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Gyan Ganga

MARCH 2024

Regional Capacity Building & Knowledge Institute, Prayagraj
Indian Audit and Accounts Department

e-Newsletter *-In Search of Excellence*

(For Departmental Circulation only)

From the Director General, RCB &KI Desk

I have great pleasure in bringing out the e-Newsletter of this Institute for the year 2023-24 which report the milestones and important developments of this Institute and achievement's made during the year 2023-24.

Regional Capacity Building & Knowledge Institute Prayagraj- is a Knowledge Centre of "Government Finances and Audit including GASAB. The Structured Training Module on "Government Accounting including GASAB" prepared by the RCB & KI, Prayagraj, has been approved by Headquarters and disseminated. Two (02) All India Webinars on "Government Accounting including GASAB and Accrual Accounting" was conducted during 2023-24 and two (02) all India Webinars on GASAB & Natural Resource Accounting were also conducted during 2023-24 in the capacity of Knowledge Centre for Group A and B officers. These Seminars/programmes have also been planned in COTP 2024-25.

The e-newsletter, also brings out an important topic on "Using AI with Python" to provide first-hand/preliminary information about this emerging topic and another informatics on Stakeholder Engagement for Public Auditing", "Concept of UPI" and "Data Visualization".

Lastly, I would like to convey my sincere thanks to all officers who have participated in the RAC meeting and shared their valuable inputs and continual support/cooperation for improvement/betterment of RCB & KI.

In our endeavour to continuously evolve, we look forward to your inputs, remarks and suggestions on the newsletter.

I welcome your valuable suggestions on the contents and presentation of this e-Newsletter.

Ram Hit- DG

MOMENTS TO CHERISH.

Achievements of RCB &KI, Prayagraj

- **Successfully conducted a following additional courses as per on minutes of the conclave of Heads of RCB&KI/KC held on 06.03.2023: -**
- **"**Budgetary Process in the Government, Appropriation/Surrender of Funds, comments on excess expenditure, savings of funds etc.
- Process of compilation of Accounts by AG (A&E) Office.
- Off Budget Borrowing.
- Consolidated Sinking Fund/ Guarantee Redemption Fund/ SDRF etc.
- Preparation of VLC/IFMS Dashboard using Tableau
- Successfully organized Induction Training for Newly Promoted Supervisors and AAOs **(Additional HQrs)**
- Conducted 03 Additional General courses include Induction training and SAS preparatory training for DRAAOs (total 120 training days). **(on the direction of HQrs).**
- Successfully conducted all India webinar/Seminar on GASAB and NRA and Government Accounting
- Successfully published and circulated Institute **Hindi Patrika "Gyan Ganga"** during Hindi Diwas 2023-24.
- Prepared and sent 03 Training Guides and 05 case studies to HQrs.
- Successfully made collaboration and signed **MOU with G.B.Pant Institute Prayagraj** for exchange of knowledge, Information and cooperation in the training.
- Successfully organized RAC meetings and implemented their valuable compliances.
- The Institute celebrated the Independence Day & Republic Day and observed others important day as per Hqrs instructions. The staff and officers participated in flag hosting with due care of Covid-19 guidelines

Faculty's Column

(i) Using AI with Python by Nitin Singh / Faculty IT
(ii) Stakeholder Engagement for Public Auditing" by Dhawal **Kishor /Faculty General**
(iii) Concept of UPI" by Abhishek Jaiswal/Faculty KC
(iv) Data Visualization by Ram Raj Pal/Faculty IT

Institute Latest?

- **All India Workshop on "GASAB & NRA".**
- **All India Seminar on Government Accounting including GASAB and Accrual Accounting.**
- **Course on e-office & E-HRMS(New)**
- **Workshop on IT Audit & IDEA**
- **Mid RAC Meeting will be held in September 2024.**

'It's a beginning of new era'

About RCB &KI Prayagraj

Profile: -

➢ Introduction

Training, as a basic tool to develop the Human Resources, is the most vital element of our functioning. To cater to the training needs of Group 'B' and Group 'C' staff, ten Regional Training Institutes were opened at different places in the Indian Audit and Accounts Department including Regional Capacity Building & Knowledge Institute, Prayagraj which was established on 11th August 1986.

The Institute is located at 20, Sarojini Naidu Marg, Prayagraj. The Institute is providing value added and special training courses. It also plays a major role in imparting EDP training to the officers/officials of the user offices. The Institute also imparts basic training during probation to Directly Recruited Assistant Audit Officers. The Institute is also preparing structured course materials of various value added courses. **Name of the Institute has been replaced with Regional Capacity building & Knowledge Institute (RCB&KI) vide Hqrs notification No. 226/15-SMU/2023 dated 25.07.2023.**

➢ REGIONAL ADVISORY COMMITTEE FOR RCB & KI, Prayagraj

1. Principal Accountant General (Audit-I), Uttar Pradesh, Prayagraj
2. Principal Accountant General (A&E)-I, Uttar Pradesh, Prayagraj.
3. Accountant General (Audit-II), Uttar Pradesh, Lucknow.
4. Accountant General (A&E), Uttarakhand, Dehradun.
5. Accountant General (A&E)-II, Uttar Pradesh, Prayagraj.
6. Principal Accountant General (Audit), Uttarakhand, Dehradun..
7. Director General of Audit (Central), Lucknow.
8. Principal Director of Audit (NCR), Prayagraj.
9. Director General of Audit, (NER), Gorakhpur.
10. Director of Audit, Defence Services, Central Command, Prayagraj.
11. Deputy Director, Office of Principal Director Commercial Audit & Member Audit Board-II Mumbai at Dehradun.
12. Director of Audit, Defence Services, Central Command, Meerut
13. Director of Audit, Air Force, Dehradun.
14. Director of Audit, Ordnance Factories, Kanpur
15. Deputy Director, Finance & Communication Audit Office, Lucknow.
16. Director General of Audit, Northern Railway, New Delhi at Lucknow and Moradabad.
17. Deputy Director, office of Principal Director of Audit, RPU and Metro Railway, Kolkata at Varanasi.
18. Representative from Headquarters office.
19. Director General RCB &KI, Prayagraj (Member Secretary).

➢ Jurisdiction Offices

1. Principal Accountant General (Audit-I), Uttar Pradesh, Prayagraj
2. Principal Accountant General (Audit), Uttarakhand, Dehradun.
3. Accountant General (Audit-II), Uttar Pradesh, Lucknow.
4. Principal Accountant General (A&E)-I, Uttar Pradesh, Prayagraj.
5. Accountant General (A&E)-II, Uttar Pradesh, Prayagraj.
6. Accountant General (A&E), Uttarakhand, Dehradun.
7. Director General of Audit (NER) Gorakhpur
8. Principal Director of Audit (NCR), Prayagraj.
9. Branch offices of Principal Accountant General (Audit-II), Uttar Pradesh, Lucknow; at Prayagraj.
10. Director General of Audit (Central), Lucknow.
11. Branch Office of the Director General of Audit (Central), Lucknow, at Prayagraj.
12. Branch Office of Principal Director Commercial Audit & Member Audit Board-II (Mumbai) at Dehradun.
13. Deputy Director of Audit, Defence Services, Central Command, Prayagraj.
14. Director of Audit, Defence Services, Central Command, Meerut.
15. Director of Audit, Air Force, Dehradun.
16. Director of Audit, Ordnance Factories, Kanpur.
17. Deputy Director, Finance & Communication Audit Office, Lucknow.
18. Branch office of Principal Director of Audit, Northern Railway, New Delhi at Lucknow and Moradabad.
19. Branch office of Principal Director of Audit, RPU and Metro Railway, Kolkata at Varanasi.

38th year of RCB&KI,Prayagraj

Regional Advisory Committee (RAC) meeting:

1. The Annual meeting of Regional Advisory Committee of the Regional Capacity Building and Knowledge Institute (RCB&KI), Prayagraj was held on 04.03.2024 at Prayagraj under the Chairmanship of Shri Ram Hit, Director General, RCB&KI, Prayagraj to discuss various issues relating to the Institute. RAC reviewed the draft training calendar 2024-25, prepared based on Training Need Analysis (TNA), inputs received from the user offices and the decisions taken in the mid-term RAC which was held on 27th September, 2023. The training calendar for the year 2024-25, after deliberations in the RAC, was sent to headquarters and it received approval on 31st March 2024.

