

Putting AI to Work

# 1

## Understanding the Different Types of AI

# Learning Objectives

- Describe how AI creates original content such as text, images, music, and video by identifying its key processes and applications
- Explain how predictive AI uses patterns in existing data to forecast future outcomes and support decision-making
- Differentiate between inputs using discriminative AI by exploring how AI categorizes and separates data types based on learned features
- Analyze how AI systems extract insights and trends from data through processing, modeling, and interpretation
- Examine the role of probability and statistical models in enabling AI to reason, draw conclusions, and make informed decisions
- Compare and contrast different types of AI to recognize their relationships, areas of overlap, and combined use in real-world applications

# Module 1.1: Generative AI

- Generative AI produces new content by learning patterns from training data.
- Output is a statistical remix, not truly original creation.
- Applications:
  - Marketing graphics
  - Blog posts
  - Logos
  - Music
  - Email campaigns
- Uses probabilistic modeling to predict next token (word, pixel, note).

# Module 1.1: Ethics in Action

- Generative content can reproduce biases and copyrighted material.
- Users must review outputs for fairness and originality.
- Transparency about AI-generated content builds trust.

# Module 1.1: Techie Dive

- Models like GPT and DALL·E use probabilistic modeling.
- Training involves billions of examples so the tools can learn statistical patterns.
- AI calculates likely continuations based on patterns, not understanding.

# Module 1.1: Business Lens

- Generative AI enables small businesses to scale content creation efficiently.
- It reduces the time and expense for initial content creation.
- Overreliance without oversight can harm brand authenticity.

# Module 1.2: Predictive AI

- It forecasts future outcomes by identifying patterns in historical data.
- It estimates likelihoods, not certainties.
- Applications:
  - Sales forecasting
  - Churn prediction
  - Inventory management
- It requires labeled data and supervised learning.

## Module 1.2: Ethics in Action

- Predictive models can reinforce social biases from training data.
- Transparency about data sources is critical.
- Question whether past biases should influence future forecasts.



## Module 1.2: Techie Dive

- Predictive AI uses regression analysis, decision trees, ensemble methods.
- Core process:
  - Train on labeled data
  - Test
  - Deploy for forecasts
- It outputs the most likely outcomes with confidence scores.

## Module 1.2: Business Lens

- Predictive AI enables smarter resource allocation and proactive decisions.
- Benefits:
  - Better inventory management
  - Optimized staffing
  - Higher profits
- It provides a strategic advantage through early detection of problems or opportunities.

# Module 1.3: Discriminative AI

- Predictive AI classifies or labels data by learning boundaries between categories.
- It focuses on recognition and categorization.
- Applications:
  - Spam filtering
  - Sentiment analysis
  - Fraud detection
- It learns to distinguish between categories based on key features.

## Module 1.3: Ethics in Action

- Misclassification can lead to unfair outcomes in hiring or lending.
- This requires avoiding biased training data and regular fairness audits.
- Transparency in decision making builds trust and accountability.

## Module 1.3: Techie Dive

- Models focus on decision boundaries between classes.
- Algorithms include logistic regression, SVMs, and neural networks.
- Discriminative AI tools don't model an entire data distribution, only the boundaries.

## Module 1.3: Business Lens

- Accurate classification drives automation and efficiency.
- Faster decisions lead to happier customers and lower costs.
- Predictive AI helps with early problem detection before escalation.

# Module 1.4: Analytical AI

- It interprets data to uncover patterns, relationships, and insights.
- It acts as data detective that helps humans understand information.
- Applications:
  - Customer behavior analysis
  - Trend identification
  - Anomaly detection
- It integrates with dashboards and decision-support systems.

## Module 1.4: Ethics in Action

- Privacy concerns require data anonymization.
- Insights must be presented transparently without manipulation.
- Validation and ethical review are critical before acting on insights.



## Module 1.4: Techie Dive

- Analytical AI combines clustering, regression analysis, anomaly detection, and summarization.
- It explores data to find structures without predefined answers.
- It discovers meaning rather than assigning labels.

## Module 1.4: Business Lens

- Understanding behaviors and spotting trends creates competitive advantages.
- Analytical AI turns data noise into actionable business intelligence.
- It enables faster, data-driven decision making.

# Module 1.5: Statistical AI

- It uses mathematical methods to find patterns, relationships, and probabilities.
- It forms the mathematical backbone for other AI types.
- Methods:
  - Probability
  - Regression
  - Clustering
  - Bayesian inference
- Applications:
  - Loan approval probability
  - Customer segmentation
  - Anomaly detection

## Module 1.5: Ethics in Action

- Incomplete or biased data introduces risks.
- Correlation does not equal causation.
- Responsible interpretation and validation is essential.

## Module 1.5: Techie Dive

- Statistical AI applies traditional statistical tools in automated ways.
- The methods used include linear and logistic regression and clustering.
- It provides confidence scores and probability estimates.

## Module 1.5: Business Lens

- Statistical insights lead to better strategic decisions.
- Statistical AI reduces guesswork through evidence-based analysis.
- It is essential for data-driven competitive advantage.

# Module 1.6: Compare and Contrast

## Types of AI

- Each AI type answers different core questions about data.
- Modern systems blend multiple types (hybrid models).
- Statistical AI underlies most other AI types.
- Real-world tools combine approaches for better results.

## Module 1.6: Ethics in Action

- Blended systems make decision making less transparent.
- Transparency about AI types builds user trust.
- This is critical in high-stakes areas like healthcare and finance.



# Module 1.6: Techie Dive

- AI types use different architectures and techniques.
- Types are modular components combined within systems.
- Understanding AI architecture helps with predicting a tool's strengths and limitations.

## Module 1.6: Business Lens

- Most business tools are hybrids combining multiple types.
- Understanding both what AI does and how it works is essential.
- Knowledge informs ethical use and smarter technology investments.

# Key Takeaways

- Five AI types serve distinct purposes with specific strengths.
- Modern AI tools typically combine multiple types.
- Understanding types helps users choose tools and set expectations.
- Ethical considerations apply across all AI types.
- Statistical AI forms the foundation for other approaches.
- Business success requires matching AI types to an organization's needs.