Strategic Services Marketing
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Lecture - 23

Predictive Analytics for Personalized Marketing

Hello everyone. In this session, let's try to comprehend the importance of predictive analytics for personalized marketing with special reference to services. What is Predictive Analytics? Predictive analytics is the use of data, statistical algorithms, and machine learning techniques to identify the likelihood of future outcomes based on some historical data. The goal is obviously to go beyond knowing what has happened to provide the best assessment of what will happen in the future. In the context of services marketing, predictive analytics helps businesses anticipate customer behavior, preferences, and trends to make informed marketing decisions. There are other types of analytics as well.

For example, descriptive analytics, wherein we try to answer the question what has happened in the past. Whereas in predictive analytics, we are focusing more on understanding what could happen in the future. There is also another analytics which is called as prescriptive analytics, wherein businesses try to understand how should they respond to those conditions. But for this session, our focus is on predictive analytics, that is what could happen in the future.

There is a growing interest among organizations in terms of adopting numerous predictive analytics tools and techniques. Why? Let's understand. First reason is growing volumes of data, different types of data, and more interest in using data to produce valuable insights. Secondly, now there is cheaper and faster computers that are available that also propels the use of predictive analytics techniques and tools. Third reason is with respect to easier to use software.

No need to have those kind of coding and those kind of skills. There is no need of sophisticated coding skills to run predictive analytics. There are easier to use softwares available in the market. And finally, there is a tougher economic conditions and a need for competitive differentiation that is propelling lot of organizations to adopt predictive analytics to improvise their customer services. Let's have a look at this particular video and understand what is predictive analytics and how transforming data into future insights can help organizations.

Have a look at this video. What is predictive analytics? Transforming data into future insights. Predictive analytics is a category of data analytics aimed at making predictions about future outcomes based on historical data and analytics techniques such as statistical modeling and machine learning. With the help of sophisticated predictive analytics tools and models, any organization can now use past and current data to reliably forecast trends and behaviors milliseconds, days or years into the future. Retailers often use predictive models to forecast inventory requirements, manage shipping schedules and configure store layouts to maximize sales.

Airlines frequently use predictive analytics to set ticket prices reflecting past travel trends. Hotels, restaurants and other hospitality industry players can use the technology to forecast the number of guests on any given night in order to maximize occupancy and revenue. Predictive analytics can also be used to detect and halt various types of criminal behavior before any serious damage is inflicted. By using predictive analytics to study user behaviors and actions, an organization can detect activities that are out of the ordinary, ranging from credit card fraud to corporate spying to cyber attacks. Models are the foundation of predictive analytics.

They are the templates that allow users to turn past and current data into actionable insights. Some typical types of predictive models include a customer lifetime value model, which pinpoints customers who are most likely to invest more in products and services. A customer segmentation model groups customers based on similar characteristics and purchasing behaviors. A predictive maintenance model forecasts the chances of essential equipment breaking down. A quality assurance model spots and prevents defects in products and services.

Model users have access to an almost endless range of predictive modeling techniques. Many methods are unique to specific products and services, but a core set of generic techniques is now widely supported across predictive analytics platforms. Decision trees, one of the most popular techniques, rely on a schematic tree-shaped diagram that's used to determine a course of action or to show a statistical probability. The branching method can also show every possible outcome of a particular decision and how one choice may lead to the next. Regression techniques are often used in banking, investing, and other finance-oriented models to forecast asset values and help users understand their relationships between variables such as commodities and stock prices.

On the cutting edge of predictive analytics techniques are neural networks. Neural networks are algorithms designed to identify underlying relationships within a data set by mimicking the way a human mind works. While getting started in predictive analytics isn't exactly a snap, it's a task that virtually any business can handle as long as it is committed to the approach and is willing to invest the necessary time and funds. Beginning with a limited-scale pilot project in a critical business area is an excellent way to cap startup costs

while minimizing the time before financial rewards begin rolling in. Once a predictive analytics model is put into action, it generally requires little upkeep as it continues to grind out actionable insights for many years.

  So, as we understood what is predictive analytics, we are sure that there are main components that mix up for predictive analytics. There are three key components of predictive analytics. First one is obviously data collection. Then comes algorithms and then comes predictive modeling. Data collection deals with gathering relevant data sets including customer interactions, demographics, and past behaviors.