LIST OF RAC MEMBERS ATTENDED ANNUAL RAC MEETING HELD ON 04/03/2024

Sl. No.	Name Smt./Shri	Designation
1.	Ram Hit	Director General
2.	Abhishek Singh	Accountant General
3.	Dr. Surendra Kumar	Accountant General
4.	Dhanlaxmi Chaurasia	Sr. Deputy Accountant General
5.	Jay prakash	Sr. Deputy Accountant General
6.	Mukesh Kumar	Deputy Accountant General
7.	Yashwant Kumar	Deputy Accountant General
8.	Sahil Sangwan	Deputy Accountant General
9.	Manju Puri	Dy. Director
10.	Manoj Kumar Srivastava	Dy. Director
11.	Manju Katharia	Dy. Director
12.	S C Mamgai	Dy. Director
13.	T. Manohar Rao	Dy. Director
14.	Dhherendra K. Upadhyay	Sr. Audit Officer
15.	Rajpal Singh	Sr. Audit Officer
16.	Uttam Singh Kaida	Sr. Audit Officer
17.	Sanjay Kumar Saxena	Sr. Audit Officer
18.	Manish Kumar Sinha	Sr. Audit Officer

Resource/RCB &KI Profile

➢ Infrastructure: -

The Institute building is renovated during 2017-18 & 2018-19.

Existing infrastructure available is given below: -

The Institute has one lecture hall with all teaching aids for arranging General Courses. This hall can accommodate 24-30 officials.

The Institute has two EDP lecture halls capable of handling two EDP training programs at a time and each hall is equipped with 28 & 21 computers respectively. One HP Prolaint ML 350 e-gen8 server for providing EDP training in Oracle 11g is installed. All the hardware of the Institute is supported by UPS to arrange uninterrupted power supply to various equipment's. All the computers, server, and printers are connected by local area network including computers installed in the hostel rooms.

The Institute has one well-furnished air-conditioned conference hall to accommodate twenty-two persons. Seminars/Workshops and RAC meetings are being organised in this conference hall.

The air-conditioners and radiators have been installed in Training Halls and Conference Room for more environmental comfort to trainees. Each EDP training room is provided with projector with Interactive Board and General lecture hall is equipped with LCD projector.

Library

The Institute has a library with 4972 books on a variety of subjects including a sizeable number of books in Hindi. The library contains books on subjects of general interest, Computer, Management, Accountancy, Auditing, Training and other allied topics.

The library management software was developed in house and inventory of books are managed by using the software.

Hostel

The existing facilities are given below: -

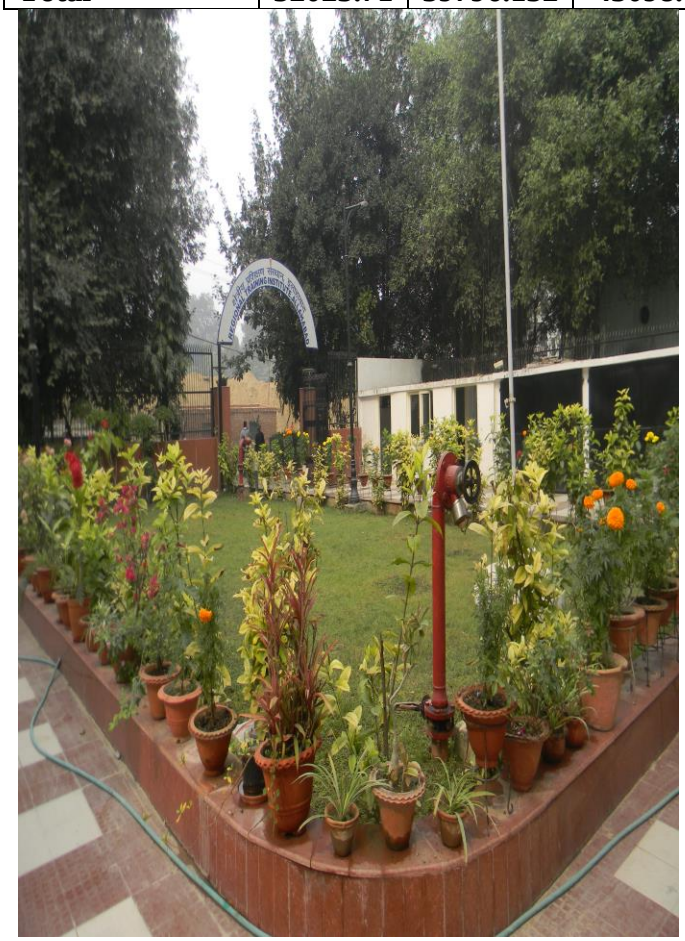
The hostel can accommodate 30 officials in 15 residential rooms with A.C. Computers have been provided in the hostel rooms for the use of trainees. The hostel is equipped with necessary amenities including TV in each hostel room. Wi-fi connectivity has also been provided in the hostel rooms as well as other floors of the Institute.

RCB&KI has designated one Sr. Auditor as the Caretaker of the Hostel with a multitude of functions for the comfort of resident trainees.

Personnel: Details of personnel in the Institute are as under:-				
S.No.	**Cadre**	**Sanction**	**MIP***	**Remarks**
1.	Sr. AO	05	04	02 working as Core Faculty / Gen, 01 as Sr. AO/ KC, SAO/IT and 01 Consultant against vacant post of SAO / Admn.
2.	AAO	08	08	02 Faculty/EDP, 01 Faculty/KC, 02 AAO / OIOS,02 AAO/eHRMS and 01 as AAO Admin
3.	P.S.	01	----	Presently Vacant
4.	Sr.Acct / Acctt	04	04	03 in Admn. and 01 as Caretaker.
5.	Junior Hindi Translator	01	01	Posted in Admin.
6.	DEO/ Clerk	04	02	02 post of clerk/typist is vacant
7.	MTS	06	02	04 Outsourced against vacancy
8.	Driver	02	---	02 outsourced

Budget: Head wise breakup of expenditure of the last three years is as under :-(Rs.in thousands)

Sl. No	**Description**	**2021-22**	**2022-23**	**2023-24**
1.	Salaries	26476.38	25646.970	26984.44
2.	Office Expenses	662.44	1356.603	5816.83
3.	Other Expenses	4884.89	12792.559	10297.53
Total		**32023.71**	**39796.132**	**43098.8**



Achievements of RCB &KI, Prayagraj:

Training Activities: RCB&KI, Prayagraj is continuously providing value added and specialized quality courses to the user offices. The Institute followed the best training methods and provide best available infrastructure to trainees of the user offices.

1. During last Five years (2019-20 to 2023-24), training activities of RCB&KI, Prayagraj is as follows:

Year	GENERAL COURSES/KC			
	No. Of Course	No. of Official trained	No. of workshop / Seminars	No of Trainees in workshop/ Seminars
2019-20	28	696	05	126
2020-21	26	683	05	186
2021-22	34	648	08	269
2022-23	31	655	06	126
2023-24	34	637	05	153
Total	153	3319	29	860

EDP COURSES				
Year	No. of Course	No. of Official trained	No. of workshop/ Seminars	No of Trainees in Workshop/ Seminars
2019-20	22	426	01	19
2020-21	23	522	01	27
2021-22	23	419	02	35
2022-23	23	375	01	16
2023-24	26	501	01	15
Total	117	2243	6	112

Additional Courses Organized during 2023-24

(i) Preparatory/Induction Training for DRAAO's (Batch 2021) successfully organized additionally on the direction of HQrs during 2023-24 and total 51 trainees participated.

(ii) An another additional Rajbhasha online Prabandhan Pranali had been successfully conducted), total 24 officials participated on direction of HQrs,

(iii) 03 Additional General Courses include induction training and SAS preparatory training for DRAAOs (total 120 training days).

(iv) During current calendar Institute is negotiating additional total 150 training days for conducting these Additional Courses.

(v) **In addition to above, 184 additional slots were utilized by the offices (all India) other than user offices in the different courses.**

4. Knowledge Centre:

(i) Headquarters has designated RCB&KI, Prayagraj, Knowledge Centre of "Government Finances and Audit including GASAB in 2024.

(ii). On direction of GASAB wing Hqrs, Knowledge Centre wing of RCB&KI had coordinated 06 monthly virtual meeting with the offices working on the preparation of Asset Accounts on Mineral & Non-Renewable Energy Resources between 2023-2024 and submitted reports to Hqrs.

