



Retailer Analyzes Unused Data to Reveal
Customer Moods, Boost Online Sales



We've all heard the advice to never grocery shop on an empty stomach. Research shows that when you're hungry, you're more likely to buy high-calorie or junk food. Moods and behaviors also influence online retail shopping. Customers' unique contextual behaviors, such as moods and personal dispositions, cause them to act in certain ways. Retailers can benefit from understanding the nature of these contexts when engaging customers.

Companies that don't understand their customers are missing opportunities for engagement, enhancing customer loyalty, and improving sales. Retailers lacking the ability to respond to customers with personalized, contextually relevant offers in real time, using insights based on in-the-moment activity and past behaviors, will be challenged to meet customers' needs and demands.

Understanding the "Hidden State"

In a typical online scenario, a customer views a product on a retailer's homepage. What the customer does next—adds the product to the shopping cart or does something else—is determined by the "hidden state." The underlying disposition of the customer that cannot be observed, the hidden state plays an important role in the sales process.

Examples of a hidden state include an email received from a competitor to check out products on its website, or a child coming to his or her parents with a request to play just as they are about to check out. The hidden state includes actions that cause shopping to be stopped or postponed.

It consists of a progression of events that can include a customer:

- Visiting the retailer's website.
- Browsing the site.
- Placing an item in a shopping cart.
- Checking out.
- Completing the purchase or choosing not to buy.

Customer actions in the hidden state can be equated to how children's moods effect their actions when they come home from school. Some immediately go for a snack. Others go outside to play. Still others watch TV or log onto the Internet. Online shoppers experience the same mood-effects-actions scenario, which can be the result of things as wide ranging as taking on an urgent task to dealing with a sudden natural disaster like an earthquake.

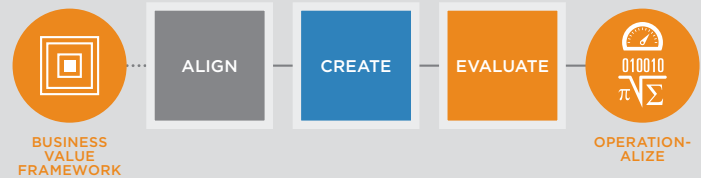
The customers' feelings at a specific moment in time can:

- Drive them to make a purchase.
- Prompt impulse buys.
- Result in no purchase.

What drives each customer is different. These driving factors provide critical information to retailers to help them meet each shopper's unique needs. For example, some people are simply browsing and want to be left alone. Others are looking for a specific product or have a question—and that's an opportunity for the retailer to provide assistance to close a sale. For retailers, the holy grail is being able to gain the full knowledge of customers' hidden states and then take the appropriate actions to convert a would-be buyer to an actual buyer.

RACE Quickly Determines Data Value

Teradata® Rapid Analytic Consulting Engagement™ (RACE™) is a proof of value (POV) that looks at data to quickly determine its business value. A low-risk engagement, RACE allows the business to access if the data aligns with a proposed use case before investing time and resources into a project.



Discovering New Value in Online Data

A major retailer wanted to gain deeper insights into its customers' online shopping habits to improve sales. Like most companies offering ecommerce, the retailer wanted to understand and guide the path to purchase. And like most companies, the retailer had large volumes of data, some of which had never been monetized.

The retailer engaged Think Big Analytics, a Teradata company, to derive more value and customer insights from its data. Think Big Analytics used Teradata® Rapid Analytic Consulting Engagement™ (RACE™), which accelerates the process of aligning key stakeholders around the highest value use cases, then leverages data and analytics to uncover high-value business outcomes.

Think Big Analytics data scientists and consultants worked with a transactional log dataset that resided in Hadoop. That data was not being used, allowing the possibility of uncovering new insights. The data was time stamped and contained customer information.

Data scientists moved the data into the Teradata® Aster® Database, then applied Teradata Aster Analytics. Consultants used Hidden Markov Models (HMMs) to understand likely sequences of events for customers and the probability of a customer following a particular sequence. HMMs are models of transactional processes in which the true hidden states that generate observable data are probabilistically determined.

