



Machine Learning

Lessons In Machine Learning:

Early Adopters Share Their Strategies

Leading-edge companies are applying artificial intelligence and machine learning technologies to solve business problems and create opportunities.

HERE'S HOW TO DO IT.

IDG Research Services recently took a two-pronged approach to study how enterprises are implementing AI and ML technologies. It conducted eight in-depth interviews and carried out a quantitative survey among 200 IT leaders.

Taken together, the interviews and survey results provide prescriptive insights into machine learning projects. This guide incorporates these practical considerations and lessons learned into a step-by-step ML strategy, including specific implementation advice from early adopters.





STEP 1: IDENTIFY USE CASES

Although ML requirements typically evolve from lines of business (LOB), IT leaders are the shepherds of ML projects. Once the business case is determined, 67% of survey respondents say IT leads the project, meaning it's important for IT to recognize which projects will be the best candidates for ML.

It's also IT's role to help educate LOB leaders on potential use cases for the technology by demonstrating areas where it has been effective, and encouraging LOB executives to extrapolate from there.

The most popular use cases, according to IT leaders, include:

▶ **IMPROVING SECURITY:** Using AI/ML to examine large quantities of security alerts to weed out false positives and identify patterns of threat behavior. Two thirds of respondents in the quantitative survey say they've already implemented ML for this purpose, and another 29% plan to do so within a year.

▶ **AUTOMATING TRANSACTIONS:** A financial organization is improving accuracy by using the technology to automate transaction-processing decisions. This use case is being implemented by 56% of survey respondents, with another 36% planning for it. Similarly, a large bank uses ML to automate the advice brokers give to customers.

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▶ **PERFORMING PREDICTIVE ANALYSIS:** Identified as a use case by 59% of survey respondents. For example, an auto parts manufacturer is using ML to determine how different polymers will perform under various conditions, as well as to predict future product pricing.

▶ **AUTOMATING CUSTOMER COMMUNICATIONS:** More than half of respondent organizations (58%) are using ML to determine customer preferences and provide support with little to no human interaction.



STEP 2: START SMALL

Start with a well-understood problem to prove ML will be useful in solving real business problems or addressing opportunities. It's typical to build from existing big data projects, such as a bank CTO who applied AI technology to an existing data lake to help predict late payments.

"Pick a project you are confident you can solve," then use its success to obtain support for future projects, says the computational modeling manager at the auto parts maker. His first big win: a cost and price prediction model that resulted in doubling its business with General Motors.

"Take a small problem and solve it," agrees the CIO of a health services company. Demonstrate tangible benefits and get the business thinking about other potential workloads for ML. One of his wins: reducing the time to resolve a support ticket from 48 minutes to six.



STEP 3: DETERMINE SUCCESS FACTORS

It's critical for IT to engage with LOB leaders to define a realistic goal and identify one or more meaningful metrics that will define success.

For example, the CIO of a healthcare services company set a target around security endpoint monitoring: **"Right now, we have an [employee]-to-monitored endpoint ratio of about 1,000 to 1, and we believe ML will bump that number to almost 10,000 to 1,"** he says.

He also sees ML playing a role in finding other ways to improve ROI. For example, his company spends \$150,000 per month on backup resources. **Early projections showed a potential savings of \$10,000 to \$15,000 per month on an ML project that will cost about \$250,000,** putting the ROI at about 18 months. However, by factoring in the company's 18% growth rate, the ROI may be achieved in less than a year. **"That's one area where we have a huge opportunity,"** he says.



STEP 4: IDENTIFY STAFF REQUIREMENTS

Come up with a strategy to deal with a shortage of skilled staff to implement AI/ML. Only 15% of the survey respondents said they have all the required skills in-house.

Interviewees offer this advice:

- ▶ **Have at least one data scientist in-house to define strategy**, and be prepared to pay that person well—around \$100,000 per year minimum. Then use contract engineers for coding—scaling up and down as demand warrants.
- ▶ **Provide training.** Rather than hiring, “sometimes it’s better to retrain developers and analysts,” says a financial institution’s VP of IT.
- ▶ **Partner with experts.** That might mean plumbing open-source communities for collaboration opportunities, or relying on vendors for help. “I tell people to buy commercial products because you’re also paying those vendors to help you along the way,” advises one IT leader.



STEP 5: ASSESS INFRASTRUCTURE OPTIONS

For example, the VP of IT for a financial services company already has Hadoop and Cloudera clusters in place. **“We are going to continually expand our Hadoop clusters. [Apache] Spark machine learning will sit on top of those. It’s not a rip-and-replace situation where we’re going to throw away [existing infrastructure] and build something to address the needs of our ML and AI communities,”** he says.

