

Introduction to AI & Machine Learning Models

This slide provides an overview of the core concepts and differences between Artificial Intelligence (AI) and Machine Learning (ML).

What is AI?



COMPUTER SCIENCE FIELD

AI is a broad field of computer science focused on creating systems that can perform tasks typically requiring human intelligence.



INTELLIGENT TASKS

These tasks include problem-solving, natural language understanding, pattern recognition, and decision-making.



EXAMPLES

Examples of AI include calculators, voice assistants, self-driving cars, object recognition, and chatbots.

AS AI AND MACHINE LEARNING ALGORITHMS CONTINUE TO EVOLVE, WE CAN EXPECT TO SEE EVEN MORE IMPRESSIVE AI APPLICATIONS IN THE FUTURE.

Examples of AI

- **CALCULATORS**

Devices that perform mathematical calculations, a classic example of narrow AI that excels at a specific task.

- **VOICE ASSISTANTS LIKE SIRI OR ALEXA**

AI-powered virtual assistants that can understand and respond to natural language, enabling hands-free interaction and voice-based control of various tasks.

- **SELF-DRIVING CARS**

Vehicles equipped with AI-powered systems that can navigate roads, detect obstacles, and make driving decisions without human intervention, showcasing the potential of AI in transportation.

- **RECOGNIZING OBJECTS BY PICTURE NAME**

AI models trained on large datasets of images that can accurately identify and classify objects, animals, or scenes depicted in photographs, demonstrating advancements in computer vision.

- **CHATBOTS THAT PROVIDE CUSTOMER SERVICE**

AI-powered conversational agents that can engage in natural language interactions to assist customers with queries, complaints, or other support requests, automating and improving customer service experiences.

The Approaches of AI

- **RULE-BASED SYSTEMS**

An earlier form of AI that uses manually programmed 'if-then' rules derived from expert knowledge to make decisions.

