

Co-creation of AI-Based Consumer Insight Marketing Services

SHIMOMURA Hanae, TAKAGI Masashi, TSUCHIYA Hironori, TAKEI Yutaka, TOMARU Ryo

Abstract

In a world where the boundary between the real and digital worlds is becoming increasingly fuzzy, effective marketing requires the development of richer and more powerful “consumer insight” that can be used to motivate and trigger consumer behavior. At NEC, we are pursuing transdisciplinary solutions to achieve consumer insight that draws from deeper layers of data which is essential for implementing today’s market strategies; a more comprehensive understanding of consumer moods, feelings, desires, and aspirations. This study focuses on a joint effort by NEC and Macromill to develop a sophisticated transdisciplinary suite of tools for gleaning consumer insights by combining NEC’s AI technology with the wide range of consumer data possessed by Macromill.

Keywords



insight marketing, co-creation, AI, NEC the WISE, Remote Gaze Detection technology, dotData, Customer Profile Estimation technology, consumer data, consumer insight

1. Introduction

Today, marketing’s modus operandi is in the process of being thoroughly overhauled. As the boundary between online and offline disappears, every business — from retailers to financial companies to manufacturers — is being forced to reassess its approach to marketing and how better to understand its customers. Propelled by E-commerce, marketing technology has advanced rapidly. Yet, attempts to derive consumer insight by drawing solely on digitally obtained data can lead to a massive misreading of what really drives the customer when the distinction between the digital and real worlds is no longer clear.

The insight marketing services introduced in this paper leverage NEC’s AI technology to converge data to gain a deeper understanding of what motivates a particular customer and how best to trigger that customer to take a desired action. This kind of consumer insight is increasingly crucial in today’s turbulent and rapidly evolving markets.

In Section 2 below, we describe how NEC thinks about insight marketing and what it should be able to achieve.

In Section 3, we introduce the co-creation between NEC and our partner Macromill and outline what we hope to achieve. Section 4 goes into more detail about the business we have created, and Section 5 concludes with a look at future prospects.

2. Insight Marketing Perceived by NEC

Almost everybody today uses a mobile device. These devices free people from the restrictions of time and space, enabling them to do all kinds of things — communicating with friends, watching a video, listening to music, shopping, ordering a cab, and so on. The range of available services and channels is expanding exponentially, opening up a dizzying array of possibilities. And in this world of near limitless choice, it becomes ever more difficult to catch a consumer’s attention. Desperate to capture and retain customers, companies mine the data they have collected in an effort to glean insights that will give them the edge. Yet data analysis and application in marketing is still in its infancy.

One of the things limiting effective application of marketing data is that companies tend only to use specific

types of data in specific fields. Consumers do not necessarily purchase products only at certain retail chains, nor is shopping the only part of their lives that matters. Hence, if a business attempts to understand its customers by analyzing only the data it has collected itself, the understanding it gains will necessarily be severely limited.

Another factor stymieing current efforts to utilize consumer data is the failure to dig beneath the superficial and awareness data. Purchase history may indeed be important, but it is often difficult to gain a deeper insight without understanding the hidden motivations behind each purchase.

In order to gain true consumer insight, it is crucial to overcome these two limitations. A much broader range of data and a transdisciplinary analysis are key to achieving the deepest possible understanding of each individual — right down to the unconscious level. NEC is committed to using the power of AI to achieve this goal.

3. Co-creation with Macomill

To achieve true consumer insight, NEC chose the path of co-creation with Macomill.

Macomill is one of the leading companies in the marketing research industry. It owns a panel network encompassing more than ten million people in nineteen countries from which it collects a broad range of consumer data. Macomill's massive and multifaceted data resources are composed of demographic data, questionnaire data, web access information, and purchase data based on the consumers' daily buying records — all obtained with consumer consent. These diverse data resources even include EEG (electroencephalogram) data. Macomill's business focuses on proposals for new product development ideas and sales promotion projects, and supports of new markets cultivation. In order to achieve them it leverages these resources to conduct research in a wide range of areas such as what is demanded in a specific market. To make their unique and advanced data resources even more valuable, Macomill needed additional technological assets such as sensing and AI.

NEC, meanwhile, was known to possess several proprietary number-one and only-one technologies that had been demonstrated to be very compatible with the marketing field. However, NEC's focus on the B2B business meant that it didn't have the consumer data to take advantage of these technologies.

It was a perfect match. Combining Macomill's consumer data with NEC's AI technology reinforced the strengths of both companies to build an extremely robust cooperative relationship that will co-create new

marketing insights by effectively leveraging the assets of both companies.

Already, solutions that are only possible with co-creation have emerged. These are highlighted in Section 4 below.

