

Customer Acquisition Through Predictive Analytics:

An Adaptive and Fine-Grained Experience with Big Data & Data Science
Written by Bruce Ho, Chief Big Data Scientist, BigR.io, LLC



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About the Author

Bruce is a top rated problem solver, communicator, and data scientist. Bruce has a unique strength in bridging software engineering with mathematical algorithms. He has over 15 years of IT experience, engaging in high visibility, large scale projects in marketing automation, cloud solutions, Big Data engineering and predictive analytics for top technology companies like Amazon, TeraData, and Life Technologies. He is a certified AWS solutions Architect, with a specialty in Big Data practices. Bruce published over 100 scientific papers during his academic career, and continues to draw the best ideas from start-of-the-art research to fuel his Data Science practice.



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Bruce has a deep rooted passion in using statistics modeling to improve the way business is done in the fashion of "Moneyball". His fascination with the use of mathematics to solve real world problems dates back to the early days of

Vector Calculus and Newtonian physics. After witnessing the growth of computing power in the mode of Moore's law, Bruce fully embraces the vision that data driven decision making will soon become a basic tenet of business practice. He loves playing the advocate-in-chief for predictive analysis when resolving client companies' challenges.

Bruce holds a BS in Physics from MIT, and an MS in Electrical Engineering & PhD in Applied Physics from Caltech.

Abstract

Your customers tell you a lot about themselves, through their digital interactions and social media assertions. With all the internal and external data you have, you can get to know each one of them as well as the corner store owner. Uncover their preferences, forestall their defection and predict their demands by deciphering their digital behavior with advanced analytics and Big Data technology. In this paper, we take you through the expertise BioR.io delivers to complete your 360 degree customer view.

The capabilities explored are:

- **Fine-grained Personalization** • **Social Media Sentiment** • **Next Best Action** • **Precision Recommendation**
 - **Detect Buyer Readiness** • **Market Segmentation** • **Real-time Customer Monitoring**



About BigR.io

BigR.io is a technology consulting firm empowering data to drive analytics for revenue growth and operational efficiencies. Our teams deliver software solutions, data science strategies, enterprise infrastructure, and management consulting to the world's largest companies. We are an elite group with MIT roots, shining when tasked with complex missions: assembling mounds of data from a variety of sources, building high-volume, highly-available systems, and orchestrating analytics to transform technology into perceivable business value.

With extensive domain knowledge, BigR.io has teams of architects and engineers that deliver best-in-class solutions across a variety of verticals. This diverse industry exposure and our constant run-in with the cutting edge, empowers us with invaluable tools, tricks, and techniques. We bring knowledge and horsepower that consistently delivers innovative, cost-conscious, and extensible results to complex software and data challenges. Learn more at www.bigr.io

Overview

Are your targeted prospects, even after making significant marketing investments, still just hanging around the shopping cart and not pulling the trigger? What is the last piece of "assurance" that will get them over the fence? What if you can read into their minds and find out what's holding them up? What is that missing carrot that will boost your revenue?

Experienced marketers will tell you that the customer journey starts long before reaching the shopping cart. You can begin to win the prospects' favor from their first curiosity about your product, throughout the nurturing process, until they reach the final stages of comparison shopping and conversion. To effectively channel these customers down the sales funnel, you want to remain in tune with their state of readiness, and be equipped to offer the right incentives at the right time.

But, "What is the right incentive?", and "How do you determine the right timing?", you ask. Isn't every customer different? You must not only read minds, but millions of minds, on a moment's notice. How can anyone but the IBMs of the world hope to attain this kind of market intelligence?

Fortunately, today's playing field has been leveled; all businesses can and must embrace this capability now. With the emergence of Big Data technologies and recent advancements in analytics, offering a fine-grained customer experience, across all channels, is no longer just in the domain of giant multi-nationals. The cloud infrastructure removes the economic factor in utilizing unlimited compute and storage capacity. And specialty consulting firms like BigR.io deliver the quantitative expertise which makes analytics initiatives low risk have-to-have propositions.

In this white paper, we discuss the importance of customer analytics in terms of business impacts, and present how BigR.io delivers customer acquisition through personalization.



Customer Analytics

Modern commerce is predominantly conducted via digital channels. This allows suppliers to collect unprecedented amounts of data on their customers. Advanced analytics techniques turn this data into insights that help businesses serve individual customers better and win more sales.