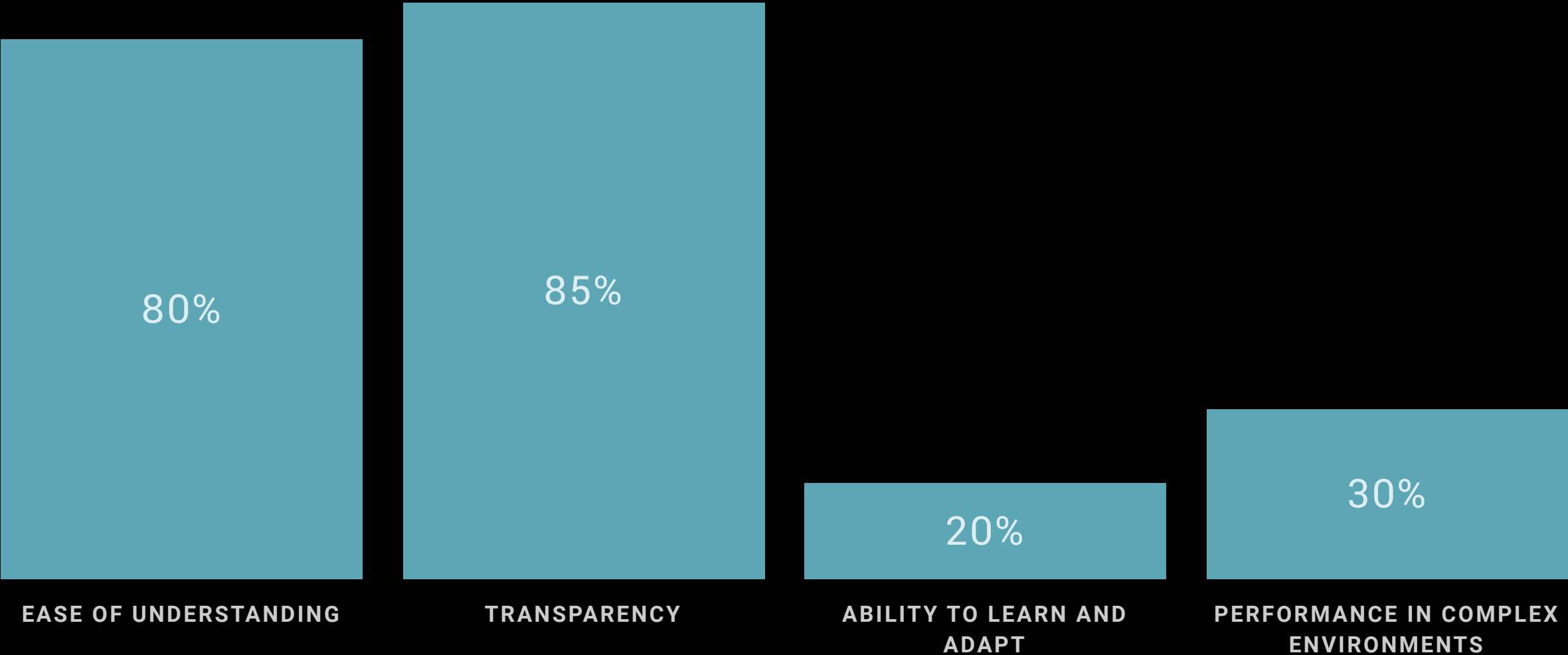
- **MACHINE LEARNING**

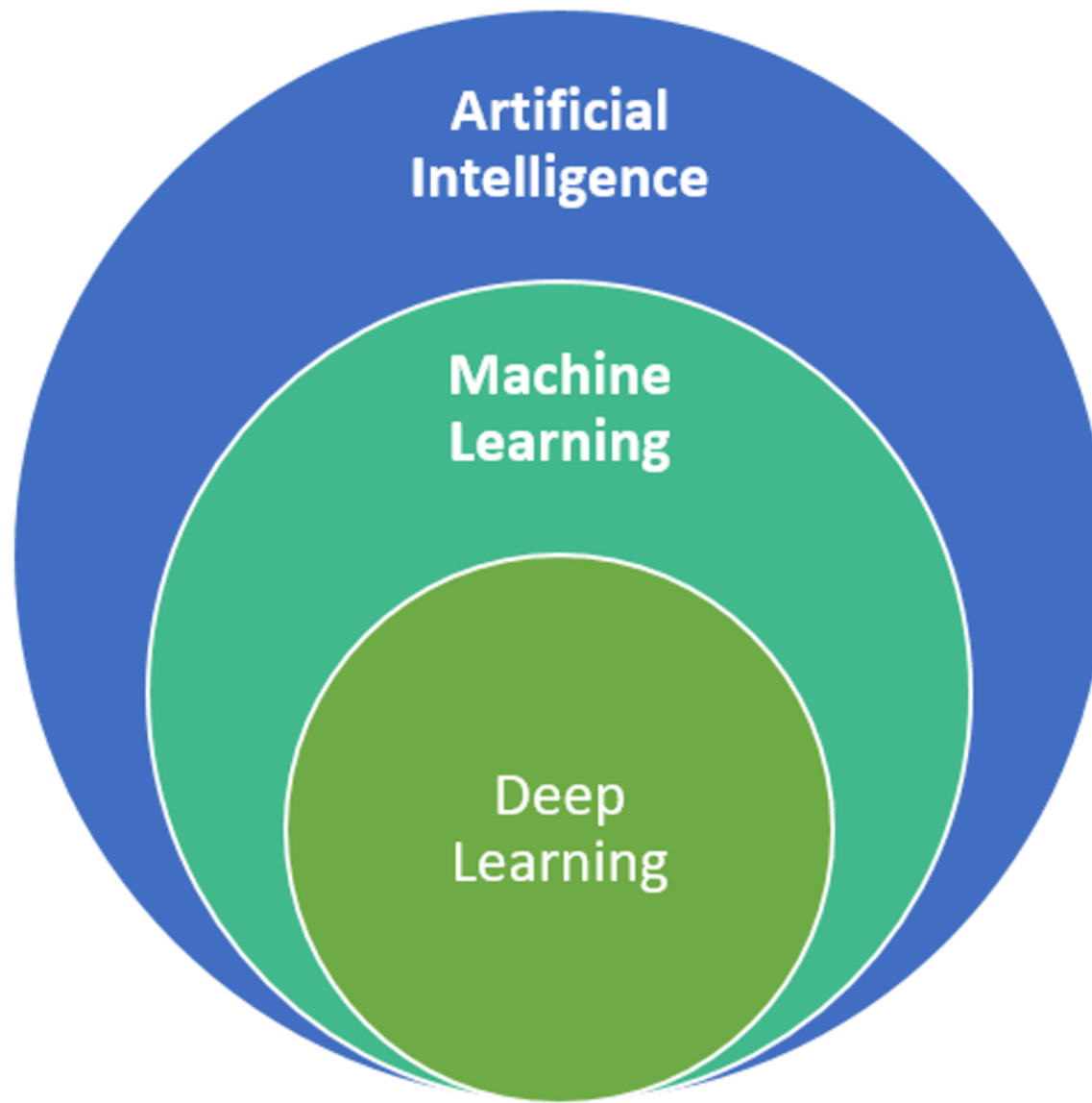
A more advanced approach to AI that learns from data, identifying patterns and relationships to make predictions or decisions, without relying on predefined rules.



