K.R. Mangalam University
School of Engineering & Technology

Course Code: ETCCCP105

Course Name: Computer Science Fundamentals & Career Pathways

Programme: B.Tech CSE (Specialization in AI & ML)

Semester: 1st

Assignment No.: 03

Domain : AI/ML

Aim : AI researcher or AI developer

Submitted To: Mr. Aryan Sharma

Submitted By:

Name: Sonam Yadav

Roll No: 2501730260

Section: 'B'

1. Field Introduction:

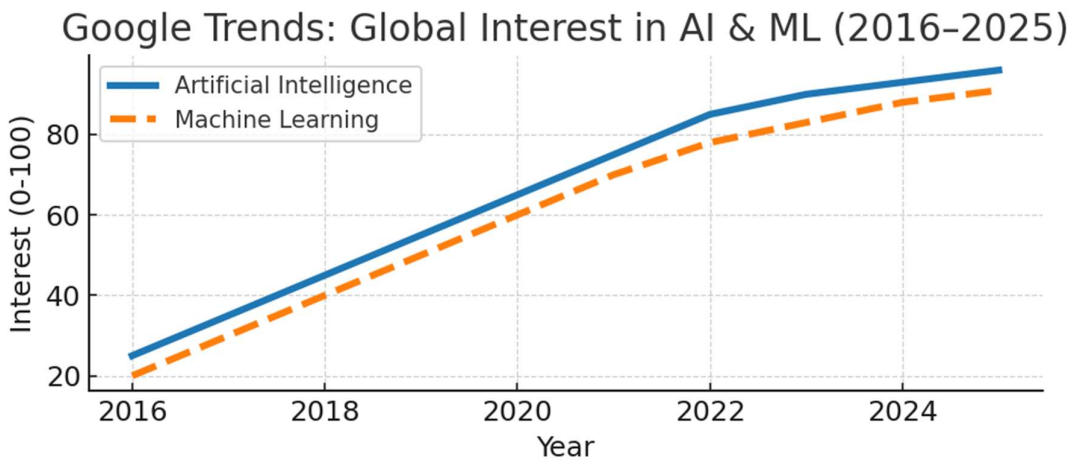
a. Artificial Intelligence and Machine Learning (AI/ML) involve teaching computers to learn from data and make intelligent choices. Professionals in this area create models and systems capable of identifying patterns, forecasting outcomes, and simulating human-like reasoning.
b. The role of an AI/ML engineer centers on the full development cycle—designing, training, and deploying intelligent systems, from data preparation and pipeline setup to production-level deployment and research.
c. Recent reports highlight a rapid global increase in AI-related job opportunities, with more senior and leadership positions emerging as organizations integrate AI into diverse operations.

2. What Makes This Domain Unique:

a. It merges computer science, mathematical reasoning, and innovative thinking.
b. AI drives today's most transformative technologies—from autonomous vehicles and conversational AI (like ChatGPT and Gemini) to virtual assistants, personalized streaming recommendations, and advanced healthcare diagnostics.
c. The possibilities within this discipline continue to expand, offering boundless opportunities for innovation and discovery.

3. Emerging Developments:

a. The Generative AI Wave: Platforms such as ChatGPT, Google Gemini, and Midjourney are revolutionizing industries. There's a growing demand for professionals skilled in creating and refining Large Language Models (LLMs).
b. AI Across Sectors: From healthcare and finance to education, cybersecurity, agriculture, and entertainment, AI integration is becoming a fundamental skill for the modern workforce.
c. Cloud-Driven AI Solutions: With platforms like AWS, Google Cloud, and Microsoft Azure, machine learning engineers can efficiently build, scale, and deploy AI systems using powerful cloud infrastructure.
d. Responsible Innovation: The AI research community is increasingly focused on ensuring ethical, transparent, and safe development of artificial intelligence technologies.



1.Key Job Roles:

Job Role	What You' ll Do	Average Salary (USD/year)
Machine Learning Engineer	Design, build, and deploy ML models; optimize algorithms and data pipelines using Python, TensorFlow, or PyTorch.	12 lpa-18lpa
Data Scientist	Analyze and interpret large datasets; create predictive models; turn data insights into business strategies.	7 lpa to 16 lpa
AI Research Scientist	Conduct research on new AI algorithms; develop advanced models; publish papers; work in labs or R&D teams.	9 lpa to 19 lpa
AI Product Manager	Oversee AI product development; align technical teams and business goals; manage timelines and launches.	8 lpa to

