

# Big Data and Machine Learning For SMEs



With recent advancements in technology it is now easier and more cost effective than before for SMEs to start using Data Science and its related technologies.

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## Summary

Big Data is often a term that SMEs find intimidating to some extent. Many assume that it is simply referring to the massive quantities of data that huge corporations hoarded over time. However, this is not the case. In fact, with the world producing more publicly available data than ever before it is now possible for SMEs to take advantage of the technology available to gain a big picture view.

Through connecting different data capture points a SME has the ability to vastly improve the immediate customer experience and the long-term perception of its brand.

It perhaps is not obvious to an owner of a small business how big data is changing the business landscape. The truth is that over the last decade large corporations have really ramped up their investment into Data Analytics and its associated technologies. At the same time data has become more accessible by those outside of the large corporate world. By taking advantage of the pioneering work funded by large companies then smaller businesses can now reap the rewards.

For example, being able to analyse the relationship between social media and buying

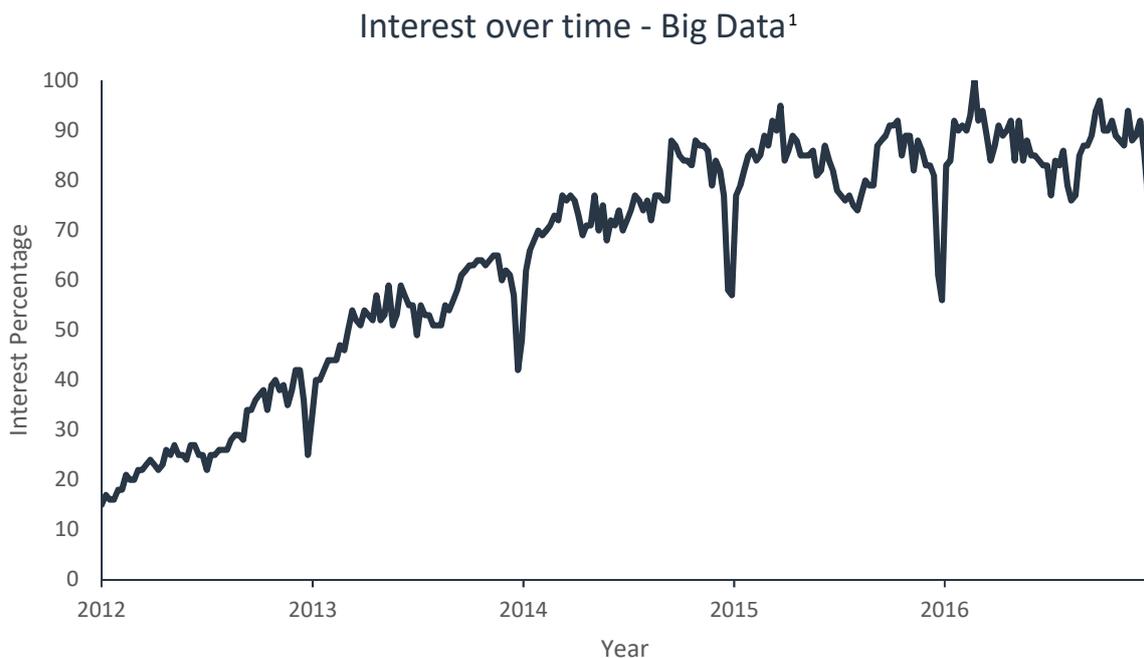
trends would allow a SME to capitalise on emerging sales opportunities. Online SMEs can gain an advantage by detecting promotional and cross selling opportunities through Machine Learning.

The other main factor in SMEs lagging on using Big Data and Machine Learning technology is their perception of cost. There are several Enterprise-software-solution providers that try to justify a large upfront cost through economies of scale in the long term, but this is not very useful for an SME that simply wants to improve their business processes to help decrease their expenditure, increase their income and ultimately improve their bottom line. Fortunately, technology has advanced to the point where bespoke software solutions can be created to make use of the scientific breakthroughs in the area of Machine Learning and Big Data that can be designed to target the specific needs of smaller businesses. This means that a SME ends up paying only for what it needs and not a huge product suite or platform that is generically produced for large corporate clients.

# Big Data

Big Data is not a new phenomenon, in fact the notion has been around for almost half a century. However, it is a topic that has been growing in exposure across every industry in recent years. There are two main reasons that, although the idea of Big Data has been around for some time, it is now gaining traction and rapidly:

- The first of these two reasons are that globally we are producing greater quantities of data than ever before meaning that how we store and process that data to make constructive use of it has become a key issue.
- The second reason is that the advancement of hardware solutions has reached the point where they are capable of running the underlying algorithms on such huge data sets. Meaning that no longer is the field of Big Data confined to a corner of academia or indeed gigantic organisations as the hardware required has become more affordable and practical to obtain and use.