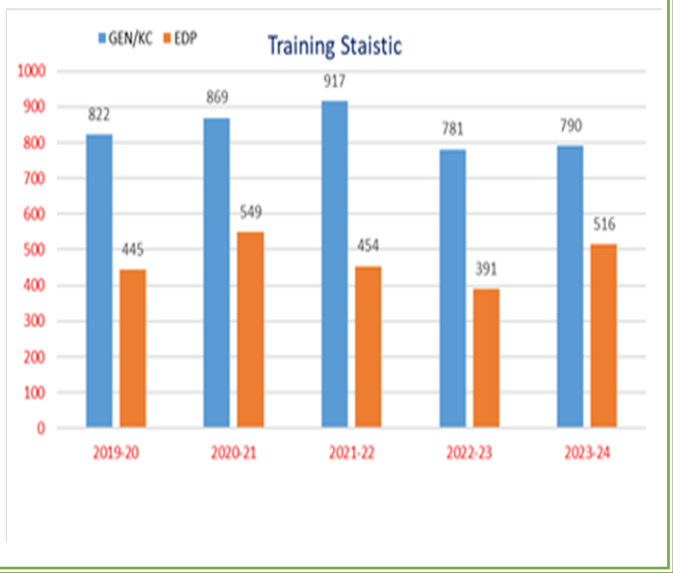
(iii) During 2023-24, total 15 courses conducted on knowledge center related topics including 04 seminars/webinar and total 324 trainees had been participated.

5. Structured Training Materials:

Training materials of each course were prepared / modified by RCB&KI, Prayagraj before conducting the course. The trainees are provided with training materials and other related materials during the training.

Following STM has been prepared by this Institute:

(vi) Drawing and Disbursing and Receipt in VLC
(vii) Corporate Governance & Internal Control
(viii) Certification Audit
(ix) Public Exchequer Controls
(x) APAR Writing
(xi) Government Accounting
(xii) GASAB
(xiii) Budget -GFS (2001)
(xiv) STM on "IPSAS"



38th year of RCB&KI,Prayagraj

1. Successfully Procured/Installed/Implemented Smart Class room:

Learning is a cognitive process that involves thinking, reasoning, and making sense of what is being taught. Using digital content in the form of videos and picture books, trainer can enable trainees to visualize what they are learning, which has the potential to create better conceptual clarity in the training.

Smart Class is a digitally equipped classroom with a range of teaching and learning tools. This incorporates audio and visual learning material through which the trainer can make the classroom teaching more interactive and engaging.

RCB&KI Prayagaraj is the first Training Institute of IA&AD who successfully procured and implemented Smart Class room facilities for imparting training in offline/online mode.

Following Interactive Tools are available in the Smart Class module for delivering effective training:

(i) **Digital Podium:** These are all-in-one integrated systems that are well equipped with various digital tools like a mic, recorder, speakers, document visualizer, etc., to deliver smart lectures and presentations.

(ii) **Interactive Whiteboard:** Also known as smart boards, interactive whiteboards are designed to replace traditional whiteboards with markers. They have a built-in smart class app, a touch-sensitive display, and many other handy features.

(iii) **Interactive Display Panels (IDPs):** IDPs are LED panels with big interactive screens, which are used to represent pictures, videos, and 2D/3D animations to trainees. They make visual learning more interactive and effective.

(iv) **Speakers:** They ensure the trainer is audible to each trainees in the smart classroom, even on the last bench. Thus, no one misses anything important.

(v) **Wireless Microphone:** Microphones go hand in hand with speakers. They help trainer deliver their teaching to trainees while enhancing mobility in a large classroom.

2. Case studies prepared in 2023-24:-

(i) Unnecessary re-appropriation of funds

(ii) Indiscriminate use of minor head 800.

(iii) Funds outside consolidated fund or public account of the state.

(iv) Non-payment of interest on delay filing of GST returns.

Besides above, successfully published and circulated Compendium of Case Studies" which was inaugurated by Hon'ble Chief Justice on occasion of Audit Diwas-2022.

This compendium contains various case studies prepared by Institute on diverse subjects. Regional Training Institute, Prayagraj is designated as knowledge centre for Government Finances and Audit including GASAB. In pursuit of excellence in our assigned areas of Knowledge Centre activities, we have brought out series of interesting cases in these areas. Apart from these, Compendium also contains case studies on other subjects related to IT Audit and Goods and Services Tax.

3. Successfully made collaboration and signed MOU with G.B.Pant Institute Prayagraj for exchange of knowledge and Information for training:

This Memorandum of Understanding (MoU) is made between Govind Ballabh Pant Social Science Institute, a Constituent Institute of University of Allahabad with its office at Jhusi, Prayagraj-211019, Uttar Pradesh, India (hereafter referred to as GBPSSI) and RCB &KI, Indian Audit and Accounts Department, a training institute of the Indian Audit & Accounts Department, with its office at 20, Sarojini Naidu Marg, Prayagraj-211001, Uttar Pradesh, India for mutually beneficial relationship to be established in the areas of faculty exchange and academic cooperation in accounting, economics, statistics, management, information technology, communication skills, environmental studies, administrative and establishment matters.

4.Office Automation: Most of the activities of RCB &KI, Prayagraj have been computerized and the comprehensive database of trainees, faculty and other related training activities are maintained. The following software's are designed and developed by RCB&KI Prayagraj are

SNO.	Software	Purpose of Software
1.	Training Management System	To maintain the database of training activities of the Institute
2.	Library Management System	To maintain the database of Library
3.	Faculty Management System	To maintain the database of Faculty and their performance

5. Case Study prepared by this Institute

Following case studies have been prepared by this Institute:

1. Case Study on " IT Audit of NREGASOFT"
2. Case Study on " Irregular Availing of Exemption from Service Tax"
3. Case Study on " Analysis of Financial Health of the State"
4. Case Study on " Financial Management and Budgetary Control"
5. Case Study on 'Cases of Grants and Appropriation under savings'
6. Case Study on 'Grant No. 21-Food and Civil Supplies Department'
7. Case Study on 'Outstanding Abstract Contingent Bills'
8. Case Study on Preparation of Summarised Grant
9. Case Study-Rush of expenditure in Last Quarter of Financial Year
10. Case Study on 'Non-Submission of Utilisation Certificates'
11. Case Study on 'Non-Compliance of Financial Rule'
12. Case Study on 'Improper Financial Management'
13. Case Study on 'Misutilisation of fund'
14. Case Study on 'unfruitful Expenditure'
15. Case Study on 'Non-Compliance of Government rule led to loss to the Government'
16. Case Study on "IT Controls".
17. Case Study on "Non-Compliance of Financial Rule led to unfruitful Expenditure
18. **Case Study on "Time of supply" where there is a change in the rate of tax" (Approved by HQrs and disseminated)**
19. **Case Study on "Misclassification of Expenditure" (Approved by HQrs and disseminated)**

II. Research Paper prepared by this Institute

- Research paper on Relation between quality of Risk assessment for audit planning and money value of resultant audit products.
- Research paper on "Off-Budget Borrowing" is in process as allotted by the HQrs.

6. Courses Organized during 2023-24 (General/KC):

During 2023-24, Institute has conducted total 39 General/KC courses wherein total 790 trainees were participated.

Important Courses Organized during 2023-24 (General):

1. Audit Reporting including drafting of Audit Para.
2. Financial Attest Audit (HQ Course)
3. Course on GST
4. Audit of Procurement and Contract Management
5. Course on GPF Module.
6. Statistics and Sampling in Audit.
7. Certification of Annual Account of Autonomous Bodies & Preparation of SAR.
8. Performance Audit Guidelines
9. Compliance Audit Guidelines & Risk Analysis
10. Course on Treasury Inspection
11. Course on Soft Skills
12. Course on PPP.
13. Guidelines on PD Accounts, Reserve Funds, NPS etc.
14. Course on Settlement of Suspense & Remittance Balance
15. SpecialCourses on Establishment & Administration
16. Course on IND AS.
17. Course on e-Procurement(GEM) & CPPP
18. Course on Audit Evidence.
19. Mid carrier Training Programme (MCTP Level-II & III).
20. Course on Works & Forest Accounts.
21. Course on Finance and Appropriation Accounts with respect of Financial Attest. Audit.