Cloud services can also play a role, such as for idle collection, or unprocessed data. Some applications require brute-force compute power for just a short time, maybe seven to 10 days per month. “The rest of the time data is being accumulated but it’s not processed until you run the model at the end of the month,” says the same VP of IT. **“It doesn’t make sense to have hundreds of Hadoop clusters in-house if they’re going to be idle 75% or more of the time. That’s why we started looking at cloud.”**

As projects scale, expect infrastructure costs to likewise increase. It’s not necessarily as simple as scaling compute capacity commensurate with the workload you add, because it’s not a linear progression. It’s more exponential, says the healthcare services CIO: **“I can tell you it’s two to three more times expensive than what you will project on the front-end.”**



STEP 6: COMMUNICATE RESULTS

As you see results, share them with LOB leaders. By proving the business value, it’s easier to gain broader support for additional AI/ML technology use cases.

ML will be evaluated on its impact, whether it’s improving customer engagement, empowering employee productivity, optimizing operations, or transforming products and services.

“Show the results, show it in action, that it works... that the value is there,” says the financial industry VP of IT. And then you can broaden its application, for example, to more customer segments, geographies, and areas of the business.

IMPLEMENTATION ADVICE

Actionable tips for AI/ML implementers from in-depth interviews with CIOs and IT leaders.

▶ PROPERLY PREPARE YOUR DATA

A call-center company has for years been collecting data about the millions of inbound and outbound calls it handles every year. “There’s so much data that can be mined from those calls,” the company’s CISO says. But putting it in a format that’s useful for ML is a challenge. “We are buried in information that is siloed in different ways. You need to figure out how you’re going to get the biggest bang for the buck out of that data.”

The best bet was the event log data from systems that house sensitive data. The company feeds that data into a security event information management (SEIM) tool that has AI/ML capabilities built in, to help it with fraud detection and to identify security issues.

▶ FOCUS ON REUSABILITY

As you develop AI/ML capabilities, use programming modules that can be deployed in a reusable fashion. Then you can take a building-block approach, using components from previous projects as you move along.

Also, try to apply ML concepts to the development process itself. “The ultimate goal is to teach the machines to teach the programs to write a program, and tweak the programs based on requirements,” says the VP of IT for a large bank.

▶ USE THIRD-PARTY TOOLS

You don’t have to build AI/ML capabilities yourself. Some early implementers make effective use of third-party tools that have AI/ML built in.

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The CIO of a real-estate company, for example, draws on Zillow’s massive database to provide property value estimates. “Machine learning is not a separate and detached entity,” he says. “It’s a differentiator. When we’re choosing products, we would certainly have the ones that include ML on our short list.”

Cybersecurity tools likewise rely on AI/ML technologies to identify threats rather than just signatures. The real estate company, for example, uses Cylance, an AI-based tool that helps predict and prevent cyberattacks. “It’s a smart system that looks at behavior and makes decisions based on that behavior,” the CIO says.

▶ FOCUS ON PREDICTIVE MODELS

Many AI/ML implementers find the technology is most useful for predicting future behavior, like a human resources software and services firm predicting when specific customers will call, based on their payroll cycle.

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—VP of IT at a financial institution

Companies are also using ML to review customers’ past purchases to help them sell additional products and services to returning customers.

The key is determining which data you must collect to then create models that consistently work well. This gets back to having your big data and data analytics houses in order.

▶ PLAN FOR UNSTRUCTURED DATA

ML technologies work well with structured data, but to gain maximum value, plan now to include unstructured data—including voice, video, and photos—in your implementation

strategy. For the VP of IT at a financial institution, the solution was to convert data from unstructured to structured, then run models on top of it. “This is one of the most challenging things,” he says, but the results are worthwhile.

▶ DON’T EXPECT IMMEDIATE RESULTS

The consumer products company had a big data strategy in place for 10 years before launching its AI/ML efforts. “Machine learning doesn’t just come out of a

box. You have to have some [good data] to begin with and then the AI technology will learn from there,” he says. “There is a lot of development and growing of the technology before you get the results.”

▶ LOOK FOR UNEXPECTED BENEFITS

Be prepared to pivot and go where the AI/ML project takes you.

The auto parts manufacturer’s first ML workload was around component cost prediction, based on future car shapes and sizes. It worked so well that General Motors promised

to reduce its component supplier pool from four to two, if the manufacturer could stand by the predicted price. Doubling its business with GM was a huge incentive. Much of the effort involved getting ML to predict data that the system had never seen before. “In the end, we were able to do it,” says the computational modeling manager for the company.

Similarly, while the call-center company initially used ML technology to aid in its fraud detection and security efforts, it later realized the technology could help suggest products to return customers.

FINAL WORDS

Though AI/ML technology success comes with a significant learning curve and no small amount of trial and error, the challenges are surmountable — and the benefits can be significant. Whether it's improving productivity, customer engagement, operations, or cost effectiveness, a strong big data/analytics foundation can help drive AI/ML projects to positive ROI.

For further ML research results, download the companion white paper, "Machine Learning is Delivering ROI for Early Adopters."

