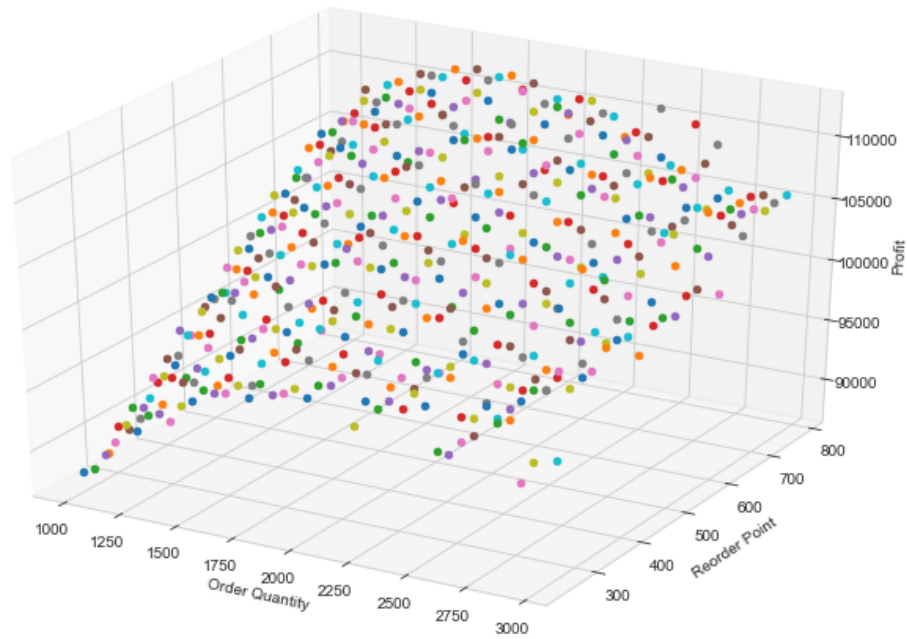


# Demystifying Artificial Intelligence and Machine Learning



*Profit Optimization in Continuous Review Model*

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*If you're a company dealing with over 10,000 website visitors per day, multiple products, and multiple service offerings, you're generating massive amounts of data.*

**Machine Learning can unlock powerful insights in that data that a human brain can't see, but first you should know what to look for in a Machine Learning solution.**

This guide is all about demystifying Artificial Intelligence (AI) & Machine Learning (ML).

## WHAT IS MACHINE LEARNING?

There's a lot of hype lately about Machine Learning, but what is it really? And, are all the things that claim to be Machine Learning really Machine Learning?

If you think Machine Learning is something that was recently discovered, think again. Back in the 1960's there were attempts to develop Machine Learning, using calculations and algorithms, but the computer power back then wasn't enough to really create the Machine Learning that early data scientists envisioned.

Over the years the concept has been revisited and attempted again and again, and **now that computing power is equal to the task, it is becoming a reality.**

### But what exactly happens with Machine Learning?

Simply stated, Machine Learning is all about pattern recognition.

The computer begins to recognize certain patterns, and stores those patterns and data as a set of algorithms.

**Then it predicts outcomes based on the data it was given.**

That's the point where marketers begin to get excited.

The words "predicts outcomes" raise a lot of eyebrows and elicit a lot of smiles. After all, imagine having a computer predict whether and when a customer will place an order when- they're visiting a website, based on certain patterns of behavior. That would be incredibly powerful.



In its most basic form, Machine Learning takes data from human experiences. It has absolutely no innate business knowledge, doesn't have any ability to strategize or conduct abstract thinking. It isn't creative, and can't generate original thoughts.

Humans do that.

Machine Learning works in a very specific space and application.

Here's an easy way to understand the concept of Machine Learning. Suppose you want the machine to give you the optimal directions to help you drive from point A to point B. In order to do that, it needs to have data to examine, and that's where human interaction with Machine Learning comes in.

Humans feed the machine prior **experiences** in the form of data and the machine uses software to analyze those experiences. Remember, Machine Learning is all about pattern recognition. So the machine looks at your past driving routes, and predicts what would be an optimal route.

But it isn't a simple task, because there are variables that come into play—different experiences that need to be analyzed, and the machine uses its algorithms, which are simply a set of instructions, to do the analysis.