Following additional courses were also organized during 2023-24 on direction of HQrs.:

- Budgetary Process in the Government, Appropriation/Surrender of Funds, comments on excess expenditure, savings of funds etc.
- Process of compilation of Accounts by AG (A&E) Office.
- Off Budget Borrowing.
- Consolidated Sinking Fund/ Guarantee Redemption Fund/ SDRF etc.
- Preparation of VLC/IFMS Dashboard using Tableau
- Successfully organized Preparatory/Induction Training for DRAAO's during 2023-24 .
- Rajbhasha online Prabandhan Pranali had been successfully conducted on direction of HQrs,

Mid-Career Training Programmes:

HQrs has introduced five level Mid- Career Training Programme (MCTP) for the SAOs & AAOs to develop a professional, impartial and efficient officer who is responsive to the needs of the department. Emphasis is on the development of ethics and values, soft skill enhancement and commitment to work as per individual job profile.

Accordingly, 07 MCTP Level-2 & III courses were organized from 01-04-2023 to 31-03-2024 in onsite mode.

(ii)Courses Organized during 2023-24(EDP):

During 2023-24, Institute had organized 27 EDP courses wherein total 516 trainees had participated in the different courses. A workshop on "IT Audit & IDEA" also been conducted successfully.

Important Courses Organized during 2023-24 (EDP) :

1. Course on PFMS & iBEMS
2. Audit in IT Environment (HQrs Course)
3. Advance Course on MS Excel
4. Advance Course on M S Access
5. DATA Analytics (HQrs Course)
6. IT concepts, M S Office & Internet
7. IDEA & Tableau
8. Advanced MS Word & Power Point
9. Principles of Networking, Internet and Network Security
10. Course on IDEA
11. Course on Red Hat Linux, Oracle 11g with Developer11g.
12. Course on preparation of VLC Dashboard by using Tableau (Proposed by HQrs)
13. Course on Audit of Procurement through GeM.

Photo gallery of Important Events during 2023-24

ANNUAL RAC MEETING March 2024

INDEPENDACE DAY 2023

REPUBLIC DAY 2024

Miscellaneous Events 2023-24

Successfully published and circulated Institute **Second Yearly** Hindi Pratika "Gyan Ganga" on occasion of Hindi Diwas 2023-24.

Hindi Meeting 2023-24

Faculty Columns

"Using AI with Python" to provide first-hand/preliminary information about this emerging topic.

By Nitin Singh, EDP Faculty RCB&KI

(Source www.geeksforgeeks.org & tutorilpoints.com)

AI With Python:

In this AI with Python editorial, we will explore the fundamental and advanced concepts of artificial intelligence (AI) using the Python programming language. Whether you're a complete beginner or an experienced professional, this tutorial is tailored to meet your learning needs, offering a step-by-step approach to mastering AI techniques with Python. From understanding basic concepts to exploring advanced algorithms and applications, this editorial equips you with the essential skills and knowledge to dive into the exciting world of AI.

Artificial Intelligence

Artificial Intelligence (AI) is a computer system which is able to execute the tasks that requires human intelligence. The tasks can involve problem solving, machine translation, image generation, and decision making. The primary objective of AI systems is to replicate or simulate human-like cognitive functions, enabling machines to tackle intricate tasks and adapt to varying circumstances. The subset of AI includes machine learning (ML), deep learning (DL), natural language processing, computer vision, robotics and generative AI.

Basic Concept of Artificial Intelligence (AI)

According to the father of Artificial Intelligence, John McCarthy, it is "The science and engineering of making intelligent machines, especially intelligent computer programs".

Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think. AI is accomplished by studying how human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

While exploiting the power of the computer systems, the curiosity of human, lead him to wonder, "Can a machine think and behave like humans do?"

Thus, the development of AI started with the intention of creating similar intelligence in machines that we find and regard high in humans.

The Necessity of Learning AI

As we know that AI pursues creating the machines as intelligent as human beings. There are numerous reasons for us to study AI. The reasons are as follows –

AI can learn through data

In our daily life, we deal with huge amount of data and human brain cannot keep track of so much data. That is why we need to automate the things. For doing automation, we need to study AI because it can learn from data and can do the repetitive tasks with accuracy and without tiredness.

AI can teach itself

It is very necessary that a system should teach itself because the data itself keeps changing and the knowledge which is derived from such data must be updated constantly. We can use AI to fulfil this purpose because an AI enabled system can teach itself.

AI can respond in real time

Artificial intelligence with the help of neural networks can analyze the data more deeply. Due to this capability, AI can think and respond to the situations which are based on the conditions in real time.

AI achieves accuracy

With the help of deep neural networks, AI can achieve tremendous accuracy. AI helps in the field of medicine to diagnose diseases such as cancer from the MRIs of patients.

AI can organize data to get most out of it

The data is an intellectual property for the systems which are using self-learning algorithms. We need AI to index and organize the data in a way that it always gives the best results.

Why to use Python for AI?

Python provides a clear and readable syntax hence provides a smooth path to learn and build intelligent models without complex code structures. The best part of using Python is its rich ecosystem of libraries and frameworks specially tailored for AI and machine learning. Python has strong community of AI enthusiasts, researchers and developers who share knowledge, insights and resources. The collaborative spirit of the Python AI community ensures that help is always within reach.

Artificial intelligence is considered to be the trending technology of the future. Already there are a number of applications made on it. Due to this, many companies and researchers are taking interest in it. But the main question that arises here is that in which programming language can these AI applications be developed? There are various programming languages like Lisp, Prolog, C++, Java and Python, which can be used for developing applications of AI. Among them, Python programming language gains a huge popularity and the reasons are as follows −

Simple syntax & less coding

Python involves very less coding and simple syntax among other programming languages which can be used for developing AI applications.

Inbuilt libraries for AI projects

A major advantage for using Python for AI is that it comes with inbuilt libraries. Python has libraries for almost all kinds of AI projects. For example, NumPy, SciPy, matplotlib, nltk. Simple AI are some the important inbuilt libraries of Python.

Open source − Python is an open source programming language. This makes it widely popular in the community.

Can be used for broad range of programming − Python can be used for a broad range of programming tasks like small shell script to enterprise web applications.

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages. Python's features include the following −

- Easy-to-learn − Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
- Easy-to-read − Python code is more clearly defined and visible to the eyes.
- Easy-to-maintain − Python's source code is fairly easy-to-maintain.
- A broad standard library − Python's bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.
- Interactive Mode − Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.
- Portable − Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
- Extendable − We can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
- Databases − Python provides interfaces to all major commercial databases.
- GUI Programming − Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.

Important features of Python

Let us now consider the following important features of Python −

- It supports functional and structured programming methods as well as OOP.
- It can be used as a scripting language or can be compiled to byte-code for building large applications.
- It provides very high-level dynamic data types and supports dynamic type checking.
- It supports automatic garbage collection.
- It can be easily integrated with C, C++, COM, ActiveX, CORBA, and Java.

AI With Python – Machine learning

Machine learning is a subfield of AI that allows developers to focus on the development of algorithm and models that enable computers to learn and make predictions or decisions without being explicitly programmed.

There are four types of machine learning techniques:

1. Supervised Learning
2. Semi-Supervised Learning
3. Unsupervised Learning
4. Reinforcement Learning

Supervised Learning

In supervised machine learning, the algorithm is trained on a labelled dataset, where each input is paired with its corresponding output. The application includes classification and regression tasks.

Unsupervised Learning

In unsupervised machine learning, the algorithm is provided unlabelled data and is tasked with finding patterns or relationships within it. The goal of the algorithm is to inherent structures or groups in the data. The application of unsupervised learning includes clustering and dimensionality reduction.

Reinforcement Learning

In reinforcement learning, the algorithm learns by interacting with an environment and receiving feedback in the form of rewards or penalties. The application includes game playing, robotics, autonomous systems.

Despite the success of machine learning, there are several limitations that led to the development and adoption of deep learning. The key limitations of machine learning are:

- ML models rely on handcrafted features and their performance is limited to quality and relevance of these features.
- ML algorithms struggle with high dimensional and unstructured data types like images, audio and text.
- ML models are limited in their capacity to model nonlinear and complex relationships.

AI with Python – Deep Learning

Deep learning is subfield of machine learning. The deep learning model derives inspiration from structure of human brain. The human brain consists of billions of neurons that communicate through electrochemical signals and in DL, artificial neural networks are composed of nodes that are interconnected with weights.

AI with Python – Natural Language Processing (NLP)

Natural language processing focusses on interaction between computers and human language. NLP enables machines to understand, interpret and generate human-like text, allowing for seamless communication. The foundations of Natural Language Processing (NLP) encompass the fundamental principles and techniques that enable machines to understand, interpret, and generate human language.