The analytics and HMMs quickly proved that the retailer's data was indeed valuable. It revealed behaviors of customers who purchased a product and those who didn't. This allowed the retailer to gain insights into the

hidden states. The retailer could determine probabilities that individual customers, once online, would make a strategic purchase, browse the sight and make an impulse buy, or browse without buying.

High-Value Outcomes Across Industries

The RACE approach that Think Big Analytics used for the retailer can also deliver value to other industries. For example, Think Big Analytics helped a bank use its data to uncover customers' needs. Data from the hidden state showed that some customers were not engaging in any online transactions or branch visits.

By using HMMs to determine customer attributes, the bank was able to make strategic decisions about where to place ATMs and open new branches to reach customers. In addition, analytics identified customer behaviors. This information let the bank connect with customers to offer, for instance, automated bill payment options and answer questions about the loan application process.

3 Parts to a Hidden Markov Model



Evaluate and rank. Determining the probability of actions.



Decode. Using a sequence of events to find hidden states.



Segment customers. Grouping customers, such as by loyalty or longevity, for analysis.


Contextual Offers Drive Sales

Companies that want to truly become customer-centric and deliver outstanding experiences must turn their data into a competitive advantage. By augmenting existing infrastructures and ecosystems with advanced analytic capabilities, organizations can deliver an elevated, integrated customer experience across all channels.

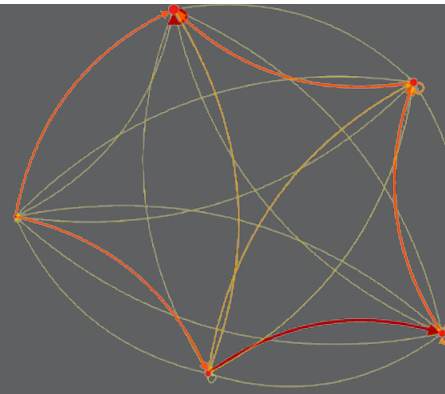
These capabilities enable companies to bring together and benefit from all data, including online data. This allows the business to react in real time to customer opportunities at the enterprise level. Retailers and other industries gain the ability to guide, influence, and meet their customers' needs online and across any other channel. Data and analytics give businesses the history and context of customer interactions, allowing companies to engage customers at the right time with the right offer in the right channel to drive more sales.

Advanced Technologies in Action

Companies in any industry can benefit from an analytic approach that leverages all data.

 **This video** shows how a leading retailer utilized Hidden Markov Models and previously unused data to better understand customer behaviors, leading to improved sales.

Visualizing Customer Behaviors Produces a Star



The Teradata Art of Analytics turns business stories into compelling works of art. Using data science expertise, advanced analytics, and visualization techniques, the Art of Analytics transforms data into images that show actual business problems.

Data scientists from Think Big Analytics, a Teradata company, used the Art of Analytics when working with a leading retailer. Using transactional data, Hidden Markov Models (HMMs), and the Art of Analytics, the consultants visualized the data in an artwork called "The Star."

The Star shows the progression of the customer visiting web pages. The top point of the star indicates the start of the transition from a given state, which is visiting the home page, to another state, such as putting an item in the basket. The thickness of each line indicates the number of sessions observed as the customer moves to the next state. The image shows what happens in each state and how other states they are connected, providing an understanding of relationships between the different states. Retailers can use this information to determine the nature of underlying states, such as a competitive offer or computer crash, and take appropriate action to re-engage the customer.

10000 Innovation Drive, Dayton, OH 45342 Teradata.com

Teradata and the Teradata logo are registered trademarks of Teradata Corporation and/or its affiliates in the U.S. and worldwide. Teradata continually improves products as new technologies and components become available. Teradata, therefore, reserves the right to change specifications without prior notice. All features, functions, and operations described herein may not be marketed in all parts of the world. Consult your Teradata representative or Teradata.com for more information.

Copyright © 2017 by Teradata Corporation All Rights Reserved. Produced in U.S.A.

10.17 EB9857



TERADATA