<sup>1</sup> Data from Google Trends - <https://www.google.com/trends/explore?q=big%20data>

# Machine Learning

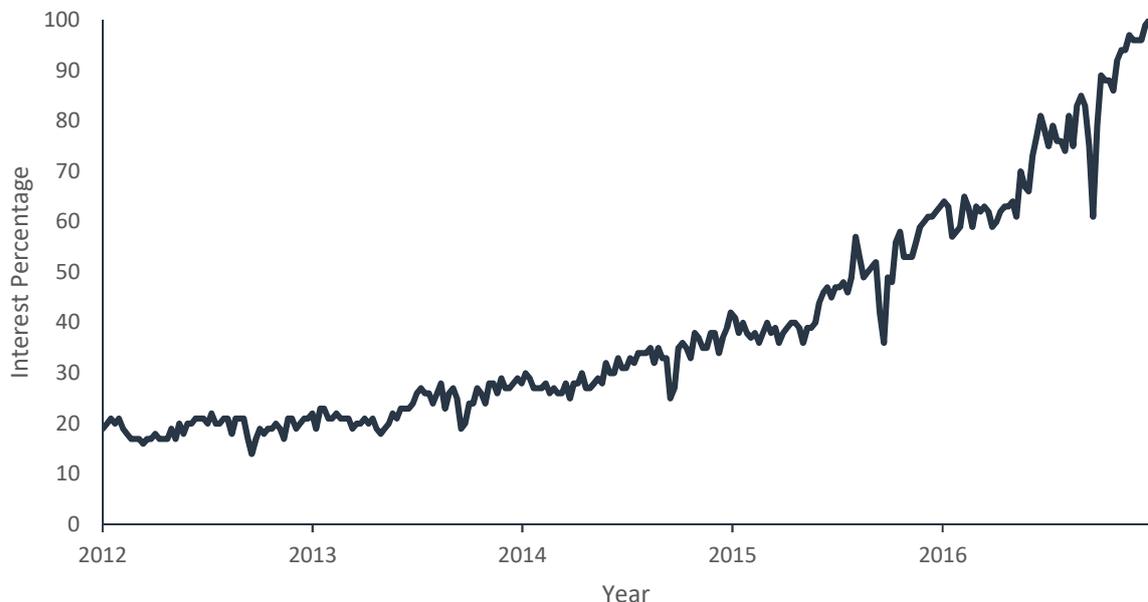
Machine Learning is similar to the process of Data Mining and in many ways, can be considered a subset of the field. Both share the concept of looking through data with the goal of identifying patterns and establishing connections.

The algorithms that Machine Learning is built upon can be very useful for extracting qualitative data from datasets that are simply too large for people to sort through. These algorithms are generally split into two main categories, supervised and unsupervised. Supervised Machine Learning algorithms take what has already been learned and apply that knowledge to new data, whereas Unsupervised Machine Learning is the process of sifting through data with the aim of discovering some, as yet unknown meaning, from it.

In the real world, what this means is that we can utilise Machine Learning technology to carry out tasks such as extract sentiment from bodies of text like product reviews and use that information to derive the reasons for negative or positive feedback.

The real power of Machine Learning comes from the fact that it is a technology that can enable the prediction of future events even when certain datasets are absent. Employing this power can help SMEs not to be held back by their lack of resources when compared to their larger counterparts.

Interest over time - Machine Learning<sup>2</sup>



<sup>2</sup> Data from Google Trends - <https://trends.google.com/trends/explore?q=machine%20learning>

## Requirements and Benefits of SMEs working with Big Data and Machine Learning

“Any solution for an SME must allow them to choose only the capabilities that they need.”

### Flexibility

Most Big Data solutions are targeted at large enterprises and are typically require customers to replace their existing systems. This means a heavy upfront cost and disruption to the business. For most SMEs this is simply a burden that they are unwilling, and even unable, to take.

Any solution for an SME must allow them to choose only the capabilities that they need and integrate them with the systems that they already have in place.

## Deployment Simplicity

The most common method of deployment of Big Data solutions for enterprise customers involve months or even years of deployment, integration and training. In the case of SMEs this process should take only a few days or weeks as they simply don't have the resources to absorb the disruption such a process could inflict on their business.

The main reason that an SME can expect a solution deployment to be fairly rapid compared to larger organisations is that if done correctly the solution has been integrated with their current systems. In this way, they can benefit from the technology that has been implemented but with the familiarity of what they are used to using. Furthermore, any bespoke solution will have been designed and built with the input of the SME at every stage. This means that the final system will be closer to what the organisation wants and needs than a costly pre-made enterprise solution would be.

**“Designed and built with the input of the SME at every stage.”**

“It is now possible for smaller organisations to benefit from data insights.”

## Reducing Cost

For an SME it is essential that they only pay for the features that they need. Furthermore, any licensing should be scalable allowing for increased capabilities in line with analytic needs.

With the falling costs of technology, it is now possible for smaller organisations to benefit from the data insights that larger enterprises have been enjoying.

Data sources themselves are becoming more common and cost effective as an SME now not only has access to its own data but also, many times free, data from government databases and social networks. With the costs coming down for the technology used to store data even specialist providers are able to offer better price plans.

Even if the data an SME has is not that big and they don't have all of the resources that large companies do then they are still able to benefit from Machine Learning and Big Data analytics to gain insights into their business, customers and key performance Indicators (KPI).

