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The usage of Big Data mechanisms and Artificial Intelligence Methods in modern Omnichannel marketing and sales

Today's IT service providers offer a large set of tools supporting sales and marketing activities directed to business operating in the Internet. There is a number of applications and systems that allow targeted marketing campaigns, such as Facebook, marketing automation tools, remarketing systems and recommendation tools.

Additionally, when it comes traffic analyses, we have effective tools offered by Google Analytics or other competitive solutions. Available analytical solutions generate business hypotheses and enable managers to evaluate them. Such approach empowers creation of effective sales and marketing policies. Business reality shows that such systems providing people responsible for sales with valuable insights useful in business optimization.

The e-commerce and offline retail markets are currently saturated and as a result highly competitive. We have a number of suppliers with a broad range of various products to satisfy customer needs such as conducting campaigns using the modern and effective tools mentioned above or creating a sales strategy based on conclusions from expert opinions provided by external market research agencies. But each of our competitors has the same access to knowledge that we can acquire. So where do we find our competitive advantage? In order to surpass our competitors, we need to learn and understand the motivations of customers to make a purchase. Having such awareness, we can communicate with them in a way that is tailored for every single customer.

It should be remembered that the Omnichannel approach illustrated by the Customer Experience Journey Map (Figure 1) requires a full integration of off-line channels with those on-line at the business but also IT level.

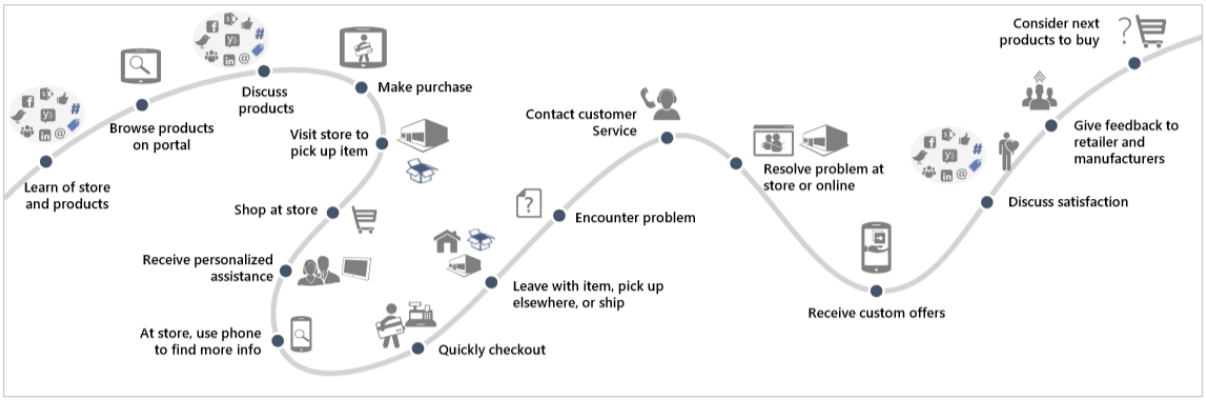

Figure 1. Customer Experience Journey Map

Source: https://www.slideshare.net/MicrosoftAT/digital-transformation-book-of-dreams

With all the efficiency of the tools mentioned above, none of them provide full integration with all contact channels. Very often, a customer who makes a purchase in our online store, and then submits a complaint or makes a return in a store, is a separate entity from the perspective of each system. For retailers it is a considerable challenge to properly identify customers who undertaken specific actions on a web site and then moved to an offline channel completing their journey.

Of course, in most cases, we have all the data needed for such designed identification but it is impossible to create proper references. Sometimes we can use external software or a service that allows us to observe aggregated data, but it doesn't provide us with atomic data about every single event.

How can Big Data technology help us here?

Much is currently being said about the Big Data approach, which tries to make us believe that its technology is a "magic" black box to which we can upload any amount of data in any formats and it will output automatically a solution ready to be applied for our problems and business challenges. The reality is different. As with any IT system implementation, we need to define clear goals here and design the system to fulfill these goals. There are reference architectures for the construction of Big Data systems, which help in designing a system whose purpose is the possibility of performing analyzes on large data sets from heterogeneous sources.