What type of variables do the algorithms look at? Well, let's go back to our optimal driving directions. One day it might have been raining. Or, there could have been an accident that caused traffic to come to a standstill. Maybe there was road construction on one of the turns you made on the way to your destination.

Those are the variables—the different experiences—that Machine Learning incorporates before making any **predictive outcomes**. And the outcome it makes is without any human involvement—except for the data it was given.



Based on all the data, experiences and training, the machine will do a predictive outcome: "turn right at the light, go two blocks and make a left, go half-a-mile and the destination is on your right."

If this sounds familiar to you, you're right. It's basically the way Google Maps and other similar apps provide users with directions.

It's all based on those human experiences **and the variables** that come into play.

But human interaction stops at training. Other than providing data and prior experiences, the machine will take care of all the rest.

Here's an important point: Machine Learning is only a tool. It's like a hammer lying on a table: if you don't know what the machine has the information it needs, and in this example—how to use the hammer to pound nails into wood. Without that information, the tool is useless.

Just remember that the machine can't learn without training, and the training is where human interaction is involved. The machine doesn't realize that you have to stop at a stop sign, for example. It must be trained to understand that concept, and humans provide that type of input.

Without that training, about the stop sign, for example, it couldn't predict the optimal route to take to your destination.

# Different Approaches to Machine Learning

To help you not only understand Machine Learning and how it might help marketing efforts, it is important to understand the different types of Machine Learning that are available.

The evolution of Machine Learning over time has led to many different types of Machine Learning. They're basically defined based on the purpose of the Machine Learning.

## Here are the different types of Machine Learning:

- Supervised Learning
- Unsupervised Learning
- Semi-supervised learning
- Reinforcement learning

Let's take a closer look at each one.

First off there is **Supervised Learning**. This includes human involvement, from entering data and experiences to entering training information. (Remember, the machine didn't know you have to stop at a stop sign until it was trained to understand that concept.)

Conversely, there is **Unsupervised Learning**. There is no human involvement with unsupervised learning, no data from the past to share with the machine, no experiences to provide. Instead, the machine has to figure everything out by itself.

In an unsupervised learning mode, the machine will begin to assign attributes, which as you would imagine are limited in scope simply because the machine is only "guessing." It will continue to do so until an event actually happens.

As you would guess, supervised learning is far more accurate.

But there are times when you just don't have any past experiences or data to share with the machine; so unsupervised learning may help provide some type of predictive outcome.

There is also **Semi-Supervised Learning**, which is a type of learning that falls between Supervised and Unsupervised Learning.

For many applications, it's simply too costly to provide labels and datasets to the machine. To do this would require highly skilled and trained experts at massive scale. If there are some datasets to provide, some is better than none. Even though most of the data experiences are unknown, the semi-supervised learning model will still do the best it can with the data it has available.

Finally, there is **Reinforcement Learning**. In this model, the machine learns from the experiences in the environment and works to take actions that would mitigate any risks while maximizing the rewards.

In this scenario, reinforcement learning is defined by a unique problem, and the solutions it provides are actually reinforcement learning algorithms. It determines the best action to take based on the input it receives. Once it performs an action, it will receive reinforcement from the environment.

As will all of the different types of Machine Learning models, they're all a form of Artificial Intelligence. The software and the machines continuously learn from the different environmental experiences, and then explores different possible actions.

# What Industries are Using Machine Learning?

Not surprisingly, most people are familiar with Machine Learning and Artificial Intelligence (AI) when you talk about facial recognition and voice recognition. Walk through any airport or transportation terminal and chances are that cameras are capturing images of everyone and running them through image recognition software that is based on Machine Learning.

The data input in this case would probably be known terrorists and criminals, and by scanning these images the software can spot the people that law enforcement are looking for. It's the same with voice recognition software.

But neither facial or voice recognition doesn't necessarily have to be looking for a surreptitious user such as a criminal or as a method of fraud detection. It can be used in a positive way: for example, a customer's or employee's voice that is being recognized and helps bypass various security systems that are in place.

More and more consumers are being exposed to Machine Learning with Alexa. It doesn't just follow voice commands; it learns patterns and habits and can "predict" what the user might need next. Privacy advocates tend to be alarmed by just how intrusive some of this technology is, but overall it has enjoyed widespread acceptance.