## Increased Competitiveness

In the early days of Big Data analytics and Machine Learning it was only really the larger organisations with seemingly endless resources that could take advantage of this technology. However, now that SMEs are able to tap into this wealth of knowledge too then they can position themselves with a more competitive outlook.

Being one of the first SMEs to successfully introduce Big Data analytics and Machine learning techniques such as analysing customer traffic patterns, not just from your own data but also from industry wide data, will help your business become more competitive.

Through Big Data technologies SMEs can eliminate inefficiencies and human bias from their business and in doing so strengthen client relationships and enriching service or product offerings.

“Big Data technologies can help SMEs eliminate inefficiencies and human bias.”

“Free up time to be able to work on tasks that require more human interaction.”

## Reclaiming Time

For small businesses, it is often the case that the business owner is the busiest person who has to rely mostly on instinct to make decisions. However, with the use of Data Science it is now possible for business owners to have access to a wealth of information that can help them to make the data driven decisions that need to be made in today’s marketplace; without the need to have a team of Business Intelligence experts on staff.

It is well known that in the not too distance future Artificial Intelligence and Machine Learning will eliminate some kinds of jobs. Whereas, it could be the case that it will make other types of jobs easier to do. For example, accounting teams are now able to navigate through financial data much faster and make sense of the numbers. It is even possible today to use Machine Learning to free up some time in different roles such as accountants and small business owners, allowing them to work on other task that require more human interaction than a machine can provide.

## How an SME can get started with Big Data and Machine Learning

### Identify the problem

“Once you know the question then data can be used to find the answer.”

The first step that needs to be taken is to identify the problem that needs to be solved. This sounds easier than it is. Most of the time businesses try to start with what they think is the right solution for them rather than figure out what the actual problem is that they want to solve.

Data Science can't simply be introduced to a business and magically optimise the whole organisation. As advanced as technology is there is still the requirement of a human being to identify the problem and then frame it in such a way that a machine can understand it. Furthermore, every business is different which is why an out of the box solution usually only does an OK job, not a great one.

Once you know the question then data can be used to find a solution. Whether the problem is finding more customers, retain old customers, doing a better job of marketing or something else altogether.

“Start slow, identify the areas where Data Science can have the greatest impact on the business.”

## Manage Expectations

Data Science technologies should be applied to any business in a strategic way. What does this mean? Well in a general sense it means that any business, but especially SMEs, should not seek to immediately apply these tools in every aspect of their business. Rather they should identify key areas where it is believed they will have the biggest impact solving the questions that have already been identified. In this way, it is possible to get the results that are wanted with minimal disruption to the ongoing business.

Businesses should adopt the scientific method when starting out with Big Data and Machine Learning. A hypothesis should be constructed and then data should be applied to test its basis. This is often a difficult concept for industry to participate in as they are used to demanding results instantly. However, with Data Science the best results are obtained when exploring the data in this way. The difficulty for SMEs is keeping the cost of such explorative methods down to a minimum.

The reality is that in today's data driven world busy business leaders and entrepreneurs who often find themselves bogged down in the day to day running of a business and can find Data Science to be an important tool in helping them refocus their view on the big picture.

## Finding Data

Many SMEs have been reluctant to get involved in Data Science as they feel that they do not have the quantities or quality of data that is needed to get the most out of these technologies.

- **E-Mails:** There are a lot of data in company e-Mails, whether internal or external. Mining this data for information can provide insight into several areas including interaction networks and sentiment.
- **Social Media Data:** Social media is a rich resource of data that in many cases can be collected and analysed for no cost. The wealth of knowledge about customers, their preferences, opinions and locations that can be harvested from this source.
- **Web Traffic Data:** If you have a website then you have data about who has visited it and what they did on the site. This sort of information can be extremely useful for understanding your clients and, for online businesses, converting views into sales.
- **Government Data:** A business does not always need to look for internal data and in fact many times when internal data is augmented by external data this can provide greater insights with previously unseen information that can be created. Government information is one such source of free external data.
- **Customer/Client Data:** Any data, no matter how small, that an organisation has about its customers can be useful when taken as a whole or complimented by other data sets.

“A business does not always need to look internally for data.”

## Conclusion

Big Data could end up widening the divide between large corporations and SMEs with the former gaining advantage through insight. That being said with the right strategy and solution in place Big Data is both affordable and manageable for the small business owner. The opportunities of Big Data for start-ups have been shown by firms like Uber who have used the competitive advantage they gained to not only become a large player but also ultimately create a whole new business model and market segment to operate in.

Implementing a data strategy is vital for an SME in today's world where new breeds of technology mean that data generation levels will see new highs. If an established SME is not thinking about this issue then they need to start now before newer start-ups and larger corporations surge ahead. For every organisation, the ability to correctly predict the future is the key to sustainable growth and Data Science and its related technologies can help businesses of any size achieve that. In the past it has taken considerable computing power and expensive technologies to extract value for data in this way but advancements in technology and reductions in price mean that now even SMEs can tap into the advantages that Big Data and Machine Learning offer to improve their customer experiences and increase their bottom lines.