AI with Python – Computer Vision

Computer Vision is a multidisciplinary field of artificial intelligence that enables machines to interpret, analyze and understand visual information from the world, much like the human visual system. It involves developing algorithms and systems that enable computers to gain insights from images, videos, and other visual data, allowing them to recognize objects, understand scenes, and perform tasks such as image classification, object detection, and facial recognition.

Image Processing and Transformation

Image processing and transformation refer to the techniques and methods used to manipulate and enhance digital images. These processes involve applying various operations to modify the appearance, quality, or information content of an image.

Image Recognition Architectures

Image recognition architectures are specialized models or neural network structures created for the purpose of identifying and categorizing objects within images. Throughout time, numerous architectures have been discovered.

Object Detection Architectures

Object detection architectures leverage deep learning techniques to detect and classify objects with varying orientations. There are two main types for object detection techniques two-stage detectors and single shot detectors.

Two-stage Detectors

Two-stage detectors follow a two-step process. First, they generate region proposals that are likely to contain objects using methods like region proposal networks (RPNs). In the second step, these proposals are classified and refined to obtain the final object detections

Single Shot Detectors

Single Shot Detectors perform object detection in a single forward pass through the network. They predict bounding boxes and class probabilities directly from predefined anchor boxes across multiple scales

Image Segmentation Architectures

Image segmentation architecture models to create partition an input image into distinct regions or objects. Each pixel in the image is labelled, assigning it to a particular segment.

AI with Python – Generative AI

Generative AI re creative models that are capable to generate fresh content, typically encompassing images, text, audio, or various data form. This area of AI is dedicated to producing novel and diverse outputs based on learned patterns and structures.

Image Generation Architectures

Image generation architectures refer to specialized models or neural network structures crafted for the purpose of generating realistic images. These architectures utilize generative models to create visual content that is both realistic and diverse.

Text Generation Architectures

Text generation architectures refer to specialized models or neural network structures created for the purpose of generating fresh textual content. These architectures utilize generative models to produce text that is both coherent and contextually appropriate.

Audio Generation Architectures

Architectures dedicated to audio generation are specialized neural network models crafted for the purpose of generating novel audio content. These structures utilize generative models to create sound sequences that are realistic

Installing Python

Python distribution is available for a large number of platforms. You need to download only the binary code applicable for your platform and install Python.

If the binary code for your platform is not available, you need a C compiler to compile the source code manually. Compiling the source code offers more flexibility in terms of choice of features that you require in your installation.

Here is a quick overview of installing Python on various platforms −

Unix and Linux Installation

Follow these steps to install Python on Unix/Linux machine.

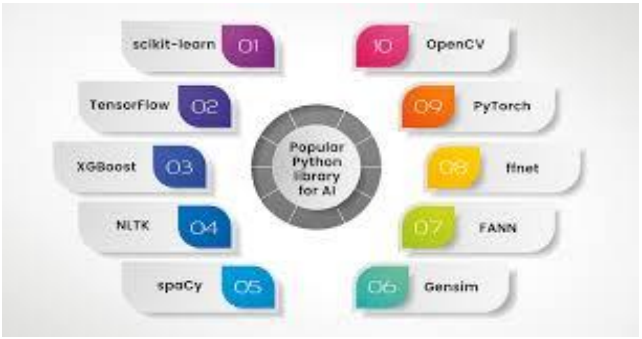
- Open a Web browser and go to https://www.python.org/downloads
- Follow the link to download zipped source code available for Unix/Linux.
- Download and extract files.
- Editing the Modules/Setup file if you want to customize some options.
- run ./configure script
- make
- make install

This installs Python at the standard location /usr/local/bin and its libraries at /usr/local/lib/pythonXX where XX is the version of Python.

Windows Installation

Follow these steps to install Python on Windows machine.

- Open a Web browser and go to https://www.python.org/downloads
- Follow the link for the Windows installer python-XYZ.msi file where XYZ is the version you need to install.
- To use this installer python-XYZ.msi, the Windows system must support Microsoft Installer 2.0. Save the installer file to your local machine and then run it to find out if your machine supports MSI.
- Run the downloaded file. This brings up the Python install wizard, which is really easy to use. Just accept the default settings and wait until the install is finished.



Stakeholder Engagement for Public Auditing"

by Dhawal Kishor Singh, Core Faculty General RTI

Stakeholder Engagement for Public Auditing

Stakeholder engagement plays a pivotal role in the public auditing process conducted by the Comptroller and Auditor General (CAG) to uphold accountability, transparency, and good governance in the management of public finances. As an independent constitutional authority tasked with auditing government expenditures, the CAG recognizes the importance of engaging stakeholders at various stages of the audit cycle to foster trust, gather valuable insights, and ensure the relevance and impact of audit findings.

Defining Stakeholders

Stakeholders is an individual or group that has an interest in any decision or activity of an organization. Stakeholders in public auditing encompass a diverse range of entities and individuals with an interest or influence in government finances and operations.

These stakeholders may include government agencies, elected officials, civil society organizations, taxpayers, beneficiaries of government programs, regulatory bodies, and international organizations.

Recognizing the diverse interests and perspectives of stakeholders is essential for effective engagement.

For Indian Audit &Accounts Department is concerned, stakeholders include both Internal and External Stakeholders.

Internal Stakeholders

1. Top Management includes Comptroller and Auditor General of India

2.Executives (Group Officers, Senior Audit Officers, Assistant Audit Officers)

3. Other employees

External Stakeholders

1. Various State Governments & their legislatures

2. Union Government and Parliament

3. Public Sector, viz. Government departments, Government organisations like Central & State Autonomous bodes, Government companies (State & Central)

4. General Public, Media, Civil Society Organisations etc.

Objectives of Stakeholder Engagement

Many emerging markets, international bodies, governments, financial institutions, public and private sector bodies have reformed their governance systems in the last two decades. They are encouraging debate and spearheading initiatives towards good governance. In the same way, Audit is also responsive to meeting the diverse information needs of the stakeholders in a transparent, objective and timely manner. Audit is accessible to stakeholders and there are effective communication channels for publicizing substance of Audit Reports.

Mission Statement of CAG of India is 'Mandated by the Constitution of India, we promote accountability, transparency and good governance through high quality auditing and accounting and provide independent assurance to our stakeholders, the Legislature, the Executive and the Public, that public funds are being used efficiently and for the intended purposes'.

The effectiveness with which SAIs fulfil their role of holding the government to account for the use of public money not only depends on the quality of their work, but also on how effectively they are working in partnership with the accountability functions of the legislature as well as the executive arm of government in making use of audit findings and enacting change.

The primary objectives of stakeholder engagement in public auditing by the Supreme Audit Institution (SAI) of India are: Promoting transparency and accountability by providing stakeholders with access to audit processes, findings, and recommendations.

Gathering feedback, insights, and concerns from stakeholders to inform audit planning, scoping, and risk assessment.

Enhancing the credibility and relevance of audit reports by addressing stakeholder expectations, priorities, and areas of interest.

Facilitating dialogue and collaboration between auditors and stakeholders to address complex audit issues, challenges, and opportunities.

Building trust and confidence in the audit process and the integrity of audit findings among stakeholders.

Key Principles of Stakeholder Engagement

SAI, India has always emphasised on effective Stakeholder Engagement. Therefore, even in Audit Quality Management Framework issued by CAG, one element included is 'Client and Stakeholder Relation'.

Key issues for engaging with Stakeholders of SAI include:

Developing strategic plans that respond to key issues that affect society, and establishing mechanisms for information gathering and decision making to enhance relevance to stakeholders

- Enabling those charged with public sector governance to discharge their responsibilities in responding to audit findings and recommendations and taking appropriate corrective action
- Reporting on audit results and thereby enabling the public to hold government and public sector entities accountable

Stakeholder engagement in public auditing by the SAI is guided by the following key principles:

- Inclusivity: Ensuring the participation of diverse stakeholders representing different perspectives, interests, and constituencies.
- Transparency: Providing stakeholders with clear, timely, and accessible information about audit processes, methodologies, findings, and recommendations.
- Accountability: Holding auditors and stakeholders accountable for their roles, responsibilities, and contributions to the audit process.
- Respect: Valuing the perspectives, opinions, and contributions of stakeholders, even in cases of disagreement or contention.

Expectation of Stakeholders

Following are the key expectation of Stakeholders from SAI.

