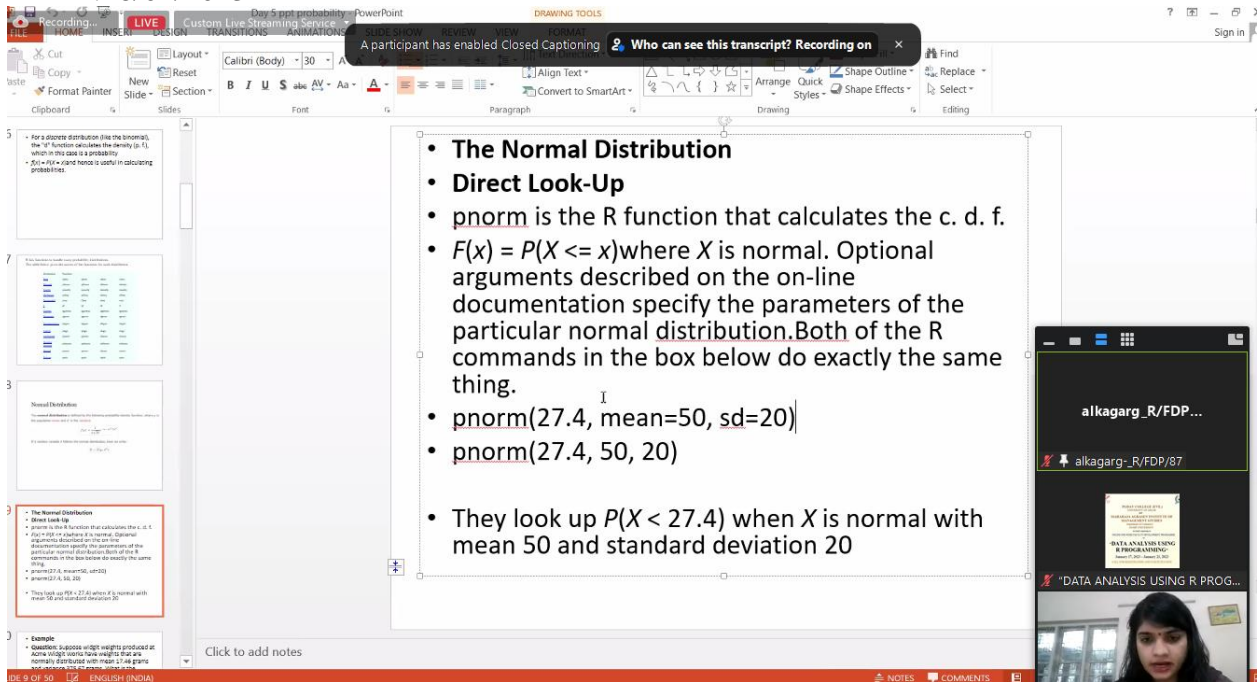
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DAY2:18/01/2023



DAY3:19/01/2023



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Inverse Look-Up

- `qnorm` is the R function that calculates the inverse c. d. f. F^{-1} of the normal distribution. The c. d. f. and the inverse c. d. f. are related by
- $p = F(x)$
 $x = F^{-1}(p)$ So given a number p between zero and one, `qnorm` looks up the p -th quantile of the normal distribution. As with `pnorm`, optional arguments specify the mean and standard deviation of the distribution. **Example**
- **Question:** Suppose IQ scores are normally distributed with mean 100 and standard deviation 15. What is the 95th percentile of the distribution of IQ scores?
- **Question Rephrased:** What is $F^{-1}(0.95)$ when X has the $N(100, 15^2)$ distribution?

DAY4:20/05/2023

DAY5:23/05/2023

Prof. (Dr.) Manju Gupta
Head (Department of Commerce)

Prof. (Dr.) R.K. Gupta
Principal, PGDAV College

Prof. (Dr.) Rajni MalhotraDhingra
Director, MAIMS