

Introduction to Prescriptive analytics

Prescriptive analytics is a statistical method that focuses on finding the ideal way forward or action necessary for a particular scenario, based on data. Prescriptive analytics uses both descriptive and predictive analytics but the focus here remains on actionable insights rather than data monitoring.

Prescriptive analytics have the power to help companies make better decisions by optimizing results of future events or risks involved, by creating an algorithmic model to analyze them. The process works on data that is collected from a wide range of both descriptive and predictive sources, and then creates models that can be applied to decision-making. It considers existing conditions and the results of each possible decision to make predictions that are impactful. It can even measure the consequences of any decision in multiple future scenarios.

Prescriptive analytics rely heavily on mathematics and computer science and utilize a range of statistical methods. The process continuously recreates every possible decision pattern and the various outcomes possible. Prescriptive analytics is considered the final step of business analytics and is usually accepted as an extension of predictive analytics.

Benefits of prescriptive analytics

Revenue generation

Prescriptive analytics can help a business understand what their customers want to buy and why. These outcomes can be arrived at with detailed and timely information on customers and their purchasing journeys. This will help managers accelerate their sales cycles and be able to find and open up new avenues for cross and up-selling.

Gross margin management

The prescriptive analytics models provide insights into the optimal mix of products that an organization should focus its attention on. The model for this can be created based on current as

well as anticipated market conditions and customer purchase patterns. It will ensure higher business productivity and profitability.

Expense reduction

With the right algorithmic model, a company will be able to ensure that they have better inventory management systems in place. This will help in reduction of costs for long term stock storage. It also brings down the number of manual processes and costs involved. An organization will also have better control over their expenses and transparency across the board.

Uses for prescriptive analytics

The uses of prescriptive analytics are still in the nascent stages, but it has managed to impact quite a few key industries. Below are several use cases that one can learn from.

Optimizing the travel and transportation sector

In the travel industry, a lot depends on pricing and sales for travel and transportation. Considering the large amounts of data that are available, prescriptive analytics as an approach works ideally for the sector. Everything from online travel and hotel websites to ticket buying services, hotel bookings and more can make use of prescriptive analytics and determine their pricing and sales pitches based on customer perspectives, their choices, route optimization, as well as a categorization of the different kinds of travelers and their needs. All this can be derived from data sets that the sector already has in their database. This has encouraged a good degree of competition and helped travel businesses stay on top of their game.

Fracking and oil production

Fracking for oil production has been on the rise in recent years, catering to demand. Knowing where to frack, how to make the process a safer one and optimizing it for best use has been done with the help of prescriptive analytics and this has led to the substantial growth of the use of the process.

Healthcare industry

This is perhaps the largest sector to have employed prescriptive analytics to its benefit. The healthcare sector in general has employed a wide range of technologies to make itself more efficient.

It works hand in hand with predictive analytics in the case of healthcare. Predictive analytics help with the identification of specific patient populations and disease categories that may affect them. This can be further micro-classified on a range of parameters. With prescriptive analytics, one can determine the best action plan and even measure the efficacy of interventions.

With the advances in technology and the speed at which the medical sector employs it, there are several opportunities for effective collection and analyses of a wide range of data. All of this helps create actionable insight.

Prescriptive analytics also work well in assessing quality risk in the medical sector, especially in identifying a variation in practice. It will be able to determine, for example, the best practices for specific kinds of interventions - a knee replacement surgery versus a repair procedure.

Prescriptive analytics makes use of patient and clinical data to help enhance performance and promote wellness and the management of diseases in a more effective manner.

Challenges with prescriptive analytics

Prescriptive analytics is powerful but it does present unique challenges. Here is a look at the top five issues you may encounter:

Difficult to define a fitness function

To optimize results, every prescriptive analytical model requires a fitness function (how 'fit' the solution is for the problem) to be well defined. A fitness function forms the base to help obtain the ideal set of solutions. However, arriving at this function can be difficult because it requires an in-depth understanding of the business from multiple angles. The best approach to handling this is to involve business partners early on to ensure that the algorithms you create are accurate to business outcomes.

Human bias in models

Unfortunately, one of the biggest inhibitors to the growth of prescriptive analytics is that most models are human written meaning they have an inherent bias. In fact, most discussions on prescriptive analytics talk about this unfortunate fact. What this means is that the algorithms are set up in a certain way, not based on data but based on a domain expert's opinions. One of the future fixes for this would be to generate models using machine learning based on the data that is flowing in. That would be an ideal way to cross out any potential human bias.

Complex constraints

Parameters need to be in place to be able to build a prescriptive analytical model that functions towards finding a range of solutions. Often there are constraints on these parameters. This happens when the solution it arrives at cannot be achieved. This could happen because of a negative length or because of a business rule that doesn't allow a price change beyond a certain amount. There are two ways to handle this – make sure the optimizer knows of these rules or have them coded into the fitness function.

Prescriptive analytics, although very underutilized today, can improve decision making by helping analysts get closer to tying outcomes to specific situations. However, capturing business value from data requires insight into real-time events to capture the value when it matters. Plus, it's not just knowing the future but to take intelligent actions quickly you need to know exactly what to do and when to do it. Prescriptive analytics fills this critical need for businesses.

The future of prescriptive analytics will rely on event processing technology as well as distributed, pervasive computing infrastructure along with machine learning algorithms to facilitate action ability. Distributed processing and data management in conjunction with advanced algorithms, should enable prescriptive analytics solutions to identify risks and potential problems in business situations, but also recommend mitigating actions. All of these enabling technologies will enable next generation prescriptive analytics to deliver real-time decision support to business users. Prescriptive analytics are a great tool if utilized well. It is still the least used type of analytics but the potential for organizations is immense.