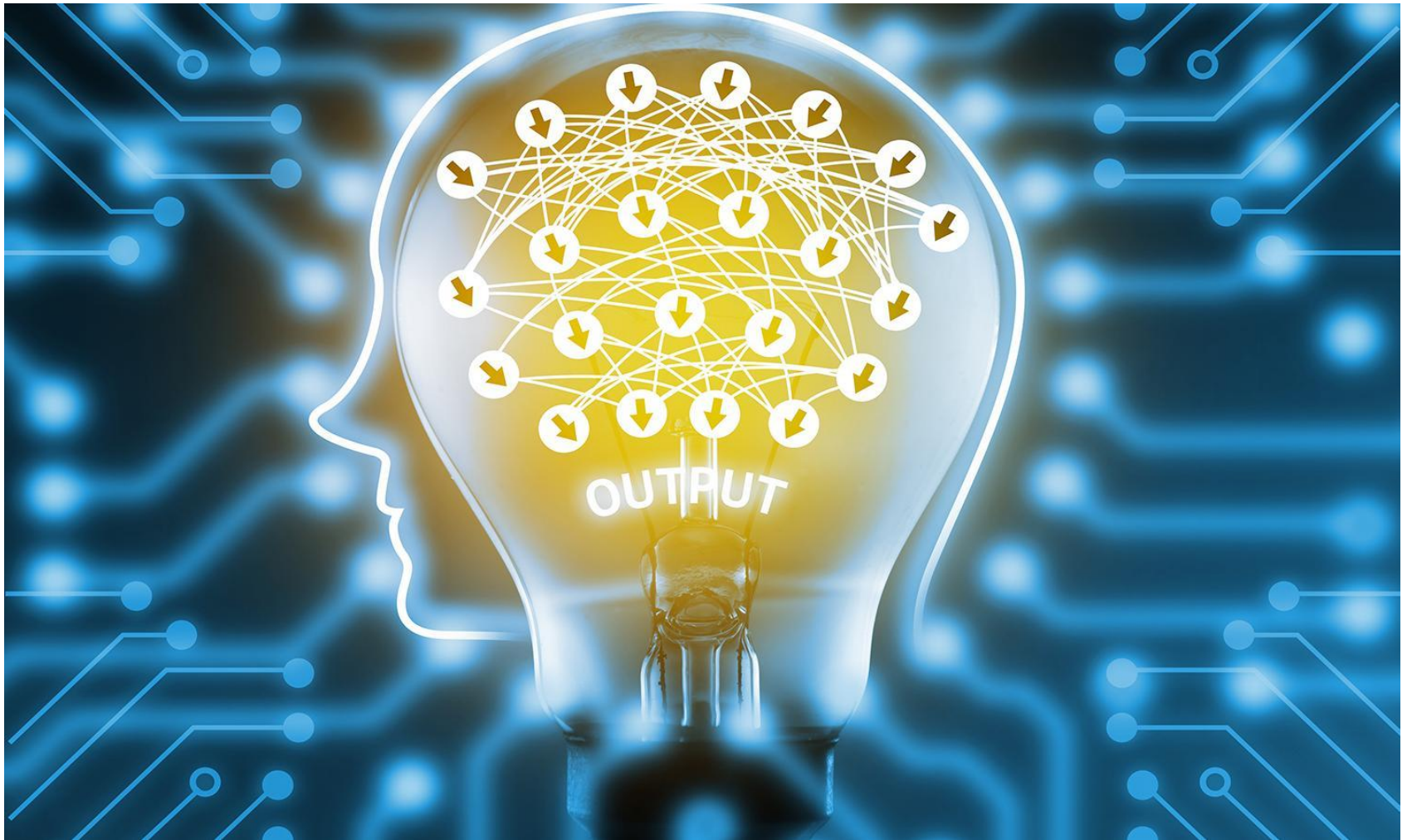# The Role Of Machine Learning In Marketing Research And Automation

Marketing campaigns generate tons of data that can be used to understand customer preferences and behavior. This includes structured data (information like name and location that prospects provide voluntarily) as well as lots of semi-structured and unstructured data. Social media texts, navigation behavior on your website, photos and emails are all examples of unstructured data that can reveal a lot about the customer when studied individually but may not convey anything at a holistic level.

Let us take an example. A study of user behavior on a popular apparel store showed that 20% of visitors from search engines hit the 'Buy' button within two minutes of landing while 30% of visitors bounced (quit the page) for the same keyword. Navigational study of individual users showed that some users quit after checking out the various color variants of the product while a few other users quit as soon as the page finished loading.

At an individual level, it is easy to identify a fix for each of these visitors who do not convert. Perhaps some of these users did not find the product

in the color they were looking for while others decided that the product was not for them as soon as the page loaded. But how can a retailer know what the visitor is looking before they take a decision?

Machine learning makes use of past patterns and experiences to predict future behavior. In this case, machine learning algorithms could make use of navigational patterns to predict the likelihood of the visitor making the purchase or quitting due to various reason and in turn deploy remedial features like a discount or alternate product recommendations.

Clustering

A major chunk of machine learning in an eCommerce setup comes from clustering. This is essentially a form of 'unsupervised learning' where the algorithm learns through observation of thousands of navigational patterns and user instances. This data can then be segregated into various categories and fed into a marketing automation setup through an API - this way, the algorithm will trigger different ACTIONS based on the CONDITIONS and RULES set by the marketer.

Rotation Estimation

Also called cross-validation, this aspect of machine learning is extremely important when it comes to prediction based on past data sets. In regular statistical methods, cross-validation is a one-time procedure that makes use of a historic data set to generalize an independent data set. In machine learning, however, cross-validation is a continuous process that adds every new data into the historical dataset and redraws its interpretation based on the new updated database. Since such a technique would require analysis of millions of data points, big data tools like Hadoop are required to perform this component of machine learning.

Overfitting

One of the troubles with machine learning for marketing, however, is overfitting. When tracking millions of behavioral data points, ML algorithms are routinely guilty of learning something too specific and thus

failing to categorize a specific data point to a generalized category. Quite often, machine learning algorithms succeed in categorizing only about 20% of the input data into specific categories. In other words, machine learning fails to identify the behavior of a major chunk of users which defeats the purpose of machine learning and thus makes marketing automation ineffective.

Machine learning is yet to become a mainstream technology in marketing. Although factors like overfitting can tend to reduce effectiveness in the early stages, the benefits from machine learning are too many to let go of the technology.

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