  Then comes role of algorithms.   Applying advanced statistical models and machine learning algorithms to analyze the data that we have collected. And then comes running some models on this particular data. So, building models to forecast future customer behaviors and trends is the ultimate step in predictive analytics. Now, let's look at some of the main techniques or important techniques that have been adopted by organizations or service providers.

  First type of predictive analytics is regression models. Regression models evaluates the strength of association between variable. For example, how changes in X are related with changes in Y. These models examine the impact of actions which we also call them as independent variables and their impact on outcomes which are nothing but the dependent variables. So, in this example we can say X is an independent variable, where is Y is a dependent variable.

  In these models, these models can range from simple with one independent and one dependent variable to multiple linear regressions with several independent variables. So, instead of having just X, we can have X1 plus X2 plus X3 and all these variables are affecting your Y that is dependent variable. Different regression techniques exist chosen based on the application and type of variable that you are analyzing. Through defining variable relationships, organizations can conduct scenario analysis which is also known as what-if analysis that introduces a new independent variable to observe the impact on outcomes. For instance, an organization might utilize a regression model to assess how specific service features influence the likelihood of purchase.

  Examining the connection between service attributes such as let's say response time and customer satisfaction, an organization may find a correlation indicating that quicker the response times, higher will be the customer satisfaction. However, understanding that correlation doesn't always imply causation. The organizations might investigate additional factors such as service quality, promotions or even customer interactions to gain a comprehensive understanding of customer satisfaction. These insights can guide service improvement initiatives and even marketing strategies, helping organizations to identify

service aspects with the potential for enhanced customer satisfaction in the future. Another set of techniques under predictive analytics are called as classification models.

Classification models categorize data into predefined groups using historical information. The process starts with a training data set where each data point is already assigned a label. Then, the algorithm learns this particular pattern between the data and the label during training and can then classify the remaining data which we also call as test data accordingly. Common techniques for classification models includes decision trees, random forest and even text analytics. These models are widely employed across various industries due to their adaptability to the new data.

For instance, in the banking sector, classification models are utilized to detect fraudulent transactions. By analyzing millions of fast transactions, the algorithm learns patterns associated with the fraud, enabling it to alert customers to potentially suspicious activity on their accounts. Then comes clustering models, another form of predictive analytics tool or technique. Clustering models place data into groups based on similar attributes. A clustering model uses data matrix which associates each item with relevant features.

With this matrix, the algorithm will cluster together items that have the same features, identifying patterns in the data that might previously have been hidden. Organizations or service providers can use clustering models to group customers together and create more personalized targeting strategies. So what I am trying to say here is that clustering models can help you identify different segments of customer groups and then a service provider can offer customized offerings to each particular segment. For example, a restaurant might cluster their customers based on location and only mail flyers to those customers who live within a certain driving distance of their newest location. Another technique under predictive analytics is time series models.

Time series models track data points over time. So that is the differentiation of time series models with earlier techniques. Making time a crucial independent variable in predictive analytics due to the prevalence of time related data in various domains. A standard approach involves using the past year's data to analyze a metric and predict its future. Leveraging time series analysis, service providers and organizations can undertake seasonality analysis to anticipate how assets are influenced by specific times of the year or trend analysis to understand asset movement over time.

Practical applications encompass forecasting sales for the upcoming quarter, predicting store visits in numbers or even identifying peak periods for flu occurrences in particular territory. Other than this, there are other combinations that can also be used as a part of predictive analytics techniques. For example, neural network model. Frequently a blend of these models like time series with regression, regression with time series and other formats, there is always a blend of these models are in employed to analyze data for

insights and opportunities. Take neural network for that matter, which emulates the human brain to discern pattern in data.

Neural networks integrate regression, classification, clustering and even time series models, enabling them to handle a vast amount of data set and model intricate relationships among different variables. Beyond text data, deep learning techniques empower neural networks to process images, audio, video and even other type of data. Training on label data sets enhance their accuracy, making them valuable for application like voice and facial recognition. Analyzing facial movements, these networks can even identify a person's emotions, offering organizations the potential to predict customer sentiments when engaging with specific products or services. So we have seen lot of techniques that can be employed under predictive analytics.

But what are the benefits of predictive analytics, specifically for service providers? So first benefit here is improved decision making. Predictive analytics enables service firm to make more informed and data driven decisions. By analyzing historical data and identifying patterns, organizations or service providers can anticipate future trends and even outcomes as well. Second benefit is with respect to enhance customer experience. Service firms can use predictive analytics to understand customer behavior and preferences as well.