- Conducts quality audits and other functions which help in strengthening the accountability systems of public resources-planning, conduct and reporting of audit
- Provides reliable and easy access to all information on the mandate, activities and products of the SAI
- Shares insights and key audit messages relating to the stewardship of public funds, implementation of government policies and compliance with key legislation
- Offers technical support on specialized topics/reports for easy decision-making

Expectation of SAI from Stakeholders include the following:

From Auditees- Give access to reliable and timely information, Cooperate meaningfully during the audit process, Implement recommendations and regulations

From Executives: Promote SAI independence by not exerting any political pressure in the course of the SAI's work and implement the audit recommendations and sanctions

Legislature: Support in following up the SAI's recommendations, Support in formulating relevant laws and regulations, Promote SAI independence

Strategies for Stakeholder Engagement

The CAG employs various strategies to engage stakeholders effectively throughout the audit cycle.

- Pre-Audit Consultations: Seeking input from stakeholders during the audit planning phase to identify areas of concern, risks, and priorities for audit coverage.
- Stakeholder Meetings: Organizing meetings, workshops, or forums to discuss audit objectives, methodologies, and preliminary findings with relevant stakeholders.
- Information Sharing: Providing stakeholders with access to audit reports, summaries, presentations, and other relevant documents in formats that are accessible and understandable.
- Online Platforms: Leveraging digital platforms, websites, and social media channels to disseminate information, gather feedback, and engage with stakeholders remotely.
- Follow-Up Actions: Responding to stakeholder inquiries, concerns, or recommendations promptly and transparently to address issues raised during the audit process.

Following are the some of the good practices adopted by SAI to meet Stakeholder expectations in respect of Public Audit:

- Availing the services of Subject Matter Experts for special audits
- Conducting Entry Conference with the auditee entity for determining audit approach
- Conducting Exit Conference with the auditee entity for discussing the audit findings and developing recommendations
- Adequate documentation
- Independent peer review of operations of one office by another

Benefits of Stakeholder Engagement

Effective stakeholder engagement in public auditing by the CAG yields several benefits, including:

- Enhanced transparency and accountability in government operations and financial management.
- Improved audit quality and relevance by incorporating diverse perspectives, insights, and evidence from stakeholders.
- Strengthened public trust and confidence in the integrity and independence of the Increased awareness and understanding of audit objectives, methodologies, and findings among stakeholders.
- Facilitated collaboration and cooperation between auditors, auditees, and other stakeholders in addressing audit findings and implementing recommendations.

Challenges and Considerations

Stakeholder engagement in public auditing by the CAG may encounter challenges such as:

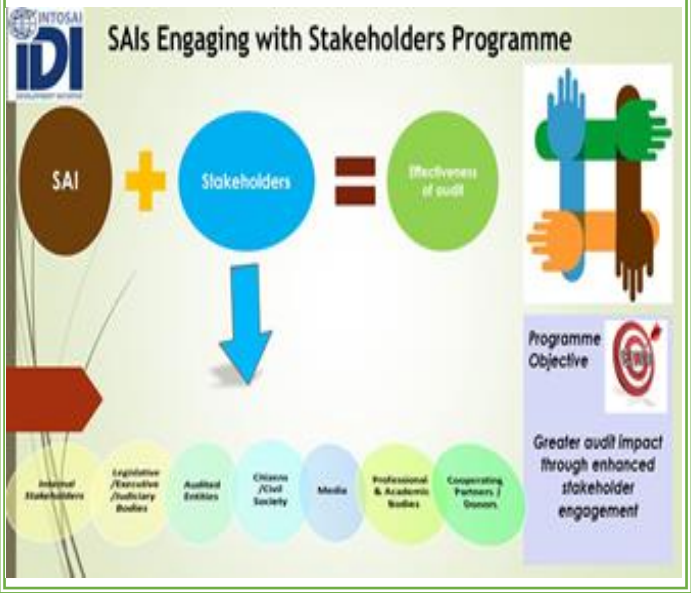
- Balancing stakeholder interests and expectations with the need to maintain independence and objectivity in the audit process.
- Managing conflicts of interest, biases, or political influences that may arise among stakeholders.
- Ensuring the representativeness and inclusivity of stakeholder engagement efforts, particularly in reaching marginalized or vulnerable communities.
- Addressing resource constraints, capacity limitations, and logistical challenges in organizing and conducting stakeholder engagement activities.

To address these challenges, the CAG employs robust governance mechanisms, ethical standards, and procedural safeguards to uphold the integrity and effectiveness of stakeholder engagement in public auditing.

Conclusion

Stakeholder engagement is integral to the public auditing process conducted by the SAI, India to promote transparency, accountability, and good governance in the management of public finances. By embracing principles of inclusivity, transparency, and accountability, the CAG enhances the credibility, relevance, and impact of audit findings while fostering trust and collaboration with diverse stakeholders.

(Image: courtesy website https://www.idi.no/work-streams/well-governed-sais/past-initiatives/ses)



Unified Payments Interface (UPI): A Boon for Digital Transactions in India

by Abhishek Jaiswal Faculty KCRTI

Introduction:

Unified Payments Interface (UPI) has emerged as a transformative force in India's digital payments landscape, revolutionizing the way individuals and businesses conduct financial transactions. Launched by the National Payments Corporation of India (NPCI) in 2016, UPI offers a seamless, instant, and secure platform for inter-bank fund transfers through mobile devices. This article provides a comprehensive analysis of UPI, exploring its evolution, key features, adoption trends, impact on financial inclusion, challenges, and future prospects.

Cash has traditionally dominated India's financial system. However, the rapid increase in use of smartphones and the internet has catalysed a shift in India's payment landscape, with digital transactions gaining momentum over traditional cash-based methods.

Among the various digital payment systems, Unified Payments Interface (UPI) has emerged as a game-changer, offering unparalleled convenience, speed, and security to users across the country. Facilitated by the National Payments Corporation of India (NPCI), UPI enables individuals to transfer funds between bank accounts instantly, using a single mobile application. It leverages existing smartphone infrastructure and eliminates the need for bank account details or lengthy Debit/Credit card information for transactions. Since its inception in 2016, UPI has witnessed exponential growth, transforming the way people transact and paving the way for a cashless economy.

Evolution of UPI:

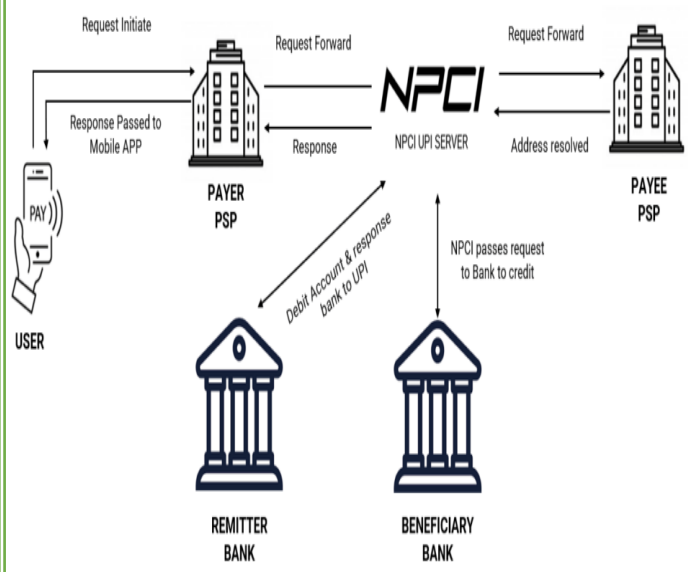
UPI offers a seamless and user-friendly platform for peer-to-peer (P2P) and peer-to-merchant (P2M) transactions. Over the years, UPI has undergone several iterations and enhancements, introducing new features such as QR code payments, recurring payments, and integration with third-party apps, thereby expanding its utility and reach.

Unified Payments Interface (UPI) has undergone significant evolution since its inception. Here's a brief overview of its evolution:

- **Launch (2016):** UPI was launched by the NPCI in April 2016 with the aim of facilitating instant real-time interbank transactions through mobile devices. Initially, it was adopted by a few banks and gained momentum as more banks and financial institutions started integrating UPI into their mobile banking apps. This led to a rapid increase in the number of transactions processed through the UPI platform.
- **Introduction of UPI 2.0 (2018):** In August 2018, NPCI introduced UPI 2.0 with several new features and enhancements aimed at improving the user experience and expanding the capabilities of the platform. UPI 2.0 introduced features such as overdraft facility, one-time mandate, invoice in the inbox, signed intent and QR, etc.
- **QR Code Payments:** QR code-based payments became a prominent feature of UPI, allowing users to make payments by scanning QR codes using their smartphones. This further simplified the process of making payments for both merchants and customers, leading to increased adoption.
- **Expansion of Use Cases:** UPI evolved beyond peer-to-peer (P2P) transfers to encompass a wide range of use cases including merchant payments, bill payments, online shopping, ticket booking, and more. This expansion of use cases contributed to the widespread adoption of UPI across various sectors.

