



NEWSLETTER

✉ info@atme.edu.in ☎ +91-821-2954081 📍 13th Kilometer, Mysore – Kanakapura – Bangalore Road, Mysore – 570 028 Karnataka

Vision Of The Department

- To develop highly talented individuals in Computer Science and Engineering to deal with real world challenges in industry, education, research and society.

Mission Of The Department

- To inculcate professional behavior, Strong ethical values, innovative research capabilities and leadership abilities in the young minds & to provide a teaching environment that emphasizes depth, originality and critical thinking.
- Motivate students to put their thoughts and ideas adoptable by industry or to pursue higher studies leading to research.



PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

- Empower students with a strong basis in the mathematical, scientific and engineering fundamentals to solve computational problems and to prepare them for employment, higher learning and R&D.
- Exposure to emerging technologies and work in teams on interdisciplinary projects with effective communication skills and leadership qualities.
- Gain technical knowledge, skills and awareness of current technologies of computer science engineering and to develop an ability to design and provide
- novel engineering solutions for software/hardware problems through entrepreneurial skills.
- Ability to function ethically and responsibly in a rapidly changing environment by applying innovative ideas in the latest technology, to become effective professionals in Computer Science to bear a life-long career in related areas.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

- Ability to apply skills in the field of algorithms, database design, web design, cloud computing and data analytics.
- Apply knowledge in the field of computer networks for building network and internet based applications.

Dear Readers,

It is with great pleasure that we bring you Volume 15, Issue I of our department newsletter "CS MAIL". The current newsletter highlights the activities of the department, achievements of faculty and students during the past six months. It also features workshop organized and attended, paper publication details and other social activity undertaken from CS Department.

Your valuable comments and suggestions are appreciated.

We wish all the readers an enjoyable reading.

Message From Principal



ATMECE has emerged as a prominent institute offering quality education. All round continuous changes in infrastructure and academics standard have helped us to build a brand name. It gives me immense pleasure to introduce the Volume 14, Issue II of the half yearly newsletter "CS MAIL" of Computer Science Department. I am pleased to know that the newsletter will showcase the activities and credentials of CS&E department. I hope this will become a platform for students and staff to exhibit their talents in science and technology. On behalf of management, I appreciate the newsletter committee for their efforts in bringing out this edition.

I wish the editorial all success!!!

Regards,
Dr L Basavaraj
Principal, ATMECE

Message From Chief Editor



It gives me immense pleasure to present this edition of the newsletter of the Computer Science and Engineering Department, ATME College of Engineering, Mysuru. This newsletter stands as a reflection of the vibrant academic culture, innovative spirit, and collective achievements of our faculty and students. The field of Computer Science is evolving at an unprecedented pace, shaping every aspect of modern life—from artificial intelligence and cloud computing to cybersecurity and data science. In this dynamic environment, our department continuously strives to equip students with strong technical foundations, critical thinking skills, and ethical values required to meet global challenges.

I sincerely appreciate the efforts of the editorial team, faculty coordinators, and students who have worked diligently to bring out this newsletter. I also congratulate all those who have contributed through their achievements, publications, events, and innovations.

I wish all our students and staff continued success in their academic and professional endeavors!

Regards,
Dr. Putte Gowda D
Professor & Head

Editorial Team

Chairman

Dr. L Basavaraj
Prinicpal, ATMECE

Chief Editor

Dr. Puttegowda D.
HOD, CS&E

Editor

Ms. B S Vanishree
Assistant Professor, CS&E

Student Coordinators

Ms. Suhana S
Ms. Umme Kulsum

Department Activities

Workshop on “How Developers Build Websites/Apps”



The Department of Computer Science and Engineering, ATME College of Engineering, organized a one-day workshop on “How Developers Build Websites/Apps” on 6th November 2025. Resource persons Mr. Chiranth S and Ms. Nikhila S, Software Developers at ATEU Softwares, shared valuable insights into web and app development practices. The session provided students with practical exposure to real-world development tools and techniques, enhancing their understanding of modern software creation.



