Improved Decision Making And Enhanced Recommendation Systems In Applications Made Possible Through Prescriptive Analytics

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Abstract: Prescriptive analytics is an advanced version of analytics that employs optimization tools in order to transform the outcomes of the analysis process into actions that would bring about improvement. Prescriptive analytics studies and processes the relationship between the various components of the data and gives a prediction about what could happen. Prescriptive analytics takes it one step ahead and in addition to forecasting the outcomes also provide recommendations on what should be done. Prescriptive analytics which in comparison with other forms of analytics is actionable would play a vital role in many fields including healthcare, self-driven vehicles, asset performance management, education, particularly the vast amount of e-learning content, business process optimization and many more. This paper discusses the role of prescriptive analytics in some of the prominent industries and how prescriptive analytics in hand with AI and Machine learning brings about improved systems that handle predicted outcomes in an improved manner.

Keywords: Prescriptive Analytics, Descriptive Analytics, Predictive Analysis.

1. INTRODUCTION

In today’s digital world, Data is growing everywhere. In fact the data grows at rapid rate, doubling every two years. Data Analytics is examining the raw data, for the conclusion about the information.

1.1 Descriptive Analytics

The first part of Data analytics is descriptive analytics, which takes a past issue and portrays them. It answers the question of what happened. These analytics describes the past where the event might occur a minute ago or even a year ago. This helps us to gain knowledge about the past behaviors, and with that how it influences the future events. Some examples of descriptive analytics are reports that provide company’s revenues, sales, and customers, stock.

1.2 Predictive Analytics

The second part of Data Analytics is predictive analytics, which joins recorded information with prescient calculations to figure what will happen in future occasions. Predictive analytics answers the question of what will happen in future. It uses the results of descriptive analytics to know about what happened and with that analysis the future trends. Common examples of prescriptive analytics are Social media analysis (example sentimental analysis), online marketing, recommender system for travel product (example hotel, airlines, railway) and so on.

1.3 Prescriptive Analytics

Prescriptive analytics specifies what action to be taken in order to eliminate the future problem. Progressively, individuals in intelligence and analytics circles are discussing prescriptive analytics. So what are they discussing? Basically, prescriptive analytics gives clients the best alternatives for managing given business circumstances based on the idea of enhancing the way toward choosing between the available choices. A key characteristic of prescriptive analytics is the need for many large data sets. Prescriptive analytics is the third part of business analytics. The second part is predictive analytics, which joins recorded information with prescient calculations to figure what will happen in future occasions. But, prescriptive analytics professes to go considerably further. It applies a large number of business rule calculations, various scientific and computational modeling systems to consequently synthesize hybrid data and answers what will occur as well as should be done about it. Put another way, prescriptive examination constantly and naturally attempts to foresees the what, when, and why of unknown future occasions.

2. APPLICATIONS OF PRESCRIPTIVE ANALYTICS:

2.1 Google car

These Google cars are loaded with various sensors. They also have Laser Illuminating Detection and Ranging, which are used to 3D frame of its surrounding. Now, even this car can see its lanes; notice the traffic signals and so on. Sensors, Processors and Actuators are the three main hard wares in the smart cars. Images and data that are collected from sensors are sent to processor, which tells the actuator about how to react further. By turning drivers experience into programs, these cars can be much more practical. These cars are not just the smart cars; they are the outcome of learning algorithms. That information is collected from the previous experience. Example of such situation are car can tell the difference between a bottle and the newspaper, it can tell even the when the person will cross the road by observing their behavior again and again.

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2231
Some other situation like every time when the bird is in on the street there is no need to apply brake, every time when another brake there is no need of flashing lights. Here comes the data science to determine what is important and what is not. These cars use prescriptive analytics to deal with the varying information collected from various sensors.

2.2 Recruitment analysis

If the new worker doesn’t fit or just endures a couple weeks, the time and cash spent on recruiting them, on boarding them, welcoming those individuals are wasted. In the interim, your effectively settled group may experience the loss of productivity. Thus the stress in the company is multiplied. With prescriptive analysis, HR and the recruiters found the new way for hiring new workers with confidence along the improved outcome. By using this analysis, recruiters can easily identify the workers or candidates who are eligible to work with the prescribed role. This eventually reduces the work of the recruiters. Time spent in ranking the resumes, pre-screening the candidates, and then again screening the candidates till they are satisfied is reduced. This analysis also shows the skills set of the candidates so that there is no need for the recruiters to look after their resumes every time. So this is obviously efficient and highly accurate. Shortlisted applicants are also wanted by the competitors. Predictive analytics pulls those possibilities to the top, giving you the upper hand in interfacing with them quickly.

2.3 Health care

Health care industry deals with huge amount of data such as patient’s personal details, their historical medicine information, economic data, health treads, hospital data etc. These data can be used to provide services with less money and also improves the facilities of the hospital. By combining all the data sets, it is possible to offer the doctor recommendation for the treatment of the patients. Prescriptive analysis not just predict the data from the environment, it also suggest how the organization can take best action for that situation. For example, if the hospital is experiencing very high number of nosocomial infection (an infection which is acquired in a hospital or other health care facility), prescriptive analytics not only just figure out the count of the infected patients, it automatically identifies the particular nurse involved in the place of all the patients who may be spreading the infection. With this, hospital might need to retrain about the hand hygiene to that particular nurse. It also helps the hospital to prevent such situation in future. Pharmaceutical Organizations use prescriptive analytics to improve their drug development and reduce the time that takes to reach the market.

2.4 Oil Production through Fracking

Fracking is the process of injecting solid, liquid, or chemicals underground at very high pressure to open the rock layers and this releases the oil/gas present inside the rock. In the past years, fracking has taken very good hike, especially in the United States. Drilling horizontally and fracturing are the two processes that made us to get the oil/gas from the rocks. But locating and extracting the oil/gas is very difficult. And also the processes involved are expensive. Now, prescriptive analytics can help to locate the fields that are rich in oil and gas by using the data sets such as sounds(of drilling and fracking), images and videos (cameras monitoring the wells), text documents (notes by other drillers) and other types of data. This enhances the process involved in order to get very good quantity of output to make pipeline safer with least threat to the environment. One of the effective applications of prescriptive analytics is that it can predict the corrosion and the cracks that are developed along the walls of the pipelines. By analyzing the videos and photos from the camera, it also prescribes the preventive measures. Another application is that by using the data from the pump, one can easily predict the failure of the submersible pumps. It will prevent the production loss by pulling oil out from the subsurface.

3. SIMULATION RESULTS

In Marketing and Sales industry, Prescriptive analytics is commonly used to optimize products and costs, to identify micro markets, to control the supply chain and to model targeted campaigns to name a few. Trade promotions are usually computed on a weekly basis studying throughout a year. River Logic determines how prescriptive analytics tools help for optimizing sales and marketing. A sample prescriptive analytics for sales industry data is computed using. The Fig.1 shows that Excel uses a method of least squares to find a line which best fit the points. The R-squared value equals 0.9295, which is a good fit. The closer to 1, the better the line fits the data.

The Fig.2 shows the use of FORECAST function to calculate future sales.
The Fig. 3 shows the use of the TREND function to calculate the timeline series and Fig. 4 shows the results of trend function. Prescriptive analytics are also not flawless. The issues that occur in descriptive and predictive analytics do occur in prescriptive analytics. External events such as consumer behavior, purchase context, real time situations and data limitations can affect the prescriptive analytics as well. Big Data with prescriptive analytics, machine learning and other techniques will continue to be used in future. This improves the quality of everyday life.

### References