This allows them to personalize services, tailor marketing strategies and anticipate customer needs, ultimately improving overall customer satisfaction. Third benefit is with respect to optimize resource allocation. Predictive models help service firms allocate resources more efficiently. By forecasting demand and understanding resource utilization patterns, service providers or organizations can optimize staffing, inventory and other resources to meet expected demand levels. Then comes benefit in the form of increased operational efficiency.

Predictive analytics can streamline operational processes by identifying inefficiencies and bottlenecks. This leads to more efficient workflows, reduced operational cost and improved overall performance. Another benefit is with respect to risk mitigation. Service firms can use predictive analytics to assess and mitigate risks. Whether identifying potential service disruptions, fraud detection or compliance issues, predictive models help organizations proactively manage and minimize these risks.

Next benefit is with respect to marketing effectiveness. Predictive analytics improves marketing strategies by identifying the most effective channels, most effective messages and most effective campaigns as well. This enables service firms to allocate marketing budgets and more effectively and target the right audience for maximum impact. Another benefit is with respect to obviously revenue growth. By optimizing pricing strategies and

identifying cross-selling or even upselling opportunities, predictive analytics contributes to revenue growth.

Organizations can identify areas where they can maximize profitability and generate additional revenue streams. Next benefit is with respect to competitive advantage. Adopting predictive analytics provides a competitive edge. Service firms that can leverage data to anticipate market trends, customer needs and operational requirements are better positioned to stay ahead of their competitors. Next benefit is with respect to fraud detection and prevention.

Predictive models are effective in detecting unusual patterns or anomalies, aiding in the early identification of fraudulent activities. This is particularly crucial in financial services, insurance and even other industries which are vulnerable to fraud. Next benefit is with respect to continuous improvement. Predictive analytics fosters a culture of continuous improvement. Organizations can regularly refine their models based on ongoing data that is coming and ensuring that predictive capabilities evolve with changing business dynamics.

Now let's understand the role of predictive analytics with some case studies. The first case study here is from a restaurant industry, that is of course Starbucks. Have a look at this particular video that talks how Starbucks uses data along with machine learning algorithms and everything. Starbucks the American born coffee brand has become so popular that it is literally a part of daily life for many people living in the cities and suburbs, Starbucks doesn't simply sell huge numbers of hot and cold drinks around the world, it also gathers huge amounts of data from over 100 million transactions a week. Let's look at how Starbucks collects customer data and how that is leveraged with analytics and machine learning.

Starbucks collects data from loyalty card and gains great insight from it. They also analyze data captured by their mobile app, which customers use to pay for drinks and accrue loyalty points. Data scientists at Starbucks know what coffee you drink, where you buy it, and at what time of day you buy it. Pairing this with data from millions of other users, along with other correlating data, they have very real and actionable insights. When Starbucks launched its rewards program and mobile app, they dramatically increased the data they collected and could use to get to know their customers and extract info about purchasing habits.

Personalizing the Starbucks experience, members of the rewards program and mobile app authorize Starbucks to gather a lot of information about their coffee buying habits, from their preferred drinks to what time of day they're usually ordering. So even when people visit a new Starbucks location, that store's point of sale system is able to identify the customer through their smartphone and give the barista their preferred order. Starbucks

segments its customers with data and machine learning, then sets up rules based on decision trees, mapping their purchase behavior. Starbucks now generates recommendations for customers approaching their stores, using location data to know when the customers are approaching. Predictive analytics increases companies' revenues by 21%.

Using data to determine new store locations, the Starbucks market planning team doesn't rely on their gut feelings to determine where new stores should be located, but taps into the power of data intelligence through Atlas, a mapping and business intelligence tool. This tool evaluates massive amounts of data, such as proximity to other Starbucks locations, demographics, traffic patterns and more, before recommending a new store location. This system even predicts impact to other Starbucks locations in the area if a new store were to open. The largest specialty coffee retailer in the world is undoubtedly becoming the third place between work and home due to the convenience of their locations. Menu design and optimization, Starbucks also uses data to help align its menu and product lines with consumer preferences.

