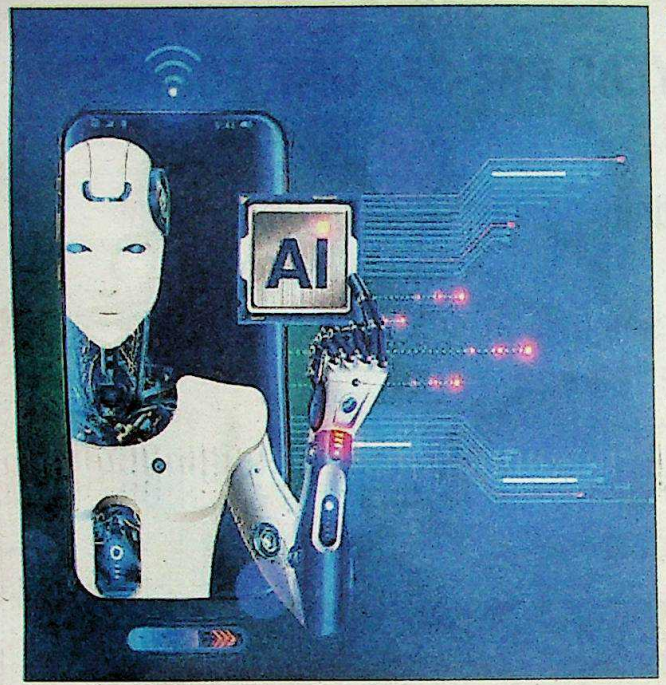
EN : 28 APR - 2 MAY 2025

Careers and Skills in Artificial Intelligence



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Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and act like humans. AI may also refer to any machine exhibiting traits associated with the human mind, such as learning and problem-solving. Today, AI is pervasive, and the demand for skilled, experienced professionals in this field is rapidly increasing.

Examples of Artificial Intelligence:

- Smart assistants like Siri and Alexa
- Pandora and Netflix, which provide personalised music and entertainment recommendations
- Chatbots
- Robotic vacuum cleaners
- Self-driving vehicles
- Facial recognition software

Key AI/ML Career Paths:

Technical Roles:

- **Machine Learning Engineer:** Designs, builds, and deploys AI and ML models and systems.
- **AI Engineer:** Develops tools, software, and processes to implement AI in real-world applications.
- **Data Scientist:** Uses data, AI, and ML to extract insights and solve problems.
- **Data Engineer:** Builds and maintains infrastructure for data collection, storage, and processing.
- **Natural Language Processing (NLP) Engineer:** Enables AI to understand and process human language.
- **Computer Vision Engineer:** Develops AI systems to interpret visual data.
- **Robotics Engineer:** Designs and develops robotic systems, integrating AI and ML.
- **Deep Learning Engineer:** Specialises in developing and optimising neural networks.

Research and Development:

- **AI Research Scientist:** Conducts research to create new AI and ML algorithms and techniques.

Product and Business Roles:

- **AI Product Manager:** Oversees development and delivery of AI products.
- **AI/ML Consultant:** Provides expert advice on AI and ML projects.
- **AI Ethics Specialist:** Addresses the ethical implications of AI technologies.
- **AI/ML Educator:** Trains others in AI and ML.

Other Roles:

- **Business Intelligence Developer:** Applies data and AI/ML insights to improve decision-making.
- **Consultant:** Offers strategic guidance on AI/ML applications.
- **Data Analyst:** Identifies trends and insights from data.
- **Software Engineer:** Develops software incorporating AI/ML capabilities.

Institutions Offering AI/ML Courses in India:

- Several leading institutions offer postgraduate courses in AI and ML:
- **Premier Institutions:** IITs (Bombay, Kanpur, Roorkee, Madras, Guwahati, Hyderabad, Jodhpur), IISc, BITS Pilani, VIT.

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- **Other Universities:** IIIT Bangalore, KIIT, Christ University, Symbiosis Inter-national University.

Types of Postgraduate Programmes:

- **Master's Degrees (M.Sc., M.Tech., M.Eng.):** 2-year full-time programmes with practical focus
- **Postgraduate Diplomas (PGD):** 1–2 years, suited for working professionals
- **Executive Programmes:** Weekend or online formats
- **Certificate Programmes:** Short-term courses on specific AI/ML topics

Key Subjects Covered:

- **Foundations:** Maths, stati-stics, programming
- **ML Techniques:** Supervised/unsupervised learning, deep learning, NLP
- **Applications:** Robotics, fin-ance, healthcare, business analytics
- **Practical Learning:** Real-world datasets, project work

Examples of Online Programmes:

- **Great Learning:** PG in AI/ML and Data Science
- **Simplilearn:** Professional Certificate in AI/ML
- **Coursera & Udacity:** Specialisations and nanodegrees

Additional Career Paths in AI

- **Big Data Analyst:** Finds patterns in historical data to predict future trends.
- **UX Designer / Developer:** Enhances product usability and bridges the gap between users and complex systems.
- **NLP Engineer:** Works on human language and computer interactions like virtual assistants.
- **Researcher:** Investigates ways to advance AI technology.
- **Research Scientist:** Expert in applied maths, ML, deep learning, and statistics—typically holds an advanced degree.
- **Software Engineer:** Develops programmes that incorporate AI tools.
- **AI Engineer:** Builds AI models and explains outcomes to stakeholders.
- **Data Mining & Analysis Expert:** Detects anomalies and patterns in large datasets.
- **Machine Learning Engineer:** Designs and manages ML software systems.
- **Data Scientist:** Collects, analyses, and interprets complex data.
- **BI Developer:** Identifies business and market trends from data.
- **Big Data Engineer/Architect:** Designs systems for data communication and collection.
- **Robotics Engineer:** Builds and tests robotic systems.
- **Computer Vision Engineer:** Specialises in projects involving visual data.
- **Data Engineer:** Maintains data pipelines for analysis.
- **AI Ethicist:** Ensures ethical development and deployment of AI.
- **Algorithm Developer:** Creates algorithms for AI applications.
- **UX Developer:** Focuses on designing user-friendly AI interfaces.

Popular AI Libraries and Their Use Cases

- **TensorFlow (Python, C++):** Deep learning, image recognition, NLP
- **PyTorch (Python):** Neural networks, computer vision, reinforcement learning
- **Scikit-learn (Python):** Traditional ML, data preprocessing, clustering
- **Keras (Python):** Rapid prototyping and research in deep learning
- **OpenCV (C++, Python):** Image processing, object detection
- **NLTK (Python):** Text analysis and NLP basics
- **spaCy (Python):** Industrial NLP tasks like tagging and parsing
- **Apache MXNet (Python, Scala):** Scalable model training and deployment
- **Caffe (C++, Python):** CNNs for image classification
- **Gensim (Python):** Topic modelling, word embeddings
- **Theano (Python):** Mathematical operations for AI models
- **H2O.ai (Java, R, Python):** Enterprise-scale machine learning
- **Apache Mahout (Java, Scala):** Scalable ML for clustering, filtering

Conclusion:

With AI becoming increasingly integrated into everyday life, the demand for professionals in the field is at an all-time high. A wide array of career paths awaits those with the interest and skill set to engage with this transformative technology.

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Views expressed are personal)