Workshop on “Future Forward: Empowering Minds for Placements”



The Department of Computer Science and Engineering, ATME College of Engineering, organized a two-day workshop on “Future Forward: Empowering Minds for Placements” on 10th and 13th November 2025. The sessions were conducted by Dr. Shilpa B. L., Associate Professor, and Mr. Teja N., Assistant Professor, Department of CSE, ATMECE, Mysuru. The workshop focused on enhancing students' technical and placement readiness skills.

Workshop on “From Idea to Publication: Writing Research Papers with LaTeX”



The Department of Computer Science and Engineering organized a one-day workshop on “From Idea to Publication: Writing Research Papers with LaTeX” on 20 November 2025 for 5th semester students. The resource person, Dr. Deepak N A, provided hands-on training on LaTeX tools, research paper structure, and IEEE formatting. Students gained practical experience in preparing professional-quality academic documents and understanding the publication process. The session enhanced their research skills, technical writing abilities, and confidence to publish papers. The workshop concluded with positive feedback and active participation from all students.

Workshop on “Play with Gemini CLI Edition”



A workshop on “Gemini CLI Edition” was organized on the 10th of December 2025 for the students of Computer Science and allied branches. GSA co-ordinators from ATMECE, Mr. Abhinandan, Mr. Bhuvan D N and Ms. Lakshmi M, organized and facilitated the workshop with the objective of introducing participants to the power and practicality of Google's Gemini models through a command-line interface (CLI). The workshop provided hands-on experience in leveraging generative AI for productivity and development tasks, successfully achieving high participant engagement and positive feedback.



Other Department Activities

Date	Name of the Activity	Target Audience
05/11/2025	Ideate. Innovate. Inspire: Research Paper Writing & Publication Awareness	5 th Semester Students
29/11/2025	INNOVISION 2025 – Project Exhibition & Demonstration in Association with ATEU Softwares	7 th Semester Students
09/12/2025	InnovateLite 2025- Mini Project Exhibition & Demo Volunteering students: Janya U. Singh, Udith S., Vijay R. Gali, Lakshmi M., Abhinandan	5 th Semester Students

Placements

Sl. No.	Name	Company
1	Md. Fakruddin S.	N Compass TechStudio
2	Naveen L. D.	N Compass TechStudio
3	Arpitha B. N.	Infosys
4	Yashika K. R.	Gupio
5	Prakruthi R. S.	Gupio
6	Kushi P.	Gupio and ATEU Softwares
7	Umme Kulsum	Gupio
8	Syed Mahtab M.	Gupio
9	Ashwini V	Corizo Edutech Pvt. Ltd.
10	Rajendra A.	Corizo Edutech Pvt. Ltd.
11	Shivashankara Murthy M.	Corizo Edutech Pvt. Ltd. and ATEU Softwares
12	Shweta	Corizo Edutech Pvt. Ltd
13	Sophiya A. S.	Corizo Edutech Pvt. Ltd
14	Tejaswini	Corizo Edutech Pvt. Ltd
15	Ranjitha C.	Corizo Edutech Pvt. Ltd
16	Faizabad Baig	SMG Ventures
17	Dhanushri R.	ATEU Softwares
18	Kalpana Lahari B.	ATEU Softwares
19	Chandana M. R.	ATEU Softwares

Congratulations to All !!!!

Toppers List

2nd Semester

Sl. No.	USN	Name of the Student	SGPA
1	4AD24CS083	Manjula	9.65
2	4AD24CS092	Mohammed Maaz	9.60
3	4AD24CS102	Nischitha M	9.60
4	4AD24CS146	Thanusha B S	9.60

Toppers List

4th Semester

Sl. No.	USN	Name of the Student	SGPA
1	4AD23CS107	Suhana S	9.15
2	4AD23CS097	Sanjana B U	9.05
3	4AD23CS094	S Lanchana	9.00
4	4AD23CS109	Thejaswini R	8.95

Toppers List

6th Semester

Sl. No.	USN	Name of the Student	SGPA
1	4AD22CS086	Rajendra A	9.61
2	4AD22CS019	Chandana M R	9.50
3	4AD22CS125	Yashika K R	9.44
4	4AD22CS115	Tejashwini	9.39

Toppers List

8th Semester

Sl. No.	USN	Name of the Student	SGPA
1	4AD21CS044	M K Dechamma	10.00
2	4AD21CS019	Dheeraj Thotappa M	10.00
3	4AD21CS029	Hisha Vishwanath	10.00
4	4AD21CS014	Bhuvan S	10.00

"The important thing is not to
stop questioning."

