E[X]

Expected [X]

Growing Your Business Through Machine Learning

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"We've always done it that way."

"Changing any part would change our whole business model."

I'm sure you've heard reasons like these given as to why companies don't adopt newer or more effective procedures. The problem with these statements is the attitude of *complacency*. But as a business executive, you know that complacency inevitably costs you money.

You don't have the luxury of making choices based on tradition or gut-feelings. You need to keep your business profitable, even if it isn't easy.

With our increasing technological firepower, machine learning can help. Machine learning takes multiple sources of data and uses them to help you make better decisions. So, you don't have to go with your gut and hope you didn't miss an opportunity!

Expected X was founded on the idea that machine learning can help any company grow. But we also realize that machine learning can be daunting. That's why we've put together this brief guide on how machine learning works and what it can do for your business.

We've answered all of the most frequently asked questions we've received over our years of experience in the field, and we offer our best answers here!

What is [Machine Learning]?

Machine Learning is a new paradigm of Artificial Intelligence that has *dramatic* implications for business & technology.

It arises first from this question: Could a computer go beyond merely the instructions we give it, and learn **on its own** how to solve a problem?

Rather than programmers shaping how a computer works by hand, could a computer automatically learn these rules (and improve processes) by looking at data?

With machine learning, humans input data as well as the answers **expected** from the data, and out come the rules. These rules can then be applied to new data to produce original answers.

A machine-learning system is trained rather than explicitly programmed. It's presented with many examples relevant to a task, and it finds statistical structure in these examples that eventually allows the system to come up with rules for automating the task.

For instance, if you wanted to automate the task of tagging your vacation pictures, you could present a machine-learning system with many examples of pictures already tagged by humans, and the system would learn statistical rules for associating specific pictures to specific tags.

What [kinds of data] does machine learning work with?

Almost anything that can be quantified or measured numerically is fair-game. This means not only what we traditionally think of — data that can be stored in an Excel file or database (structured data), but also images, sound files, video, and text (unstructured data).

What [kinds of businesses]can benefit from machine learning?

There are very few that can't. If a business makes use of data — its customers, its competitors, its business operations — it can benefit from having a solid data strategy that utilizes machine learning solutions.

How does machine learning [reduce the cost]of doing business?

For all the external applications of machine learning solutions, there are probably an equal number of internal applications. Machine learning drives process automation — signaling errors before they occur, reducing superfluous headcount, and optimizing supplier relationships to name a few. Further, machine learning solutions can reduce or eliminate the inherent biases in human decision making that can lead to costly missteps and backtracking.

How does machine learning [improve sales]?

If you're in business, you have customers. If you have customers, you have data. The relationship between your organization and its customers is therefore quantifiable. Machine learning helps you identify the nuances that exist within your customer base and exploit it. For example, which customers are worth targeted marketing? Which products do customers with similar purchase patterns buy together? What is the typical "profile" of my customer base and how do I find more prospects like them?

What [problems] can machine learning solutions address?

Anything business process that is measurable has the potential to be addressed via machine learning solutions.

- Who will respond to a marketing campaign?
- How much will a customer use a given service?
- Which customers exhibit similar buying patterns?
- What recommendations can we provide for up-sell opportunities?
- What is the typical service usage of this customer segment?
- What data are we collecting that is important to our solution?
- What internal processes can be automated?

Who is [ExpectedX]?

What is the [Expected Value Framework]?

The Expected Value Framework is a means of applying cost-benefit analysis to the optimization of machine learning solutions for maximum ROI. The framework determines how to utilize a solution in a business setting, how to compare solution alternatives, and both lift and profit in dollars and cents. This is where Expected X differentiates — we don't stop with just a machine learning solution. We create a means of measuring bottom-line performance improvements in the language of the C-suite.

How does Expected X provide machine learning solutions [custom] to my organization?

What we do is based off the understanding that your business functions much like a machine. Your business has inputs and outputs. Your people and departments fit together in very specific and quantifiable ways.

With machine learning you can analyze the parts of your business to discover where you can improve. What areas lack fluidity? What problems might be addressable through machine learning solutions? Then we evaluate your data strategy. How do you collect, store, and utilize data internally? What are your existing pipelines? What data do you have and use, don't have and need, and don't know you have but could benefit from? From there, we craft training and development for your existing analytics team. Beyond that, Expected X has the capability to partner with you to augment your internal resources with both data scientists and machine learning engineers to work with your SMEs in an on-going capacity or ad-hoc project basis.

What makes Expected X's machine learning [training] superior?

