

5. Evaluate the role of AI in networking, cybersecurity, and digital forensics, and discuss its challenges and future scope.

Unit 1. Infrastructure and Platforms for Building Applications using AI

Hardware used in building AI applications: Processors - CPU, GPU, TPU, NPU, Memory - RAM, VRAM, Storage - HDD, SSD

Platforms for building applications using AI: Online platforms (Example - Google AutoML, H2O.ai, Teachable Machine or similar platforms - for practice only); Desktop (No-code/Low-code) platforms (Orange Data Mining, KNIME, Weka, RapidMiner or similar tools - for practice only).

Edge AI: Concept; Applications in daily life in devices like Refrigerators, Led Bulbs, Surveillance Cameras, Micro Ovens, Smart Cars/Scooters; Edge AI in smart Appliances

Unit 2: Foundations of Data - Types, Ethics and Utility in Building Applications using AI

Importance of data in building AI applications: Data as the fuel for AI, Role of big data in training AI models.

Conceptual Foundations of Data: Data vs. Information vs. Knowledge.

Structure of Data: Structured, Semi-Structured, and Unstructured Data.

Modalities of Data: Text, Image, Audio, Video, Tabular, Time-Series, and Spatial Data.

Formats of Data: Text Formats (CSV, JSON, XML), Image Formats (JPEG, GIF, PNG), Audio/Video (MP3, WAV, MP4, AVI).

Data Repositories: Definition of public Datasets; Definition of private Datasets; Importance of Public Datasets, Popular Public Dataset Repositories (Example - Kaggle, Hugging Face Datasets, UCI Machine Learning Repository, Google Dataset Search or similar ones - for demonstration only), Dataset licensing and usage rights.

Ethics, Privacy in Data Usage: Privacy concerns related to data usage; Regulations governing data usage - GDPR, HIPAA (Overview), Ethical use of data, Responsible AI data practices.

Unit 3. The AI Data Pipeline: From Collection to Model Readiness

The AI Data Pipeline: Stages and Components: Key Stages (Data Collection, Annotation, Preprocessing, Splitting, Feeding into AI Models)

Core Components: Ingestion, Storage, Processing, Validation, Delivery

Data Collection Methods for AI: Manual Input (Surveys, forms, human-curated entries), Sensors & IoT Devices (Real-time data from physical environments), System Logs & Transactions, Web Scraping (Automated extraction from websites), APIs (Structured data access from external platforms)

Data Annotation and Labelling: Definition & Importance; Annotation Methods: Manual Annotation, Automated Annotation; Types of Annotation: Classification, Bounding Boxes, Segmentation, Transcription, Named Entity Recognition (NER)

Data Cleaning and Preprocessing: Importance of data cleaning; Understanding “Dirty” Data: Missing Values, Duplicates, Incorrect Formats, Outliers, Noise; Steps in Data Cleaning: Identify Issues, Handle Errors (Imputation, Removal), Validate Cleaned Data

Data Splitting: Splitting data into training set and test set.

Data Transformation Techniques: Normalization, Transformation, Feature Engineering (Conceptual)

Unit 4. AI-Powered No-Code Development: Vibe Coding and Workflow Automation

Vibe Coding: Concept & Workflow: What is Vibe Coding and how it works; Comparison: Vibe Coding vs. traditional programming; Tools Overview: Google AI Studio, Firebase Studio, Replit, Cursor, Windsurf (for demonstration and practice only); Tool Selection: Choosing the right platform for your needs; Benefits & Challenges: Advantages and limitations of Vibe Coding; Paradigm Shift: From code-centric to prompt-driven development; Prompt Crafting: Structure and examples of effective app prompts.

Workflow Automation using AI: Fundamentals: What is workflow automation and its relevance in the AI era; Real-world Applications: Auto-email responses, Feedback summarization, Social media alerts & analytics; Toolset Overview: Zapier, Power Automate, n8n, Lindy and other similar tools (for demonstration and practice only); Choosing the Right Tool: Features, use cases, and integration potential.

Unit 5. AI in Networks, Cybersecurity, and Forensics

AI in Networking: Need of AI in Network Management, How AI works in Traffic Prediction & Intrusion Detection, Uses of AI in Optimization, Fault Management, and Routing

AI in Cyber Security: Need of AI in Cyber Security, How AI works in Cyber Security, Uses of AI in Cyber Security, Challenges and Considerations of AI in Cyber Security

AI in Digital Forensics: How AI enhance digital forensic investigations, Role of AI in cyber-forensic evidence acquisition and analysis, Overcoming challenges and limitations of AI in forensics, The future outlook for AI-powered forensic tools