— Albert Einstein

Publications - Faculty & Students

An AI-Powered Platform for Enhanced Skill Matching and Trust in the Gig Economy: The Skill-Bridge Connect

 Savitha Nagaraju
Dr. J. V. Gorabal

SCOPUS: LNSS

 Nov 2025

ISSN / ISBN 2367-3370
Vol. / Issue / Page : 601-620

SEAS: Security and Efficiency - Aware Scheduler for Workflow Execution in Edge-Cloud Platform

 Raghuram A. S.
Dr. J. V. Gorabal

International Journal of Intelligent Engineering and Systems

 Nov 2025

ISSN / ISBN 2185-3118
Vol. / Issue / Page : 18/10/1-12

An AI-Powered Platform for Enhanced Skill Matching and Trust in the Gig Economy: The Skill-Bridge Connect

 Roopa B., Vijay R. Gali, Puneeth J., Vikas Sampath
Raghunandan A. S.

International Journal of All Research Education and Scientific Methods

 Dec 2025

ISSN / ISBN 2455-6211
Vol. / Issue / Page : 13/12/592-599

A Practical CPU Friendly Model for Automated Image Caption Generation

 Ashwini P., Md. Shadab Khalid, Rifa Habeeb,
Mariam Fatima, Sonali Nag

International Journal of Research Publication and Reviews

 Dec 2025

ISSN / ISBN 2582-7421
Vol. / Issue / Page : 6/12/2575-2581

Student Course Recommendation Using Machine Learning and rule based AI

 Shrilakshmi P., Pranav Umesh, Sanjay S.,
Ujwal D. Gotur

International Journal of Research Publication and Reviews

 Dec 2025

ISSN / ISBN 2582-7421
Vol. / Issue / Page : 6/12/2609-2613

A web based College Management System for Student, Faculty and Administrative workflow Automation

 Shrilakshmi P., Akash Sajjan,
Parshanth S.

International Journal of Research Publication and Reviews

 Dec 2025

ISSN / ISBN 2582-7424
Vol. / Issue / Page : 6/12/6490-6492

AI-driven lung disease classification using deep learning

 B. S. Vanishree, Tuba Taskeen, Shiva Prakash R. S.
Md. Usman, Shashank B. S.

International Research Journal of Modernization in Engineering Technology and Science

 Dec 2025

ISSN / ISBN 2582-5208
Vol. / Issue / Page : 7/12/1237-1246

A Machine Learning-Based Framework for Election Data Analysis & Automated Anomaly Detection to Enhance Electoral Transparency

 Keerthana M. M., Md. Fardeen, Sourav Singh,
Shaik Zarar H., Md. Usama

International Journal of Research Publication and Reviews

 Dec 2025

ISSN / ISBN 2582-7421
Vol. / Issue / Page : 6/12/3414-3418

Publications - Faculty & Students

Enhanced Passive Radar DOA Estimation Using Wigner-ville Distribution and Music Algorithm in Noisy Environments



Ashwini P.

SCOPUS: 5Th IEEE International Conference on Mobile Networks & Wireless Communication (ICMNWC-2025)



Dec 2025

ISSN / ISBN 2582-7421
Vol. / Issue / Page : 6/12/6490-6492

Detection of Face-Swap Videos by using Vision Transformer



Kavyashree E. D.

IEEE: 4th International Conference on Applied Artificial Intelligence and Computing



Dec 2025

ISSN / ISBN 2004-2008
Vol. / Issue / Page : 979-8-3315-65879/25

AI-Driven Multimodal Primary Forecast Of Sudden Cardiac Arrest (SCA): A Comprehensive Examination



Bindushree

SCOPUS: ICAIES



Dec 2025

ISSN / ISBN
Vol. / Issue / Page : 978-81-996802-4-1

Generative AI and Creativity. Chapter: An Automated Image Style Transfer Framework Using GenAI Algorithm.