Strengths and Limitations of Rule-Based Systems

Ease of Understanding and Adaptability





What is Machine Learning?

Machine Learning is a specific approach to achieve Artificial Intelligence (AI) by giving machines access to data and allowing them to learn for themselves. Instead of being explicitly programmed to perform a task, a machine is trained on data, and it learns patterns and relationships from this data to make decisions or predictions.

Examples of Machine Learning



SPAM FILTERS IN EMAIL

Machine learning models are trained on large datasets of spam and non-spam emails to learn the patterns and characteristics of spam messages. These models can then automatically detect and filter out spam emails in a user's inbox.



RECOMMENDATION ENGINES

Netflix, YouTube, and other platforms use machine learning algorithms to analyze user preferences, browsing history, and other data to provide personalized recommendations for movies, videos, and other content the user is likely to enjoy.



PREDICTIVE MAINTENANCE IN INDUSTRIAL SETTINGS

Machine learning models can be trained on sensor data from industrial equipment to predict when maintenance or repairs will be needed. This helps optimize maintenance schedules, reduce downtime, and prevent costly breakdowns.

AS MACHINE LEARNING ALGORITHMS CONTINUE TO EVOLVE AND BECOME MORE SOPHISTICATED, WE CAN EXPECT TO SEE EVEN MORE IMPRESSIVE AI APPLICATIONS IN THE FUTURE.

Examples of Machine Learning

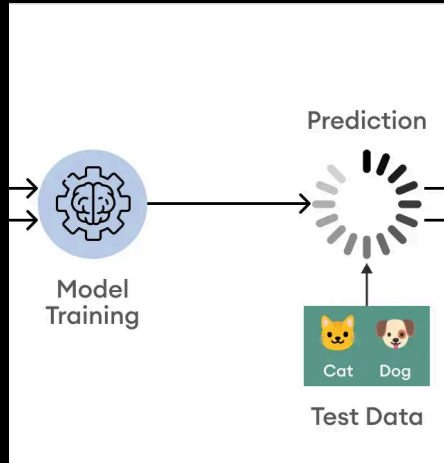
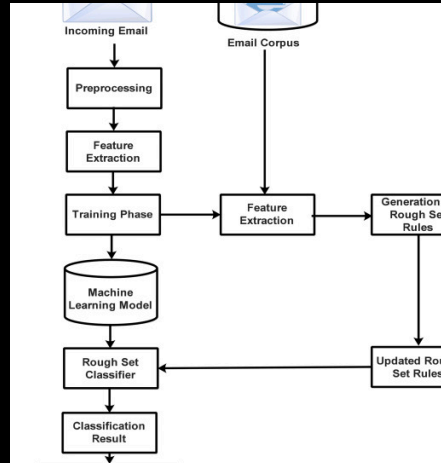


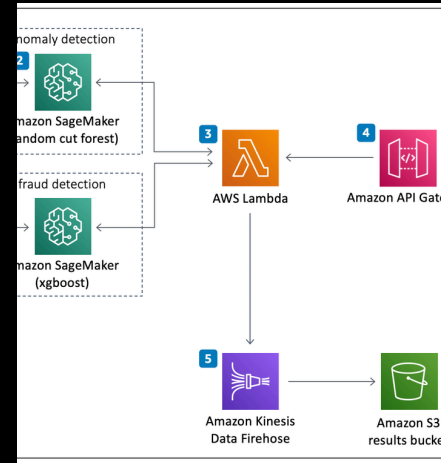
IMAGE CLASSIFICATION

Machine learning models can be trained to recognize and classify different objects, animals, or scenes in images with high accuracy.



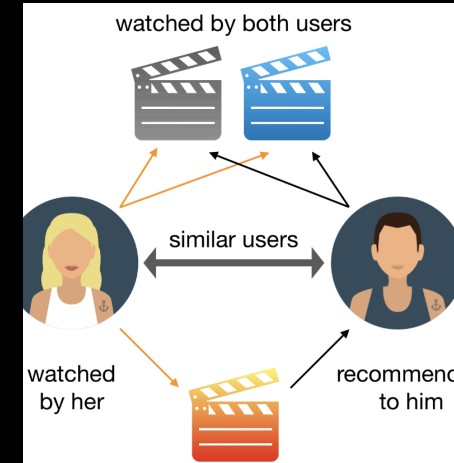
SPAM FILTERING

Machine learning algorithms can analyze email content and header data to accurately identify and filter out spam messages based on patterns learned from previous examples.