4. Specific Businesses

Through the co-creation with Macomill, we have already launched the following services: (1) Central Location Testing (CLT) service using biometric information, (2) consumer purchase prediction service using AI, and (3) AI analytics service D-Profile utilizing dotData.

(1) Central Location Test (CLT) service using biometric information (Fig. 1)

Among Macomill's many research services is what is called a Central Location Testing (CLT). This type of research generally is conducted in a controlled environment such as store mock-up where the prototype of a new product might be displayed. The behavior of the test participants is monitored to examine their receptivity to the product by evaluating their responses against the product, the package design, and so on.

Macomill now incorporates NEC's Remote Gaze Detection AI technology in its CLT service to measure biometric responses quantitatively. The Remote Gaze Detection technology is used in in-front-of-the-shelves testing and individual package testing. Because most buying decisions are made while standing in front of store shelves, being able to determine whether the person being monitored pays attention to the new product is a critical datum point. If a human researcher tries to observe the shopper's line of sight, the results are approximate at best. For

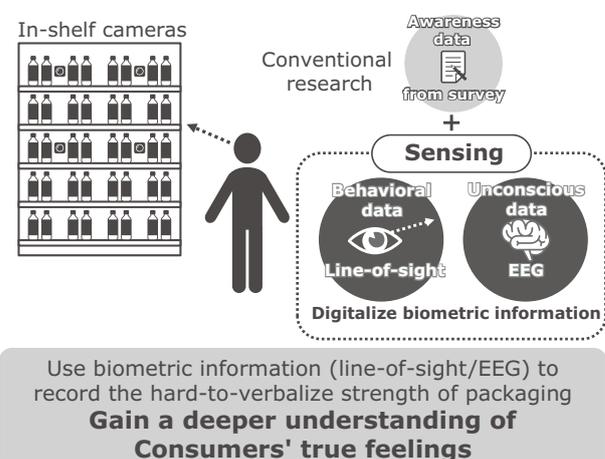


Fig. 1 CLT service using biometric information.

more precise results, the shopper has to wear a goggle-type line-of-sight measurement device. However, when NEC's Remote Gaze Detection technology is used, no dedicated measurement device needs to be worn and line of sight can be estimated accurately. NEC's Remote Gaze Detection technology makes it possible to accurately detect the direction of someone's gaze using images captured with conventional cameras¹⁾. It applies the face feature point detection technology, which constitutes the core of NEC's world's number-one face recognition technology²⁾. Able to reliably and accurately perform detection with no need for a dedicated device and even from a remote location, this technology makes it possible to conduct research in more natural environments. Meanwhile, in the individual package testing, NEC's gaze detection technology is combined with the EEG sensing technology developed by Centan, a subsidiary of Macromill. This combination makes it possible to discern whether a design element in the monitored person's line of sight moves to a positive or negative side in their brain. By performing these two testing methods, you can index — in terms of both the transition of gaze and psychologically — the strength of engagement, which in turn allows you to assess the degree to which the item has attracted the customer's interest.

A preliminary verification test for this service was conducted in September 2018. The test proved that this service is capable of obtaining insight about consumers' actual and emotional responses in the process of selecting products. The following questions can now be answered: "Which part of the product did you see first?" "Which other products did you compare against?" and "Was your mental response negative or positive?" — which are difficult to clarify in conventional questionnaires.

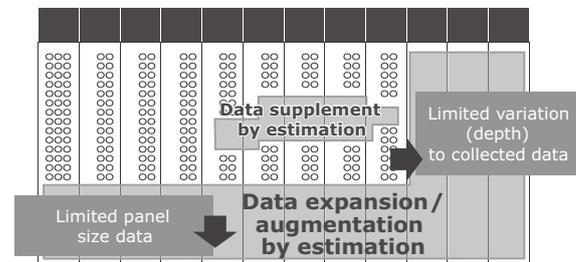
By applying the sensing technology of NEC the WISE to marketing, we can overcome the barrier of superficial data and go beyond the awareness data to reach a deeper and more profound understanding of consumer behavior and psychology.

(2) Consumer purchase prediction service using AI (Fig. 2)

This service uses NEC the WISE's customer profile estimation technology to supplement missing items in Macromill's consumer data (purchase data), augmenting it to a scale of approximately 100,000 consumers.