Abhishek Chakraborty, Rashel Sarkar, B. M. Mahendra, R. Sandesh, Gurusiddappa H., Balasubramanian P. K.

SCOPUS: Auerbach Publications



Nov 2025

ISSN / ISBN
Vol. / Issue / Page : 9781003533009 62-79

A Survey on IOT Based Anti-Theft Flooring System



R. Sandesh, Pavan Gowda B. S., D. S. Hruthik, Preetham K., Charan M. U.

International Journal of Research Publication and Reviews



Dec 2025

ISSN / ISBN
Vol. / Issue / Page : 2582-7421 / Volume 6 / Issue 12

Automated File Classification and Notes Structuring Using Whatsapp Bot



R. Sandesh, Abhinandan, Janya U. Singh, Deekshath K. P., Lakshmi M.

International Journal of Research Publication and Reviews



Dec 2025

ISSN / ISBN
Vol. / Issue / Page : 2582-7421 / Vol. 6 / Issue 12

AI-Driven Cyber Crime Reporting and Classification System Using Logistic Regression



R. Sandesh, Ausha R., Chanadana K., Jeevitha R., Loachana A. R.

International Journal of Research Publication and Reviews



Dec 2025

ISSN / ISBN
Vol. / Issue / Page : 2582-7421 / Vol. 6 / Issue 12

Adaptive Urban Traffic Control Using Camera Vision and Emergency Vehicle Mobile Interface



Dr. Shilpa B. L., Mayank M, Md. Fakruddin S

2nd IEEE International Conference on Computing, Semiconductor, Mechatronics, Intelligent Systems and Communications (COSMIC-2025)



Nov 2025

ISSN / ISBN
Vol. / Issue / Page : COSMIC-2025

Publications - Faculty & Students

IoT - Based Traditional Organic
Implementation of Jeevamrutha Using
Image Processing

 Dr. Shilpa B. L., Padmaja K., Manjunath R. L.,
Keerthana M. M.
2nd IEEE International Conference on Computing,
Semiconductor, Mechatronics, Intelligent Systems and
Communications (COSMIC-2025)
 Nov 2025
ISSN / ISBN
Vol. / Issue / Page : COSMIC-2025

Gen AI-based Personalized Food
Recommendation System

 Purna Prajna P., Parikshith S., Yashaswi B. M.,
Sowndarya H., Dr. Shilpa B. L.
International Conference on Digital Technology
and Engineering – ICDTE
 Oct 2025
ISSN / ISBN
Vol. / Issue / Page : ICDTE-2025

Handwritten letter and digit recognition

 Dr. Shilpa B. L., Pranav N., Ranjan K.M., Hemanth S. S.
International Research Journal of Modernization in
Engineering Technology and Science
 Dec 2025
ISSN / ISBN
Vol. / Issue / Page : 2582-5208 Vol. 07, Issue 12

