



The Firebrand Guide to ENTERPRISE AI

WHAT IS ARTIFICIAL INTELLIGENCE?

When most people think of Artificial Intelligence (AI), they picture a robot, a self-driving car, or a Q&A bot like ChatGPT. These are very innovative applications of AI, but are only a small sample of AI's capabilities. For enterprises in particular, many impacts from AI will be felt behind the scenes, invisible to the end customer and even to employees. To remain competitive, virtually every enterprise will need to use AI in their business, and thus must understand the basics of AI and how to apply it.

EXAMINING THE BASICS

It's helpful to understand exactly what AI is in an enterprise context. AI is more aptly termed "Machine Judgement", because a machine (computer) is making a decision in a situation where it's impractical or inconvenient for a human to make it. Machine Judgement has been around for many years, for example the predictive models that decide whether or not to issue credit to a consumer, or those that flag transactions for suspected fraud. These models were programmed by humans to make a high volume of decisions quickly, eliminating the need for a human to be involved in every decision. The models also reflect the biases and preconceptions of the humans that programmed them—some of which are good, and some of which are not. The advent of Machine Learning (ML, which is synonymous with AI in this context) changes the game: instead of being programmed, the model is TRAINED. By ingesting vast amounts of data, the machine LEARNS how to structure and weight the model. In essence, the machine is asked to accomplish a task (e.g. "Maximize Customer Value"), but not explicitly told how to do it. The machine learns how to accomplish the task using the data it is provided. Bias can still appear, of course, and still needs to be carefully managed. The role of the programmer or data scientist shifts to validating the effectiveness of the model and mitigating any unexpected behaviors or biases.

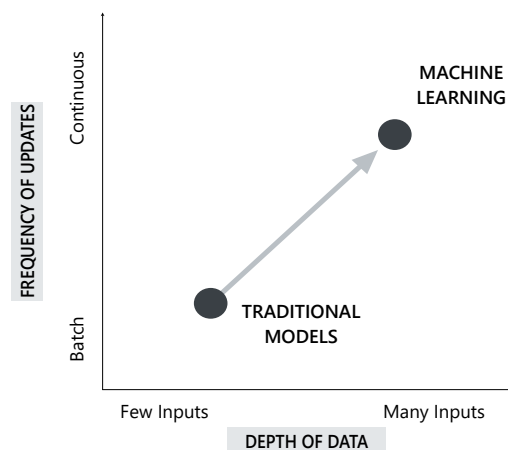
MACHINE LEARNING AT THE CORE

Two factors drove the need for ML: 1) innovations like the Internet meant enterprises could collect data on a much more continuous basis, allowing them to constantly update their understanding of key entities like customers, and 2) the depth of data enterprises collect has also expanded, allowing for a much richer and more detailed view of customers, etc. (see Figure 1). While a constantly updated, richer view of a customer is an exciting prospect, the sheer number of customers most enterprises have make utilizing this data to its full potential a big challenge.

Enter ML, which can handle the velocity, volume, and depth of big data and unlock far more of its potential. Some ML models can even understand customers as individuals, which has the potential to take the customer experience (and corresponding profitability) to entirely new levels.

FIGURE 1: THE MACHINE LEARNING PARADIGM

Unlike traditional modeling, machine learning enables more variables to be used, with continuous model updates



THREE TYPES OF MACHINE LEARNING

ML is rooted in statistical techniques that have been around for decades, and thus is a fairly well-developed discipline. In fact, there are currently three types of ML:

1. **Supervised Learning** - used when data is labeled, for example 'churned' or 'not churned.' The machine attempts to find the best model and/or coefficients that explain the variance in the labeled data. Input data is split into training and testing sets to gauge model accuracy.
2. **Unsupervised Learning** - used when the data is unlabeled for exploratory analysis. Does not require splitting data into testing and training sets.
3. **Reinforcement Learning** - the machine is rewarded or penalized with a numerical value, with the machine trying to maximize its cumulative reward. Reinforcement learning is particularly well-suited to problems that include a long-term versus short-term reward trade-off.

(continued)

Within each type of ML, there are a variety of techniques that can be leveraged, depending on the type of opportunity being addressed. Some of the more common ML techniques in use in enterprises today include Regression, Decision Trees, k-Means Clustering, and Neural Networks. That said, the landscape is evolving rapidly, and techniques like Reinforcement Learning are making fast inroads. The key is to understand the appropriate AI technique to apply in each case.

HOW TO APPLY MACHINE LEARNING

ML can be used to either *augment* or *replace* human decisions. These approaches are not mutually exclusive, and can often be used in sequence. In fact, some enterprises run ML alongside its strongest human decision makers to learn best practices, analogous to an apprenticeship.

The best place to start applying ML is anywhere human decisions are currently being made in *high volume with relatively low judgement or context needed*. ML performs better with more input data (which low volume decisions may lack), and also doesn't necessarily have the context or empathy for high judgement decisions. While these criteria may sound limiting, there are a large variety of qualified use cases in enterprises, and once identified, the problem becomes "Where To Start?" Figure 3 below lists a large (though not exhaustive) list of potential use cases by department. The goal should be to gain early wins and organizational learning on easier use cases, to leverage for momentum into advanced use cases.

WHERE TO START?

While the universe of use cases is large, many enterprises start in one of the following departments:

- 1. Sales & Marketing.** AI helps enterprises constantly optimize customer acquisition and brand spend across channels, and target customers based on the most effective attributes. In addition, AI-driven lead scoring can ensure that the most profitable opportunities are handled correctly.
- 2. Customer Experience.** Once acquired, the success of the customer has a direct relationship on repeat and ongoing business. AI can help understand that relationship at a granular level, provide a fully personalized experience for each customer, and predict weaknesses that need to be proactively addressed, in order to maximize long-term customer value.
- 3. Customer Support.** Many enterprises have deployed simple chat bots to help resolve customer queries more quickly; however, AI can take a larger share of the load, up to becoming a full-fledged agent of the enterprise (e.g. granting returnless refunds.)
- 4. Finance.** Many large enterprises use rule-based expense report processing; AI makes this process more intelligent, reducing overall processing costs. AI is also useful for revenue forecasting, being able to incorporate far more variables than spreadsheet models.
- 5. Human Resources.** An increasingly critical part of enterprise success, talent recruitment, engagement, and retention can all be enhanced by AI capabilities.

FIGURE 3: APPLYING AI ACROSS THE ENTERPRISE

Area	Department	Initial Use Cases	Advanced Use Cases
Front Office	Sales & Marketing	Segmentation Lead Scoring Media Optimization Attribution	Propensity to Buy Deal Terms Targeting & Personalization
	Customer Experience	Propensity to Churn Loan Default	Recommender Systems
	Customer Support	Propensity to Churn	Customer Lifetime Value
Back Office	Finance & Procurement	Forecasting Expense Report Approval	Fraud Detection
	HR	Recruit Scoring Compensation Equity	Talent Management
	Manufacturing	Demand Forecasting Quality Control	Predictive Maintenance
	Supply Chain	Forecasting Quality Control	Anomaly Prediction
	IT	Intrusion Detection	Intelligent Load Balancing