

Why SMEs should embrace machine learning

By Benjamin Lee and Gary Pan

RECENT technological advancements have placed artificial intelligence (AI) along with its subfield of machine learning (ML), at the forefront of transforming small and medium-sized enterprises (SMEs) digitally.

Some SMEs are starting to tap into ML to shape their business processes and decision-making with the ultimate aim of raising profitability through revenue improvement, cost reduction and new sources of value creation.

ML is seen as a continuation of the concepts around predictive analytics. However, a key difference in ML is that it uses mathematical algorithms to train computers in the processing and analysing of large amounts of data, allowing them to produce rules, identify patterns and generate classification predictions.

It is important to note that computers automatically learn without human intervention or being explicitly programmed.

To embark on a ML programme, SMEs need to first identify what data to use and analyse.

For instance, if a SME intends to predict customer behavior, relevant data to gather may include:

- Customer data;
- Social media data which include the wealth of knowledge about cus-

tomers, their preferences, opinions and locations that can be harvested from social media; and

- Web traffic data.

If the SME has a website, then the company will have data about who has visited and what customers did on the site.

This information may be useful for understanding clients and developing corresponding sales strategy.

Essentially, data are the core of any ML algorithm. It must be supplied in the form that the algorithm understands.

The main function of ML algorithms is to unlock the concealed information and knowledge available in the data.

Here are two examples of ML enabled tasks used by some SMEs:

■ Spend analytics

With the help of improved data storage capabilities, there is now greater ease for SMEs to collect and gather data involving anything on which they spend money.

Such data includes purchase orders, billed invoices, card transactions, employee claims relating to travel, medical and flexible benefits.

Based on the mathematical distances between points, clustering methods iteratively compare voluminous transactions with each other and form clusters which have similar

properties.

Because this is a purely mathematical process, bias can be reduced significantly.

This allows new insights to be gathered from the data, which was previously unknown or not quantified.

This should ultimately provide answers to questions such as "Who is buying?", "Who is selling?", "What is being bought?", "How many?", "When is the transaction?" and "What is the mode of payment?" among others – all of which are the very questions that revolve around the work that procurement does to add value to companies.

Exploring clustering and its variants are but the first foray into spend analytics for SMEs looking to better manage spending.

Through the use of text analytics combined with natural language processing (NLP), text information can be converted into data for more advanced analysis of expenditure data.

In risk management, text analytics can help classify transactions into "high risk", "medium risk" and "low risk" using classification methods like decision trees, k nearest neighbours and neural networks to analyse historical records.

Using the analysis findings, these algorithms can predict whether a transaction is likely to be "high risk"

and procurement can step in to block such a payment.

■ Sales demand prediction

With previous years of sales data, SMEs are able to identify patterns in sales and consumption. This can be done on an individual basis or focus on a target group or demographic.

Probability algorithms are the key to envisioning certainty into the future.

The base of probability which is the likelihood of an event occurring, can either be 0 or 1, which is to say impossible or certain.

The algorithms take into account all external and internal influential factors that go into the sales process and the likelihood of that process being a success.

This type of "what if" analysis allows sales managers to understand the impact of these factors on sales numbers and evaluate how to use these insights as levers so as to have a greater positive impact on sales.

In addition, ML is able to optimise marketing spends and processes, as well as increase the sales per amount spent on advertisements and product promotion in the market.

The solution can be a regression analysis based on year-on-year comparisons.

The solution process simulates different marketing scenarios and res-

ults so as to identify the optimal marketing strategy in real-life conditions.

The underlying concept behind regression analysis is that an output is explained by a combination of multiple variables.

In the example above, each marketing scenario, along with other influencing factors are the multiple variables used to predict the output of "sales per amount spent", using a regression model.

The optimal regression model is one which, when compared to others, has the smallest error.

While these ML algorithms are not without error, the continuous improvement of them coupled with more accurate and relevant data being used for analysis will help improve accuracy and can potentially provide SMEs with quantifiable sales demand figures, allowing for managers to make better decisions for their business.

Increasingly, SMEs are realising the potential of ML revolution. The question on these SME owners' mind, however, is how to adopt such major technological change.

More importantly, a mindset shift must first happen. For example, SMEs embarking on ML projects for the first time should start small.

They should begin applying ML to a small sample of their data rather than taking on too much, too soon.

SMEs may want to pick a certain problem they want to solve, focus on the ML on it, and give it a specific question to answer and not throw all the data at it.

It is also important to note that ML algorithm is not everything.

SMEs should spend their time on getting relevant input data, followed by using improved methods to preprocess data and finally, choosing the right algorithm and tuning it correctly. Therefore, algorithm is not the most important factor in this process.

Finally, SMEs should recognise the fact that not all ML projects will be successful.

Besides model development, testing and validation also form a major component of a ML project. ML models will have to be fine-tuned, and the results are validated thoroughly before they can be put in use.

Ultimately, with the right mindset towards ML adoption and readiness to embrace changes, SMEs will be on their way to realise the benefits of digitisation.

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