Faculty Achievements

Date	Activities	Faculty Name
31-07-2025	Resource Person to deliver a session on "Business Analytics Specialization" at ATME College of Engineering	Dr. Shilpa B. L.
20-08-2025	Resource Person for a one day workshop on "Business Analytics" at Cauvery College of Management, Mysuru	Dr. Shilpa B. L.
19-11-2025	Jury member for IDEATHON organized by the DATANUTS Club by ATME College of Engineering.	Dr. Shilpa B. L.
24-10-25 - 25-10-25	REVIEWER for IEEE International Conference on Communication, Computer, and Information Technology (IC3IT-2025)	Dr. Shilpa B. L.
21-11-25 - 22-11-25	Reviewer to second IEEE International Conference on Computing, Semiconductor, Mechatronics, Intelligent Systems and Communic- (COSMIC – 2025)	Theja N.
10/11/25 - 11/11/25	Resource Person for Two Day workshop on Future Forward: Empowering Minds for Placements for CSE – Final Year at ATMECC.Mysore	Theja N.
03/12/25	Resource Person at MCA SmartStart: Introductory Programming Orientation at ATMECC, Mysuru	Theja N.
21/11/25–	Governing Council Member , Amruta Institute of Engineering and Management Sciences, Bidadi, Bengaluru	Keerthana M. N. Dr. Shilpa B. L.
	Subject Expert for staff recruitment, MRIT, Mysuru	Dr. J. V. Gorabal
2025	Session Chair , ETCST – 2025, VTU, Regional Centre, Mysuru	Dr. J. V. Gorabal
2025	BOE Member , VTU, Belagavi	Dr. Puttegowda D.
2022–2025	BOS Member , Mysore University School of Engineering, University of Mysore	Dr. Puttegowda D.
2025	Honored by Institute of Engineers, Mysuru on Engineers Day for outstanding contribution and services in the field of Computer Science and Engineering Division	Dr. Puttegowda D.
2025	Awarded the "NPTEL Discipline Star" in recognition of consistent academic performance, maintaining discipline, commitment, and excellence in completing multiple NPTEL courses.	Keerthana M. N.
2022–2025	Advisory Committee Member for Intrino Robotics & Technologies Chennai	Dr. Shilpa B. L.
2025	Honored by Institute of Engineers , Mysuru on Engineers Day for outstanding contribution and services in the field of Computer science and Engineering Division.	Dr. Puttegowda D.
2022–2025	Advisory Committee Member for Intrino Robotics & Technologies Chennai	Dr. Shilpa B. L.

Students Achievements

 Date	 Activities	 Student Name
● 21-08-2025	Participated at the idea pitching contest — SIGMA IDEATHON organised by e-cell, Maharaja Institute of Technology, Thandavapura, under e-cell IIT Bombay.	Md. Fakruddin S. Adhitya Sharma
● 23-08-2025	Participated at the YUGMA TECHFEST 1.0, IEEE Computer Society Student Chapter, JNNCE, Shivamogga.	Abhinandahn Janya U. Singh Lakshmi M.
● 30-08-2025	Attended the c-talk on entrepreneurship hosted by the IEEE Student Branch of Basaveshwar Engineering College, Bagalkot.	Janya U. Singh
● 6-09-2025 – 7-09-2025	Participated at the HACKERUE 2.0, national level hackathon organised by NSS & Red Cross Youth Wing, Vidyavardhaka College of Engineering, Mysuru.	Janya U. Singh
● 8-09-2025	Participated at the national level hackathon, HACK FUSION 1.0, organised by the Maharaja Institute of Technology, Mysore.	Rifah Habeeb Saniya Khalid Mayank M.
● 17-09-2025	Participated at ARAMBH-2025, a business pitch and idea hackathon organised by the e-cell and institute innovation council at the College of Social Work, Nirmala Niketan Institute Goregaon, Mumbai.	Janya U. Singh
● 11-10-2025	Participated at the IEEE nextgen summit 2025 held at the RNS Institute of Technology organised by the IEEE RNSIT student branch in Collaboration with IEEE young professionals, Bengaluru.	Janya U. Singh
● 11-10-25 – 12/10/25	Participated at the hackathon UDGAMA – 2025, in association with the Computer Society of India – JSS STU, the student chapter at JSS Science and Technology University, Mysuru.	Keerthi G. L. Udith S. Kishore S. V. Deeksha
● 27-10-2025	Participated at Anveshan-2025 – Round 1, a multi-domain hackathon organised by IEEE Bangalore Section SAC, at SJCE, Mysuru.	Manya N. S. Pallavi P. Mrudula H, N. Keerthana M, P.
● 27-10-2025	Participated at OMNITRICS – tech symposium and hackathon hosted by the National College, Basavanagudi, Bengaluru.	Adithya Deekshith H. Akshay N.
● 28-10-2025	Participated at the technical treasure hunt as part of AI symposium, organised by MIT, Thandavapura.	Md. Fakruddin S. Mayank M.
● 29-10-2025	Participated at TECHSPHERE: HACKQUEST, a logic and teamwork-focused challenge organised by IET at ATMECE.	Mahalakshmi R. Bhoomika N. R. Mahadev Prabhu Chethan H. M. Rifah Habeeb