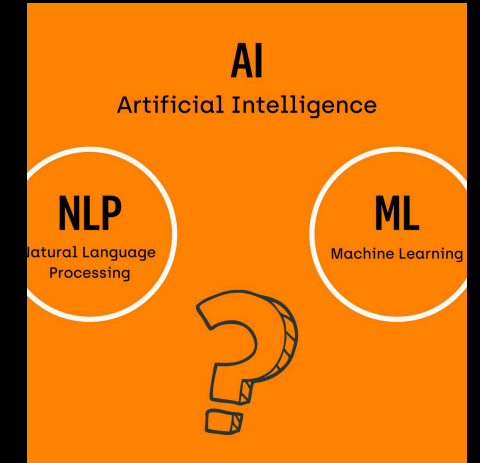
FRAUD DETECTION

Financial institutions use machine learning to analyze transaction data and detect anomalies or suspicious activities that may indicate fraudulent behavior.



RECOMMENDATION SYSTEMS

E-commerce and media platforms leverage machine learning to analyze user preferences and behaviors to provide personalized product or content recommendations.

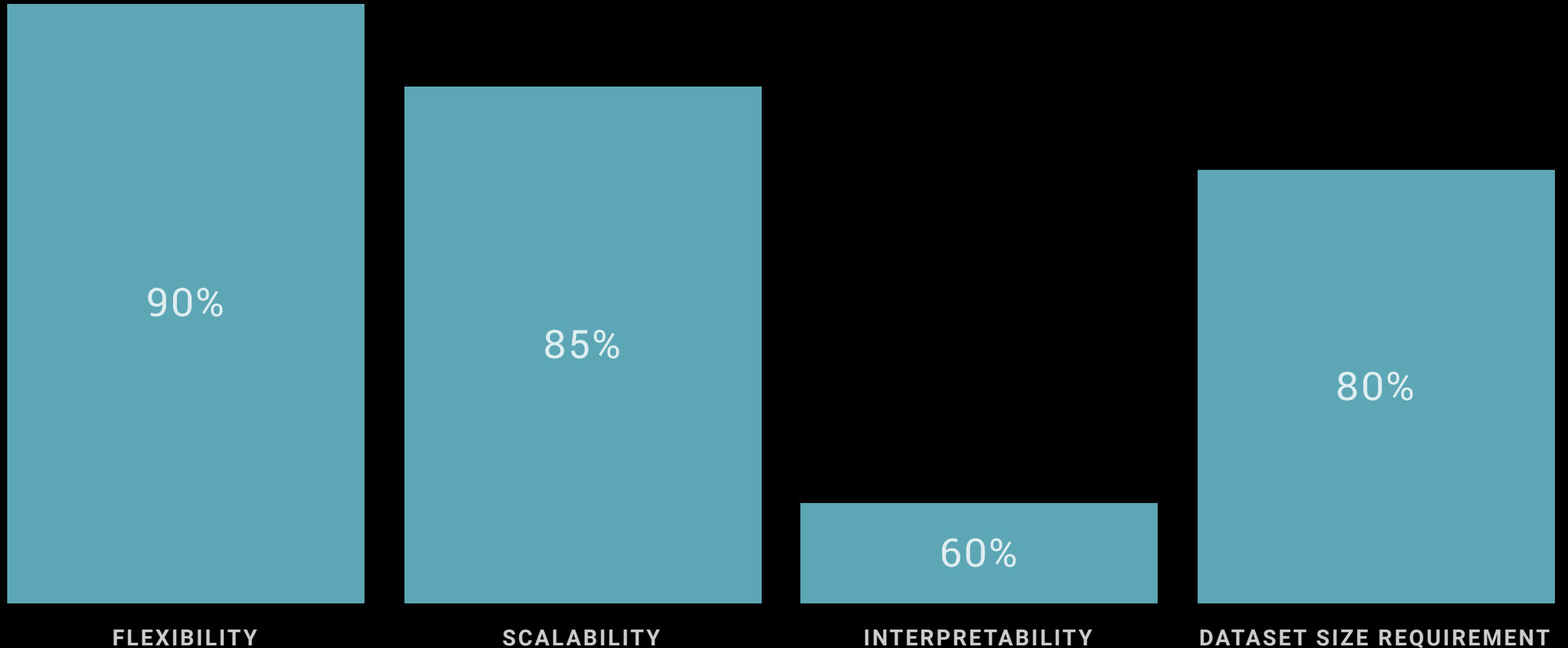


NATURAL LANGUAGE PROCESSING

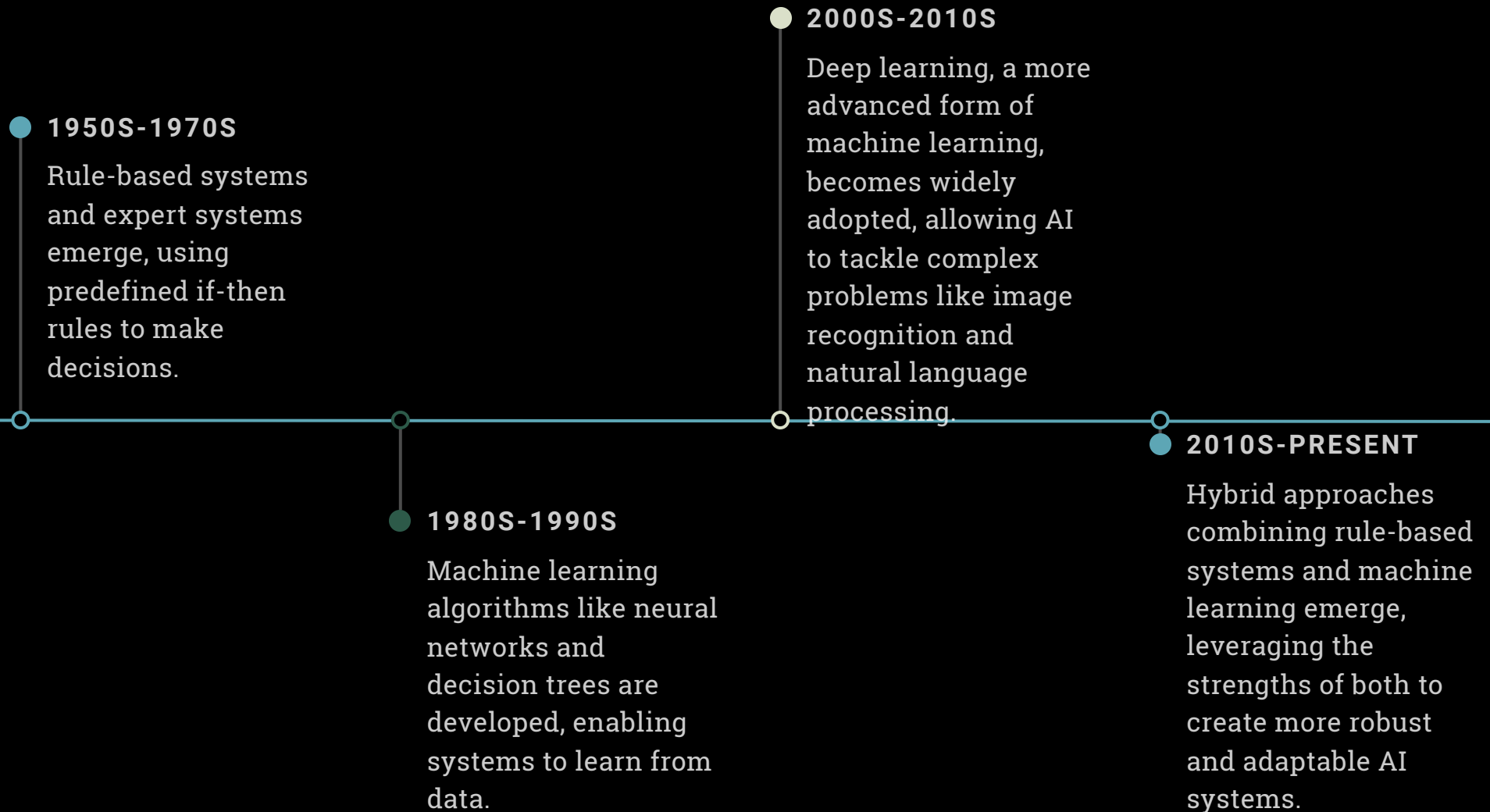
Machine learning models can be trained to understand, interpret, and generate human language, enabling applications such as chatbots, language translation, and text summarization.

Strengths and Limitations of Machine Learning

Comparison of machine learning capabilities (0-100 scale)



The Evolution of AI



Types of Machine Learning

SUPERVISED LEARNING

The model is trained on labeled data, meaning the input comes with the correct output. Examples include spam filtering, image classification, and predictive analytics.

UNSUPERVISED LEARNING

The model is trained on unlabeled data and must find patterns and relationships in the data. Examples include customer segmentation, anomaly detection, and recommendation systems.

REINFORCEMENT LEARNING

The model learns by interacting with an environment and receiving rewards or penalties based on its actions. Examples include game-playing algorithms, robotics, and resource management.