For example, when building out its grocery lines of cake cups and bottled beverages, Starbucks used both data from its stores as well as customer market research to decide which products to create. One finding was that many tea drinkers don't put sugar in their tea, so Starbucks created two unsweetened tea cake cups. Starbucks is strengthening it's ability to use data to drive its menu with its new digital menu boards. Starbucks has started testing digital menu boards in a handful of US locations. The digital boards will allow Starbucks to change which products it features to drive and increase sales strategically.

The boards can feature different items based on time of day, weather, and more. Deep Brew, a platform that elevates humanity, business, and customer experience. Their AI-driven platform Deep Brew allows them to innovate with AI and ML not only to personalize drive-through experience, but also to automate time-consuming tasks such as inventory management and optimize store labor allocations. Their Deep Brew AI platform will be able to suggest optimal product pairings based off of contextual information of the store, the weather, and other things that are going on. Machine learning at scale, a team at Starbucks is working on computer vision and object detection proof of concept.

They use framework like TensorFlow and experiment with other frameworks like PyThor. These models were trained a million plus images specific to Starbucks products. The images were annotated using capabilities from open source tooling and pre-trained models. Thank you for watching, stay tuned for more amazing content. So we understood that Starbucks, the American Burned Coffee brand gathers huge amount of data from over 100 million transactions a week.

It uses this data, number one for personalizing the Starbucks experience, number two to determine new store locations, number three menu design and optimization, and of course finally machine learning product as well. Now let's move on to the next case. Predictive analytics are also adopted specifically on large basis across different airlines or within aviation industry. Have a look at this particular video that shows us how AI that is artificial intelligence and machine learning which is acronym as AI-ML is shaping the aviation industry. So, we understood how AI-ML based models and analytics tools are shaping the aviation industry.

Moving forward, let's take a case of another industry that is banking and have an example of JP Morgan Chase. So, what is the challenge here? So JP Morgan Chase, one of the largest bank globally, we are facing some challenges in adapting it's fraud detection systems to evolve patterns of fraudulent transactions. So, they adopted predictive analytics as a solution. The bank implemented a predictive analytics solution that utilize machine learning algorithms to analyze transaction patterns, customer behavior, and historical fraud data.

And what is the outcome then? Increase in accuracy. So, JP Morgan Chase significantly improved the accuracy of fraud detection, adapting to new fraud patterns in real time. Second outcome was in the form of reduce false positives. By focusing on behavior based analysis, the system reduced false positives, ensuring genuine transactions were not flagged incorrectly. Then comes another outcome in terms of cost saving. The bank experienced cost savings by minimizing losses associated with fraudulent transactions and reducing manual review efforts as well.

Move on to the next case that is from retail industry. Online retail, we have Amazon here. So, Amazon, a global e-commerce giant, aim to enhance its marketing strategy by delivering more personalized recommendation to users. So, what solution they found out? The e-commerce platform employed predictive analytics to analyze user behavior, purchase history, and browsing patterns. Machine learning algorithms were applied to predict products that users were likely to be interested in. And the outcomes are in the form of increased convergence, wherein there is a personalized product recommendations resulted in higher conversion rates.

Then comes improved customer retention. So, Amazon saw increased customer loyalty as users appreciated the relevance of the recommendations leading to repeat purchases. And the third benefit is in terms of enhanced user experience. Customers reported a more enjoyable and tailored shopping experience, contributing to positive reviews and word of mouth referrals. After having these cases, how particular organization or service provider can go for implementing predictive analytics? So, let's have a look at how to apply predictive analytics at a service firm.

This is a four-stage process. First stage starts with identifying the business objective. Define the business goals first. Clearly articulate the question predictive analytics should address. Prioritize queries important to your organization.

Then comes second step, which deals with determining data set. Verify the availability of data set. Ensure that the data is adequate, relevant, and even complete for answering predefined questions or objectives that you have set. Verify if the data is sufficient for predictive modeling. Third step comes creating processes for sharing and using insights. Having insight is valuable only if there is a structured process to act upon them.

Establish effective communication channels to ensure valuable predictions reach the right stakeholders. And finally, choose the right software solutions to adopt or implement those predictive analytics models. Opt for reliable platforms and tools that empower users of all skill levels. For example, Tableau offers advanced analytics tools to support time series analysis, facilitating predictive tasks like forecasting within a visual analytics interference as well. So, in this session, we try to comprehend the importance of predictive analytics and we also saw different techniques under predictive analytics.

And we also saw how predictive analytics can help service firms to go for a more personalized marketing approach. Thank you.