DEPARTMENT OF COMPUTER SCIENCE SCIENCE & ENGINEERING

11-11-2025	Participated at AI VISIONARIES EXPO 2025 organised by C.O.D.E by GSSS Institute of Engineering & Technology for women, Mysuru.	Mayank M. Md. Fakruddin S.
18-11-2025	Participated at the national conference: TECHNO AYURVEDA 2025, held at VVCE, Mysuru.	Abhinandan B. Bhavana D. N. Harshith A. N. Lakshmi M.
19-11-2025	Participated at the 2025 TECH SUMMIT, Bengaluru.	Puneeth J. Uthsuh S.
	Participated at TECH TATTVA organised by DATANAUTS CLUB in association with ATME IEEE student branch STB57344 at ATMEC, Mysuru.	Vijay R. Gali, Vikas Sampath
21/11/25 - 22/11/25	Attended the 2nd IEEE international conference on Computing, Semiconductor, Mechatronics, Intelligent Systems & Communications (COSMIC - 2025) at Sadhyari College of Engineering & Management (SCEM), Adyar, Mangaluru, Karnataka.	54 Students from the Department
		Md. Fakruddin S. Mayank M.
26/12/25 - 27/12/25	Attended the International Conference on Artificial Intelligence in Engineering Systems (ICAIES 2025) at Rajeev Institute of Technology (RIT), Hassan, Karnataka	Harshith K. V. Sophiya A. S.

The Department of Computer Science & Engineering

is delighted to share that our students startup idea **Fluff-Walks** was presented at the National Level Idea Pitching Competition — “**Sigma Ideathon**”, organized by the E-Cell of Maharaja Institute of Technology, Thandavapura, under the guidance of E-Cell IIT Bombay, on 21st August 2025

Our talented students, **Md. Fakruddin S.** and **Mayank M. Sharma** (7th Semester, Department of CSE), showcased their innovative and proudly secured **First Place** 🏆, along with a cash prize of ₹5,000!



Congratulations!!

Md. Fakruddin S. and Mayank M.
for winning the first prize at the National
Level Hackathon, Havck Fusion 1.0
held at MIT, Mysuru.



Articles

Federated Machine Learning: How AI Is Learning Together While Respecting Privacy.

The Data Dilemma in Modern AI

If you study or teach machine learning, you already know the paradox of modern AI:

***Better models need more data** — but the most valuable data is often the most sensitive.*

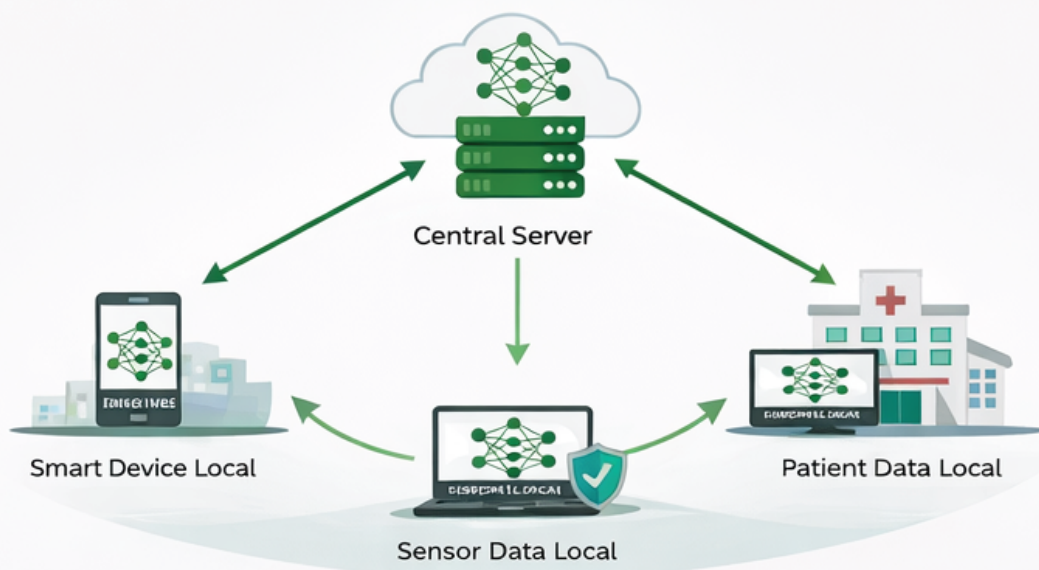
Medical records, financial transactions, personal messages, location histories, and behavioral data are exactly the kinds of information that can make AI truly powerful. They are also kinds of data that people, institutions, and governments are increasingly unwilling — and often legally unable — to centralize. This tension has created one of the most important research directions in contemporary AI: **Federated Machine Learning (Federated ML)**.