Our custom client training and development excels beyond static online options you may find in online courses or "MOOCs." We teach not only the fundamentals of machine learning (and associated fields like deep learning, computer vision, and natural language processing), but specifically how to apply them to a problem within your industry, or potentially within your own organization. Both in-person and live-virtual training options means participants' questions can be fielded in real-time by industry professionals. We combine lecture lessons combined with hands-on skill development using industry-standard software tools like Python, Jupyter Notebooks, OpenCV, and NLTK. Furthermore, what participants learn can be applied immediately following training as part of Expected X's Team Augmentation offering. Our solutions have been successfully applied at Silicon Valley's Fortune 100s.

Why should machine learning be a part of [training and development]?

Machine learning is no longer simply a competitive advantage; it's table stakes for getting a seat in the game. Estimates place the demand for machine learning professionals at 1M openings worldwide — with only 300,000 of these individuals available. This demand has skyrocketed, while the supply has remained far below. Upskilling is the key to developing talent from within, reducing demand-associated costs, and staying relevant.

What does [Expected X] mean?

In statistics and probability, the foundation to machine learning solutions, the expected value (represented as "E[X]" in mathematical notation) is just the probability of a certain outcome given a certain number of occurrences. Like flipping a coin, if we flipped it 10 times we'd expect "heads" to show "5" times (although in reality, this might not always occur). Expected X also refers to the Expected Value Framework — a tool we use for calibrating machine learning models to link their predictions to measurable business outcomes in the language of dollars saved and earned.

Ready to see how Expected X can help you dramatically improve your business processes with Machine Learning? Schedule a free Clarity Session and we'll show you the way forward!

Schedule A Free Clarity Session

Expected [X]

Driving Business Growth Through Analytics

Expected X is an analytics consulting partner that helps organizations make use of their data through predictive modeling to drive their business.

Have Data?

In today's digital world, companies are continually compiling data on every aspect of their business. Unlocking the potential of your data takes **specialized skills**.

Need Insights?

A business' ability to extract insights from their data provides a **competitive advantage**. Learn from your data and make informed decisions to drive your business.

Your Analytics Partner

Partner with **Expected X** and let their experience and specialized skills take your business to the next level.

About [Us]

John Sukup is Founder and Principal Consultant at Expected X. John has spent over a decade in the data analytics and research industries working for some of the most well-respected names in business including The Nielsen Company and BlueCross BlueShield. He has experience consulting and data modeling in healthcare, consumer tech, government projects, retail, insurance, and finance. John received his BS and MS from Purdue University.

From the [Client]

"Was really impressed with his knowledge of machine learning, clear presentations, and numerous real-world examples. John took the time to construct several practice labs which helped reinforce the material and provided a template to follow for future applications."

—Manager, Software Development at Fortune 100 IT organization

"This was a very good survey of machine learning technologies. I believe the course functioned at several levels. I was able to digest information at a 30K foot level, but other students with more statistics background were able to digest lower-level technical formulas. The class was paced so both levels of student could participate equally."

—Fortune 100 IT organization workshop participant

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Expected [X]

Services to Fit Your Needs

Whether you're looking for end-to-end predictive modeling solutions, experienced consultants to support your team, or training to grow your team's expertise, **Expected X** has solutions to meet the needs of each individual client.

Train [Your Staff]

Let us educate and motivate your staff on applying **machine learning and deep learning** in their roles. Our training workshops teach the basics of this exciting field using one of the most powerful tools in the industry, Python. Our *Fortune 100* tested workshops can be conducted on-site or virtually. **2-day workshops include:**

Machine Learning and Deep Learning Fundamentals with Python

- Jump-starts your team in predictive modeling and builds their interest in applying these skills
- Provides an introduction to *both* **machine learning** and **deep learning** foundational knowledge
- *Recommended for analysts and developers with some coding experience in Python*

Introduction to Machine Learning with Python

- Provides a more comprehensive overview of the topic and omits deep learning
- Dives further into **machine learning** with time to explore additional supervised and unsupervised algorithms
- *Recommended for analysts and developers with some coding experience in Python*

Introduction to Deep Learning with Python

- Explores the foundational, theoretical, and philosophical aspects of the field
- Provides additional time on **Artificial Neural Networks**, the basis for most applications in deep learning and artificial intelligence
- *Recommended for analysts and developers who have taken "Introduction to Machine Learning with Python"*

Augment [Your Team]

Have a project requiring predictive modeling but don't have the internal capabilities to staff it? **Expected X** provides the expertise to ramp up new predictive modeling projects or backfill resources for your temporary needs. We've supported large and small businesses, from start-ups to the U.S. Department of Energy. See what we can do for you.

Services include:

- ML/DL Project Management
- Problem identification and ROI measurement
- Stakeholder/ML team communications intermediary
- Model development, evaluation, and deployment
- Code review and feedback
- Reporting and visualization design and delivery

Learn more about Expected X!

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