Customer 360-Degree View

A 360-degree view yields a complete profile of the customer by incorporating all available information, whether from internal repositories, email, voice records, or social networks. Such a detailed understanding translates into a superior customer experience, improved campaign effectiveness, boosted sales, and better retention.



Customer Journey – track each customer’s digital trail and decipher mood relative to the experience. These interactions contain the clues on how best to engage prospects and when.

Examples of customer journey include:

- Opening a new account at a retail bank
- Shopping for new music online
- Monthly billing for an online service

Customer Acquisition – customer profiles combined with nurturing collateral are the carrots that win the hearts of new clients. The 360-degree view is the basis for tactical engagements through all touchpoints, from first exposure to final conversion and continued engagement.

Customer Churn – Conversely, every existing customer retained is worth a new customer earned. Existing clients who exhibit signs of dissatisfaction or inclinations towards switching can be detected through real-time analytics and remedial efforts can be made in time to retain loyalty.

Customer Journey Steps

Awareness

- Contact list through referrals, social media, blogs, linkedin, events, website
- Enrich each prospect by cross referencing to CRM account and other available information
- Segmentation for email / Ad campaign

Engaged – first response of any sort

- Ad targeting
- Email reminders
- Webinar / live event invitations

Active

- Promotional offers
- Assigned to sales rep
- Call center active list
- High search keyword, CPM targeting

Conversion

- Account management / customer care
- Purchase history
- Satisfaction survey

Expansion

- Recommendation upsell / cross sell
- Product release announcements

Retention

- Loyalty program
- Monitoring signs of dissatisfaction
- Frequent re-engagement
- Encourage viral advocacy



Fine-Grained Personalization

The ultimate customer care is when the buyer is automatically given or presented with the most probable match to their needs or wants. Personal preferences are ingrained in the breadcrumbs left along the entire digital journey. BigR.io can help you collect, analyze and serve them up for each and every instance of customer interaction. Implementation of personal profiles as active records means dealing with the challenges of rapid access and sheer volume; these are the very missions of Big Data engineering. By embracing the new generation of computing infrastructure, the forward-looking enterprise can incorporate this high degree of personalization into daily operations.

Blend CRM Data with Social Media Sentiments

This is where the Navy meets the pirate; the orthodox meets the avant garde. Businesses shouldn't pretend they understand all there is to know about their customers, regardless of the extent of their CRM database. Consumers are attracted to coolness, and what's cool is in the Facebook likes, the midnight Tweets, and the Instagram posts.

Deciphering social media sentiment is a fascinating and daunting challenge. All the factors that motivated the Big Data movement come together under one roof. The data is unformatted, sketchy, nearly impossible to authenticate and validate, and often short-lived in relevance, yet likely to be highly honest. Once the author's identity is mapped to the user ID in the CRM, the marketer gains insight about a person's habits, range of motion, purchasing pattern, and strongly held opinions that otherwise would not be revealed in a targeted survey. As a whole, social media data also points out market trends and help companies adapt to changing customer taste. This effort is one of the most important steps in completing the 360-degree view of your customers.

Next Best Action

Customer insights become gold if the business can plot the Next Best Action (NBA); the appropriate course of action that matches the customer's individual needs. Adaptive, Data-driven decisions are far superior to gut feelings and intuition when it comes to consistent results. Predictive analysis finds the best combination of timing and marketing levers that elicits the most optimal response from the buyer. Call center operators can work from a list of most likely customer concerns before picking up. Visiting reps can arrive at meetings prepared with the most appealing agenda. Customer support agents can proactively offer assistance or promotional material before frustration builds.

The model itself can be retrained at the appropriately set intervals to remain adaptive. Through Predictive Model Markup Language (PMML), personalized NBAs can integrate directly into operational systems such as marketing automation systems, call center software, consultation scheduling systems; anywhere automated or manual processes take place.

Digital Marketing Platform

Today's marketing activity has moved way beyond the back office CRM. Marketing automation systems, ad targeting, email delivery systems, A/B and multivariate testing tools, consumer surveys, crowdsourcing, and social media monitoring are all necessary parts of a complete arsenal to achieve marketing success. The escalation in tools and data also means the enterprise must utilize cutting-edge analytics to orient its campaigns and drive personalized marketing efforts in an ever-more competitive landscape.



Precision Recommendations with Factorization Machines

A recommendation engine is the most obvious of eCommerce strategies for any business trying to boost revenue from its existing client base. Collaborative Filtering is the most commonly-recognized technique for finding likely customer-product matches, given only sparse purchasing history data. A recent innovation, Factorization Machines, far exceeds collaborative filtering in recommendation precision to the point where a single customer-product pair can be identified to set the recommendation score. In addition, this new technique incorporates cross-feature influences which may be too important to be overlooked. For example, a viewer may actually dislike romance and comedy movies, but is fascinated by romantic-comedies.