Lambda's architecture is the most common one. The Kappa architecture was created based on Lambda, but simplified some aspects of data processing. Without going into technical details regarding the structure of such systems, the idea is to store all available and potentially valuable data into the Big Data system in the form of an immutable in-time log of events and to enable only addition of new facts without allowing for deletion or modification. In such data repository we do store, for example, the overall value of customer transactions (what changes over time). We concentrate here on the fact that the customer made a purchase in a specific moment in time and we store the value of such order (which is a constant value). Even if the customer makes a return or cancels the order, we will store it as a new fact. Having such data, and being able to define correct matching of stored entities, we are able to prepare answers to almost any query. By matching, we mean defining the references - for example, mapping the login in the online store to the client's number in a stationary store and the telephone number by which client calls our contact center.

Of course, this technique can be used to store data in traditional databases or data warehouses. Up to a certain number of objects (records), traditional technologies are fine to be employed, and what's more, they can provide a more effective way of working with data. At some point, however, the amount of data that we want to analyze can generate problems with the performance or logic of traditional databases. In response to these challenges Apache Hadoop technology has been created, addressing the challenges related to:

• ensuring scalability, ie the ability to maintain the assumed performance while increasing the load and / or the amount of data,

• immunity to hardware failures,

• increasing the efficiency of processing by using parallel operations.

Where is the place for artificial intelligence here?

With the Big Data solution, we are able to perform extensive analyzes based on data from all available data sources and customer contact channels. We are able to expand our data sets also with external facts, which may have an impact on

customer behavior, eg weather data, traffic, currency exchange rates, internet search trends, etc.

The traditional approach that we can now apply is to define a hypothesis, verify it basing on historical data and build customer segments matching these hypothesis. We can run targeted campaigns for these customer segments, which tends to achieve better effectiveness than general campaigns. But humans have boundaries – we are able to generate a limited number of such hypotheses. Artificial intelligence algorithms can create hundreds or thousands hypotheses and evaluate them automatically.

Artificial intelligence algorithms, also referred to as Machine Learning, can help us in the following areas of application:

- Automatic segmentation (clustering algorithms), analyzing variables describing clients and connecting objects similar to each other. If we group the clients described with descriptive data (gender, age, place of residence and many more) and behavioral data (aggregated behavior like number of orders, value of purchases, favorite brand or product category, number of visits, etc.), it is very likely that we receive a certain set of rules about the preferences of individual customer segments.
- Association rules (simple, multi-level, sequential) often referred to as the market basket analysis. These are algorithms indicating the relationship between purchased products. They provide us with the probability of buying product B after the purchase of product A. In connection with customer segments, they can help us predict customer propensity in order to create cross-selling, up-selling or deep-selling campaigns.
- Predictive or classification models (based on regression methods, artificial neural networks or decision trees) enabling creation of rules showing the impact of various facts on our business goal (called target value). The target may be the fact of buying a given product by the customer, the level of discount at which he is willing to make a purchase or, for example, the fact of returning after buying a given product. We can use these models in two ways:
    - Analyze and interpret the presented rules showing the impact of a given customer attribute on the behavior and adjust our business following these rules.
    - Use real-time models to suggest to the customer an individual discount / services or additional products / or other terms of the transaction.

The way to achieve a competitive advantage on the currently difficult commercial market leads through the integration of data from various channels of contact with the client and building analyses explaining the motivations and needs of customers. Conclusions transpiring from these analyses will increase efficiency of our marketing and sales activities. Due to the large amount of data describing the entire scope of cooperation with the customer, Big Data technologies and techniques can help us here. Mechanisms of artificial intelligence will allow for the partial or fully automatic detection of certain patterns, which in the case

of classical analyses are not easily available, and the use of acquired knowledge in real time, in contact with the client.

The Upsaily solution based on the presented assumptions can help you with acquisition of valuable knowledge from your online and offline business.

Contact

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Customer Intelligence

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