- **Integration with Other Platforms:** UPI was integrated into various other platforms and services including e-commerce websites, food delivery apps, utility bill payment portals, etc., making it more convenient for users to make payments using UPI.
- **Cross-Border Payments:** NPCI launched UPI for international markets, allowing users to make cross-border transactions using the UPI platform. This move aimed to expand the reach of UPI beyond domestic transactions and cater to the needs of users sending money internationally. As of now UPI payments are accepted in France, Sri Lanka, Mauritius, Bhutan, UAE, Malaysia, Singapore, Nepal, Oman, Qatar and Russia.

How UPI Works?



User: Uses a UPI app (PhonePe, Paytm etc.) to initiate and receive payments.

• **UPI App**: Facilitates user interaction and system communication.

• **NPCI**: Runs the central switch, handles communication, and routes payments.

• **Sender Bank**: This bank retains user funds and, when authorized, debits the account.

• **Recipient Bank**: After receiving the money, credits the recipient's account.

UPI Architecture:

• **Front-end**: User interfaces for sending and receiving payments are provided by UPI apps.

• **Payment Service Provider (PSP)**: Provides an additional service and links UPI apps to NPCI.

• **NPCI Switch**: The central system that manages the routing of payment requests and replies.

• **Bank APIs**: These allow NPCI and certain banks to communicate with one another.

• **Bank servers**: interact with NPCI, handle transactions, and handle debit and credit accounts.

Flow of UPI Transactions:

- **Payment initiation by User:**
  - User selects recipient (UPI ID, QR code, etc.) and enters amount in their UPI app.

- **Sending Request by App:**
  - Encrypted payment request is sent from the app to its PSP (if applicable).
  - PSP forwards the request to NPCI along with necessary authentication details.
- **Routing Request by NPCI:**
  - NPCI decrypts the request and verifies user's UPI PIN using secure protocols.
  - Based on recipient's details, NPCI identifies the receiving bank and routes the request.
- **Validation by bank:**
  - Receiving bank authenticates the request and checks recipient's account validity.
  - If sufficient funds exist, the bank sends a confirmation to NPCI.
- **Transfer of funds:**
  - Upon confirmation, sender's bank debits the account and sends funds to NPCI.
  - NPCI credits the receiving bank, which then deposits funds into the recipient's account.
- **Confirmation:**
  - NPCI sends confirmation messages to both sender and receiver apps.
  - Apps notify users of successful transaction completion.

Security features in UPI:

- **Two-Factor Authentication:** Use of two-factor verification is one of the main security features of UPI exchanges. Before an exchange can be finalized, customers must provide two types of distinct proof that they have just obtained. This frequently involves combining something the customer possesses (e.g., a mobile device or fingerprint) with something they know (e.g., a password or PIN). Unauthorized access is virtually eliminated by needing two separate pieces of data. That being said, in order to optimize the practicality of this level of security, it is imperative that users use strong and unique passwords.
- **Biometric Authentication:** Many systems now provide biometric identification methods, such as fingerprint or facial recognition, to improve the security of UPI transactions. These techniques validate the user's distinct biological characteristics, adding an extra degree of protection. Because it is impossible for unauthorized individuals to mimic these qualities, biometric authentication is extremely safe. Users must, however, make sure that their biometric information is kept safe and not susceptible to theft or exploitation.

- **Transaction Limits and Alerts:** To reduce the danger of fraudulent activity, UPI transactions additionally include real-time alerts and transaction limitations. Users have the ability to impose restrictions on how much they can transact in a given time frame. This gives users more financial control and aids in the prevention of large-scale fraudulent transactions. Every transaction also triggers real-time warnings to users' registered email addresses or mobile numbers, enabling them to promptly detect and report any questionable conduct.
- **Secure PIN Entry:** User authorization for UPI transactions requires the entry of a secure password or PIN. Platforms frequently use techniques like disguising the digits or employing virtual keyboards to stop key loggers from recording the input to guarantee the security of this PIN.
- **Secure Network and Encryption:** The entire UPI transaction process is conducted over secure networks, usually with the use of Transport Layer Security (TLS) or Secure Sockets layer (SSL) encryption protocols, to ensure user privacy. By using encryption, you can be sure that no unauthorized parties will be able to intercept or alter the confidential data that is transferred between the user's device and the payment

Functionalities of UPI:

UPI offers a wide range of functionalities that make it a versatile and convenient payment platform. Here are some key functionalities of UPI:

- **Instant Fund Transfer:** UPI enables users to transfer funds instantly between bank accounts in a secure and real-time manner, 24/7, including weekends and holidays.
- **Virtual Payment Address (VPA):** Users can create a unique virtual payment address (VPA) linked to their bank account, eliminating the need to remember complex bank account details. VPAs typically look like "username@bankname".
- **QR Code Payments:** UPI supports QR code-based payments, allowing users to scan QR codes at merchant outlets or websites to make payments quickly and conveniently.
- **Collect Requests:** Merchants or individuals can generate collect requests using UPI, enabling them to request payments from customers or peers. Users receive notifications for these requests and can approve or decline them.
- **Bill Payments:** UPI facilitates the payment of utility bills, mobile recharge, DTH recharge, credit card bills, and other bills directly from the user's bank account through their UPI-enabled app.
- **Online Shopping:** UPI can be used for making payments while shopping online on e-commerce platforms or mobile apps. Users can select UPI as a payment option during checkout and complete the transaction seamlessly.

- **In-app Payments:** Many mobile applications integrate UPI as a payment option, allowing users to make payments for various services and products directly within the app.
- **Recurring Payments:** UPI supports recurring payments for services such as subscription renewals, loan EMIs, insurance premiums, etc. Users can set up recurring payment mandates with their bank accounts.
- **Cross-Border Payments:** UPI has been extended for international transactions, enabling users to send money abroad using their UPI IDs. As of now UPI payments are accepted in France, Sri Lanka, Mauritius, Bhutan, UAE, Malaysia, Singapore, Nepal, Oman, Qatar and Russia.
- **Security Features:** UPI incorporates robust security measures such as two-factor authentication (2FA), MPIN (Mobile Personal Identification Number), and encryption to ensure the safety of transactions.
- **Transaction History:** Users can view their transaction history and account balance through their UPI-enabled app, providing transparency and control over their finances.

Benefits of UPI:

- **Convenience:** UPI offers a fast, secure, and user-friendly way to make and receive payments anytime, anywhere.
- **Cost-Effective:** Transactions are free for users, making it an attractive alternative to cash or card payments with associated fees.
- **Financial Inclusion:** UPI promotes financial inclusion by enabling individuals with basic smartphones and bank accounts to participate in the digital economy.
- **Transparency:** Users receive real-time notifications for every transaction, ensuring transparency and control over their finances.
- **Increased Business Efficiency:** UPI simplifies and streamlines the payment process for businesses, leading to faster settlements and improved cash flow.

Factors Contributing to UPI's Success:

- **Simple and User-Friendly Interface:** UPI offers a user-friendly design accessible to people with varying levels of technical expertise.
- **Interoperability:** UPI works across different banks and payment platforms, promoting inclusivity and convenience.
- **Integration with Mobile Wallets:** UPI seamlessly integrates with popular mobile wallets, leveraging their existing user base.
- **Government Initiatives:** The Indian government has actively promoted digital payments with initiatives like Digital India and cashback schemes to incentivize UPI adoption.

Future Prospects:

The future of UPI is promising, with continuous innovation and integration with emerging technologies like Artificial Intelligence (AI) and block chain. Potential areas of development include:

- **Enhanced Security Features:** Implementing biometric authentication and advanced encryption methods can further strengthen security.
- **Offline Functionality:** Exploring technologies that enable UPI transactions even with limited or no internet connectivity.
- **Integration with New Technologies:** UPI can be integrated with AI-powered chatbots for voice-based payments and block chain for secure and transparent micro-transactions.