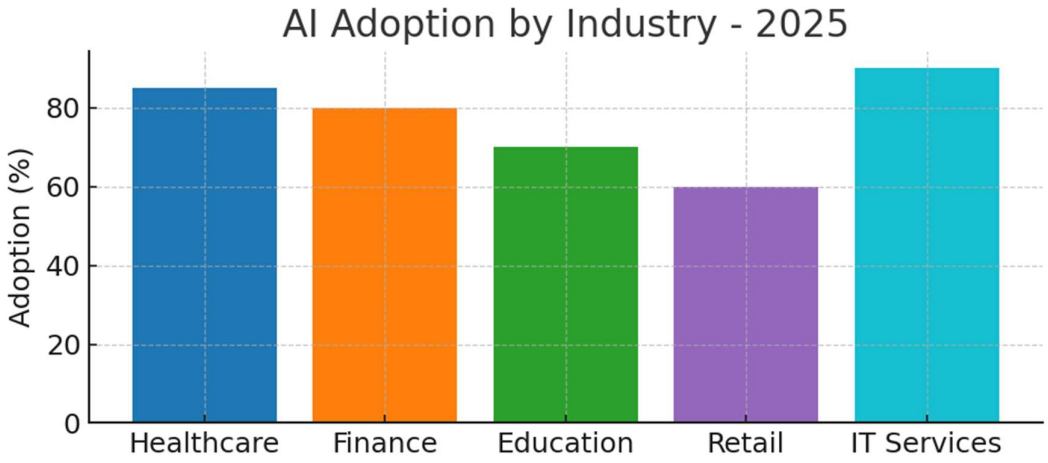
1. Why do I choose this domain as my career?

Report:

Category	Interest & Aptitude	Growth & Stability	Financial Outlook	Learning Curve	Future Potential	Resource Availability	Work-Life Balance
Key Questions	What topics or technologies excite me the most?	How stable and scalable is this career field over time?	What is the average salary and financial growth potential?	Is this field conceptually difficult or easy to learn for me?	Does this specialization align with future tech trends?	Are good courses, mentors,or projects easily available?	Does the path offer flexibility/manageable workload?
Example Metrics / Research Areas	Self-assessment, online quizzes, project enjoyment	Long-term employability, automation resistance, career diversity	PayScale, Glassdoor, location-based salary comparison	Learning hours, prerequisites, practical vs theoretical mix	Emerging technologies, startup ecosystem, patents	Course availability (Coursera, YouTube, college electives)	Remote work options, project pressure, company policies
Priority(1 – 3)							
AI & ML	**3**	**3**	**3**	**1**	**3**	**3**	**2**
Data Science(Analyst)	**2**	**2**	**2**	**2**	**3**	**3**	**2**
Cybersecurity	**1**	**3**	**3**	**2**	**2**	**2**	**1**
Cloud Computing	**1**	**2**	**2**	**2**	**3**	**3**	2
Web Development	**3**	**1**	**1**	**3**	**1**	**3**	**2**
App Development	**3**	**1**	**1**	**3**	**1**	**2**	**2**
Blockchain	**2**	**2**	**2**	**1**	**2**	**1**	**2**
IOT(Internet of things)	**2**	**1**	**1**	**1**	**2**	**1**	**1**
DevOps	**1**	**3**	**3**	**2**	**3**	**2**	**1**

2. **Minimum Required Tools:**
    a. **Programming:** Python, C++, R
    b. **ML Frameworks:** TensorFlow, PyTorch, Scikit-learn
    c. **Mathematics:** Statistics, Probability, Linear Algebra
    d. **Data Tools:** SQL, Pandas, NumPy
    e. **MLOps Tools:** Docker, Kubernetes, MLFlow, Git
    f. **Cloud Platforms:** Google Cloud, AWS, Azure
    g. **Extra Tools:** Jupyter Notebook, Hugging Face, FastAPI

Comparison between domains



AI/ML interest in India has grown exponentially since 2018, surpassing traditional domains like web or app development.
Worldwide, AI/ML remains among the top 3 career choices in the tech sector.

Conclusion:

- AI and ML are shaping the future of technology and automation. They are being used in almost every field and have a great scope for learning, research, and job growth.
- By learning the right tools, getting certified, and building small projects, students like us can prepare ourselves for a successful career in the AI and ML domain.

References:

1. Google Trends (2025) – “Interest in AI & ML Worldwide”
2. IBM AI Report 2024 – “Global AI Adoption and Career Insights”
3. McKinsey Global Institute – “Economic Impact of Artificial Intelligence”
4. Coursera AI/ML Specialization – Andrew Ng, Stanford University
5. Analytics India Magazine – “AI Career Growth 2025”