Detection of the Prospect Funnel State – Buyer Readiness

The sales funnel is an important marketing concept used to direct sales efforts and organize campaigns. While marketing automation platforms offer prospect scoring, the feature is always set manually. Advanced analytics techniques such as the Hidden Markov Model can automatically and optimally score each prospect based on digital behavior. Digitally-intelligent enterprises can leapfrog the competition with aggressive adoption of data driven innovations and harness these important hidden indicators.



Advanced Classification for Market Segmentation

While fine-grained personalization is well within the capability of today's app serving platforms, from a management perspective it is of practical necessity to conduct campaigns at a cluster level. Analytically sophisticated organizations can make guided decisions in choosing amongst a host of clustering techniques from simple (k-means) to advanced (latent classification) to handle data at the extreme scales of volume and complexity. The mathematically derived classifications reduce dependency on gut feelings in favor of consistent returns.

Streaming Analytics for Real-Time Customer Monitoring

There are a number of use cases where a timely response from an organization is vital to success. A dissatisfied customer can exhibit familiar disapproving behavior patterns right before defecting to competitors. Other digital signatures are indicative of high receptivity to promotional efforts. The concept can be extended to fraudulent transactions. The urgency for response in these cases are self evident. Streaming data analytics brings real-time pattern detection within reach of every progressive organization.



Data Management Platform

Effective marketing campaigns are essential to business expansion and bringing in sales. BigR.io can help you design and build your Data Management Platform (DMP) to help drive your marketing initiatives. A DMP incorporates data on retail transactions, catalogs, social media, and online advertising. Our DMPs supports hypothesis-driven, high-impact analyses, and helps your organization move from simply collecting data to surfacing actionable insights and delivering business results.

Personalization in Practice

Let's use a fictional company called Ace Shopper ("Ace") and a fictional customer named Hank to illustrate the above concepts in action. Ace is a specialty consumer electronic super store which actively profiles its buyers with customer 360-degree view analytics. Its records have customer Hank on file as a busy executive with three teens, two of which are musically gifted. In the past 3 years, Hank's family spent over \$10K per year on musical instruments and accessories in the store.

Ace's marketing department categorizes its customer population based on the most distinguishing features, which are found to be indicative of their spending patterns. Hank falls in the group for highly educated parent with college bound children. His purchase records show a preference for high end electronics and incidental interest in laptops.

When a new electronic keyboard came to the market, Ace's marketing department ran their recommendation engine and found Hank to be a top 10% match. Ace proactively includes Hank in their email campaign on seasonal product releases. The email addresses Hank by name, and thanked him for his purchase items in the past one year.

Soon after the email campaign, the customer tracker application lists Hank as a customer whose interest level moved from "unaware" to "interested" due to his short visit to Ace's eStore. The marketing platform does not fire additional emails yet, but starts retargeting Hank with music instrument ads.

In a few months when summer break nears, the tracking application picks up frequent visits by Hank on the eStore and each time the click trail dives deeper into product details. Click tracking software also picks up signs of comparison shopping. Hank's readiness status is now upgraded to "active". With this status, the marketing platform now authorizes promotions valued up to 5% of Hank's annual purchase.

At the same time, one of Hank's Facebook influencers posted a complaint about a failed circuit board on an electric guitar, which Hank actively responded to. Apparently, this issue worried Hank sufficiently that he opened a chat session with Ace's sales agent. Before responding, the agent sees Hank's readiness status, purchase history, issue list, and suggested promotional offers prepared by customer analytic engine. The agent greets Hank, assures him on the quality of the new product line, and offers a free two-year extended warranty, plus an invitation to attend an in-store live performance by a famed local artist. Within a week, Hank became a happy repeat customer.



Conclusion

Customer 360-degree view means a complete understanding of a client's needs and a personalized customer care presence. This level of intelligence and responsiveness can only be achieved with a highly integrated system that readily can access all data sources and continually refreshes the status of the customer.

Big Data technology and advanced analytics brings fine-grained personalization within reach of all forward looking companies. It's no longer a matter of economics but a matter of will on the part of business owners. BigR.io with its team of high-caliber consultants can help architect a platform, comb though your data, and implement a custom analytic solution that matches your unique marketing practice.