*Instead of moving data to the model, **federated learning** moves the model to the data.*

Here's how it works in practice:

1. A central server initializes a machine learning model,
2. The model is sent to many devices or institutions - (clients).
3. Each client trains the model locally on its own private data.
4. Clients send only model updates — not raw data — back to the server.
5. The server aggregates these updates to create a better global model.

This cycle repeats many times. At no point does personal or sensitive data leave its original location.



This is a **conceptual shift**: instead of thinking about “big centralized datasets,” you must think about **distributed intelligence** — many small datasets contributing to a shared model.

This is a conceptual shift: instead of thinking about “big centralized datasets,” you must think about **distributed intelligence** — many small datasets contributing to a shared model.

Why This Matters Now

Three trends made federated learning especially relevant in the last five years:

1 Stronger Privacy Laws

Frameworks like **GDPR in Europe** and emerging digital data protection laws in India have made large-scale centralized data collection legally risky and ethically questionable.

Researchers can no longer assume they can freely pool sensitive data into a single repository.

2 Explosion of Edge Data

Phones, wearables, smart devices, vehicles, and IoT sensors now generate massive amounts of data. Much of this data never reaches the cloud — and federated learning is designed precisely for this reality.

3 Erosion of Public Trust in AI

High-profile data breaches and surveillance concerns have made people skeptical of systems that “hoard” their data. Federated learning offers a more privacy-respecting alternative.

For teachers, this makes FL not just a technical topic, but also a **societal and ethical one** worth discussing in AI courses.

FL Research Streams

FL is classified into three major types:

1 Horizontal Federated Learning - Different participants, same type of data.

Multiple hospitals collaborate to train a medical imaging model. Each hospital has scans of different patients, but the data format is similar.

2 Vertical Federated Learning - Same individuals, different types of data.

A bank and an e-commerce company both have data about the same customers, but different features — spending behavior vs. transaction patterns.

3 Federated Transfer Learning - Different individuals and different data types

Prominently used algorithm: FedAvg

- Each client trains locally for several steps.
- The server computes a weighted average of all updates.
- Clients with more data have greater influence.

But real-world federated learning is messy - Devices drop out. Networks are **slow**. Data is highly non-IID. Some clients have much more data than others.

- **Communication efficient training**
- **Personalized** [1-] Networks are slow. Data is highly
- **Robust aggregation methods**
- Algorithms that handle **extreme data heterogeneity**

Is Federated Learning Actually Private?

Federated learning is **more private than centralized training** — **but** it is intrinsically private.

The model updates can still reveal statistical information about underlying data. To address this, modern systems combine FL with two major privacy tools:

Differential Privacy - Controlled noise is added to updates so that no individual's data can be reverse-engineered.

Together, these techniques make federated learning much safer in practice.

Where Federated Learning Is Being Used



Healthcare

Perhaps the most exciting application. Hospitals can collaboratively **train** diagnostic AI models **without sharing patient records**. This allows medical knowledge to be pooled while preserving confidentiality. Several large research consortia are now experimenting with real federated medical AI systems rather than simulations.



Finance

Banks can jointly improve fraud detection models while keeping customer data private and legally protected.



Smart Devices

Your smartphone keyboard, smartwatch, or smart home device can contribute to AI training without uploading raw personal data.

Open research problems

Despite impressive progress, **federated** learning remains an active research frontier seeking to address several problems:

- **Communication constraints**
- Device heterogeneity
- Non-IID data distributions
- Malicious participants
- Scalability to millions of clients

As data becomes more sensitive and **distributed**, **federated** learning will likely become a core pillar of responsible AI.

Ms. Pranamya,
7th Sem, CSE