Data Visualization

by Ram Raj Pal Core Faculty EDP RJJ

Data visualization is the process of creating graphical representations of information. This process helps the presenter communicate data in a way that's easy for the viewer to interpret and draw conclusions. Data visualization convert large and small data sets into visuals, which is easy to understand and process for humans. Data visualization tools provide accessible ways to understand outliers, patterns, and trends in the data.

Benefits of Data Visualization:

Visualizing data is more than transforming it into bar graphs and pie charts. When you choose the right interactive data visualization to highlight the most important aspects of your data, you can illuminate new insights and communicate them more persuasively. And that data storytelling can result in smarter actions and bigger outcomes.

Faster decision-making: By viewing and manipulating big data in visual and animation formats, you can understand the story your data tells you at a quick glance, rather than poring over piles of numbers and tables for hours or weeks.

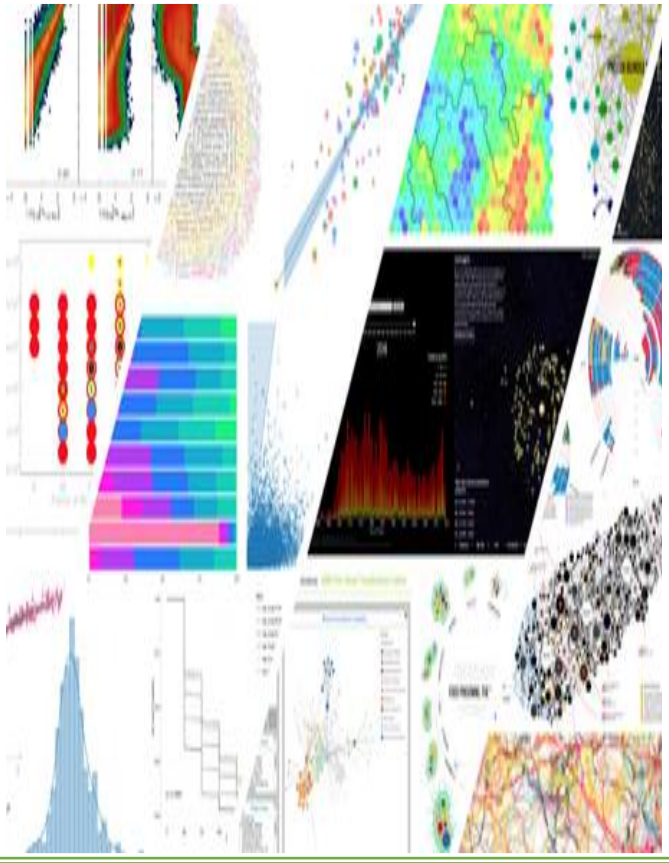
More data exploration: The best tools allow you to interact with all your data, directly on the chart to discover hidden patterns, see data relationships and uncover actionable insights — all without IT support.

Better track business initiatives: Dashboards help you easily track the performance of business initiatives by allowing you to quickly see how everyday operations affect key performance indicators (KPIs).

Extend your analytics investment: visuals make it easier to understand data, everyone in an organization can explore data and find insights that improve growth and effectiveness.

Data visualization tools and technologies:

In the world of Big Data, the data visualization tools and technologies are required to analyze vast amounts of information.



Tableau

Tableau has a variety of options available, including a desktop app, server and hosted online versions, and a free public option. There are hundreds of data import options available, from CSV files to Google Ads and Analytics data to Salesforce data. Output options include multiple chart formats as well as mapping capability. That means designers can create color-coded maps that showcase geographically important data in a format that's much easier to digest than a table or chart could ever be.

Google Charts

One of the major players in the data visualization market space, Google Charts, coded with SVG (Scalable Vector Graphic) and HTML, is famed for its capability to produce graphical and pictorial data visualizations. Google Charts offers zoom functionality, and it provides users with unmatched cross-platform compatibility with iOS, Android, and even the earlier versions of the Internet Explorer browser.

Power BI

Microsoft's easy-to-use data visualization tool, is available for both on-premise installation and deployment on the cloud infrastructure. Power BI is one of the most complete data visualization tools that supports a myriad of backend databases, including Teradata, Salesforce, PostgreSQL, Oracle, Google Analytics, Adobe Analytics, Azure, SQL Server, and Excel. The enterprise-level tool creates stunning visualizations and delivers real-time insights for fast decision-making.

Qlik Sense:

Qlik Sense is a data visualization tool designed for large business and people who want to use augmented analytics to analyse data. Qlik Sense is the successor to QlikView-as similar visual analytics tool.

Visme:

Visme is an intuitive programme that can create data visualizations and infographics. It is perfect for anyone looking to make simple charts with sleek and aesthetically pleasing designs.

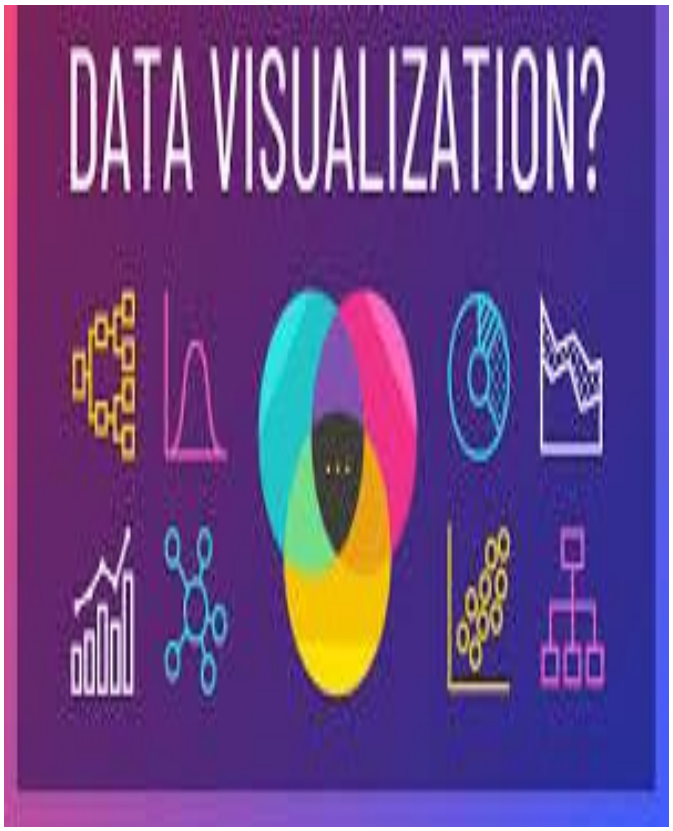
Types of Visualizations:

- **Chart:** Information presented in a tabular, graphical form with data displayed along two axes. Can be in the form of a graph, diagram, or map.
- **Table:** A set of figures displayed in rows and columns.
- **Graph:** A diagram of points, lines, segments, curves, or areas that represents certain variables in comparison to each other, usually along two axes at a right angle.
- **Geospatial:** A visualization that shows data in map form using different shapes and colours to show the relationship between pieces of data and specific locations.
- **Infographic:** A combination of visuals and words that represent data. Usually uses charts or diagrams.
- **Dashboards:** A collection of visualizations and data displayed in one place to help with analysing and presenting data.
- **Area Map:** A form of geospatial visualization, area maps are used to show specific values set over a map of a country, state, county, or any other geographic location. Two common types of area maps are choropleths and isopleths.

- **Bar Chart:** Bar charts represent numerical values compared to each other. The length of the bar represents the value of each variable.
- **Box-and-whisker Plots:** These show a selection of ranges (the box) across a set measure (the bar).
- **Bullet Graph:** A bar marked against a background to show progress or performance against a goal, denoted by a line on the graph.
- **Gantt Chart:** Typically used in project management, Gantt charts are a bar chart depiction of timelines and tasks.
- **Heat Map:** A type of geospatial visualization in map form which displays specific data values as different colours (this doesn't need to be temperatures, but that is a common use).
- **Highlight Table:** A form of table that uses colour to categorize similar data, allowing the viewer to read it more easily and intuitively.
- **Histogram:** A type of bar chart that split a continuous measure into different bins to help analyse the distribution.
- **Pie Chart:** A circular chart with triangular segments that shows data as a percentage of a whole.

Conclusion:

Data presented with the purpose of generating a larger appeal to a wider audience, allows for wider data scrutiny through more diverse interpretations. Data visualization is different from pure rational analysis in that it aims at telling a story to create an emotional response. We can have rational evidence right in front of us, but if we can't imagine something that has never existed before, it's impossible to stimulate far reaching action.



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Thank You, Feedback and comments are always Welcome!

38th year of RCB&KI,Prayagraj