Any industry where a predictive outcome could help the business thrive is exploring and using Machine Learning. Many people call it "using Artificial Intelligence," but as discussed earlier they're actually one and the same.

## Where is Machine Learning being applied?

Remember, companies need and often demand insight into how to make their business run more profitably. Predictive outcomes can be a big help in that regard. Industries using Machine Learning currently include companies that use many types of equipment on a continuous basis.

Here's why: Machine Learning can help predict why and when equipment failures will occur. If you look at the process, where historical examples and data are provided to the software, the Machine Learning algorithms will then take that data and determine the actual lifespan of machines, machine parts, and production line processes.



The variables may include historical examples of when similar machines failed, what part was worn out, what equipment part or parts failed to live up to their manufacturer's warranties, what impact a power failure had, etc. This data is then utilized to predict when the next failure or breakdown will occur.

Other areas where Machine Learning is extensively used include companies that use pumps and compressors, ATMs, vending machines and many others. And that's only a small sample of industries that are using Machine Learning.

Other applications include the field of biology and medicine. This is especially true at the genetic level, where machines (software and algorithms) can explore thousands of metabolic pathways and predict a variety of potential outcomes. They analyze DNA and RNA, and can predict anomalies and other potential outcomes that are of great interest to researchers.

## There Are Many Times NOT to use Machine Learning

As you've seen, Machine Learning is a major asset to businesses. It's a tool that when used properly can reduce costs, boost productivity and most importantly, help to increase sales and customer engagement.

But not everything is appropriate for Machine Learning! There are many times when a simple Excel spreadsheet will suffice to aggregate stats, numbers and be used to do a pretty thorough analysis.

One example would be when trying to examine how long a person spends on a website. A simple spreadsheet showing time spent is easy to create and easy to understand. If there are not too many variables involved, then a simple spreadsheet would show number of visitors, and time spent. Once you start adding in variables, the spreadsheet won't help. For example, is the visitor spending additional time because they can't locate what they're looking for? Are they spending extra time on the website because the site has internal search links designed to keep the visitor there? There's no way to aggregate this type of info using a simple spreadsheet.

The other issue is how many users are you planning to look at? If it's several hundred, then a spreadsheet would suffice. But if it's several hundred thousand or in the millions, then Machine Learning is the only option that makes sense. Here is the most important consideration: spreadsheets can't predict outcomes. They're merely a way to provide a snapshot of different customer need and habits so that the person looking at the spreadsheets can determine what next steps might be. They're also good for preparing the datasets that are given to the Machine Learning software in order to maximize the algorithm's job.



# Putting Machine Learning to Work

As discussed, Machine Learning works to help enhance the buying and customer experience for visitors to a company's website.

But it's also being used on social media, mobile devices, apps and all other types of digital applications; The fact is that users are currently on all of those spaces, so it's logical that Machine Learning can discover insights within the data generated by all of them. Any time predictive analytics are needed; Machine Learning is there to help.

One way that marketers are using Machine Learning is for customer analytics and segmentation. Using unsupervised learning, marketing departments are using a variety of platforms to analyze millions of consumer variables, explore their media activities and group consumers by interest.

This provides an in-depth insight into the consumer that was not available before Machine Learning came on the scene. It drills down to levels never imagined—which consumers are watching specific series on pay-per-view services, how much food do they purchase each week, what travel plans are they looking at, and so much more.

Customer segmentation is one aspect. Another is predicting customer churn and helping to minimize it. Churn gets expensive. It costs a lot of money to convert a visitor to a customer, and if you constantly end up losing those customers the dollars add up quickly.

Machine Learning looks at various patterns of prior churn by examining thousands of customers, and then it can accurately predict which current customers are at a high risk of churning. Using this information the company can proactively help to prevent the pending churn.



**In summary, Machine Learning is making the seemingly impossible possible with data in a variety of industries, and businesses who use it properly stand to benefit massively.**

**Are you interested in unlocking the power of your data and generating powerful insights with proprietary Machine and Deep Learning algorithms?**

**Send us an email at [dilato2000@yahoo.com](mailto:dilato2000@yahoo.com) or visit [sriyamarkets.com](http://sriyamarkets.com) to learn more.**