A broad range of purchasing data is vital in the development of a marketing strategy. Unfortunately, sufficient data for analysis cannot always be ob-

Highly accurate consumer/purchase data estimation using customer profile estimation technology



Sale of supplemented/augmented data
**Able to analyze new products/
 low frequency purchase products
 more accurately**

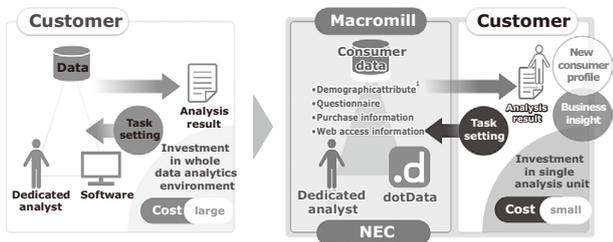
Fig. 2 Consumer purchase estimation service using AI.

tained in cases where the volume of purchases is low — for example, with newly released products or low-frequency purchase products. Similarly, performing an analysis by multiplying multiple data using a data management platform (DMP) can lead to unreliable results.

NEC the WISE's customer profile estimation technology is based on NEC's exclusive relationship mining technology³⁾. It apprehends the tendencies of existing data and multiplies it by a number of factors, automatically estimating missing data with high precision. This technology has achieved impressive results in academia and in 2017 was selected to be one of the oral sessions at the IEEE International Conference on Data Mining (ICDM), the world's premier annual research conference on data mining. It is worth noting that the acceptance rate for oral sessions at ICDM 2017 was a mere nine percent.

Utilization of this technology makes it possible to estimate and expand purchase data with high precision even if some panel members have no purchase histories. This is achieved by using learning-based analysis of the panel data which includes detailed profiles and purchase histories. Drawing on data from the Macromill Household Spending Panel Survey (MHS) — a 20,000-member panel, this new AI-based consumer purchase prediction service expands the data to the equivalent to about 150,000 people, accurately estimating the missing data. This will address needs for consumer insight starting from purchase, planning advertising strategies, building a DMP, and more.

Using NEC the WISE's AI technology, we can over-



1. Demographic data, such as age, sex, residency location, family structure, and occupation.

Fig. 3 AI analytics service D-Profile utilizing dotData.

come the limitations of field-specific data, increasing the value of Macromill's transdisciplinary consumer data and supporting the realization of more heterogeneous consumer insight.

(3) AI analytics service D-Profile⁴⁾ utilizing dotData

The D-Profile uses NEC's dotData software — which uses AI to automate data analysis processes — to analyze a variety of transdisciplinary consumer data owned by Macromill (attribute information such as age, purchase history, and access logs) in order to clarify attributes and behavioral characteristics peculiar to customers (Fig. 3). We began making this service available to multiple companies in December 2018.

By leveraging this service, businesses will be able to free themselves from individual-dependent analysis and the need to analyze large amounts of data in multiple types, while dealing with data collection, storage, and analysis tools, as well as having to recruit and retain dedicated analysts — all on their own. A completely new service that has never existed before, the D-Profile uses transdisciplinary analysis to enable companies to excavate new and more detailed customer profiles.

The D-Profile also facilitates comprehensive customer-based analysis by applying dotData to "deep data" and "wide data" — such as CLT — utilizing biometric information and our AI-based customer purchase prediction service, respectively. This will enable us to focus on the achievement of transdisciplinary marketing, which offers deeper and truer perspectives, while transcending the limitations of both specific and superficial data.

5. Conclusion

The services we have discussed above are just a small sample of the marketing solutions that combine NEC's AI technologies with Micromill's assets. Also currently underway are multiple planning and verification activities

for various projects aiming to achieve true consumer insight by leveraging AI technologies not introduced in this paper. These include a service that unlocks the reason why a customer makes the choice they do — that is, it reveals the actual mechanisms of the in-store buying process by comprehensively detecting actual consumer behavior in brick-and-mortar stores.

In the CLT service introduced in Section 4-(1) above, candid customer responses regarding pre-release products can be gleaned from their biometric information. After a product's release, moreover, real-world in-store purchase processes that take into account actual environmental and other factors can be incorporated into simulations. By mutually deepening databases of respective consumer responses and model construction cycles both before and after product release, it may eventually be possible to obtain models that can predict who responds, what products they respond to, and how they respond to them. Using consumer insight to clarify why products are purchased or not purchased can make it possible to design products and build stores that are more likely to be chosen by consumers, adding a new dimension to marketing that transcends the conventional and could revolutionize the way both manufacturers and retailers conduct their business.

Working together with Macromill, NEC will provide companies with marketing-related data and analysis that reflects consumption tendencies and consumers' sense of values. Individual companies will be able to possess and utilize original data, as well as take advantage of a broad range of secure, reliable data that will strengthen and deepen their consumer insight. All of this redounds to the benefit of the consumer as it helps create a world where each individual is free to pursue and enjoy value and abundance custom-created for them. Because it so brilliantly leverages the potential of NEC's advanced technologies and expands their possibilities, we are confident that this co-creation will serve as a powerful business platform that will innovate marketing in ways as yet to be discovered.

References

- 1) NEC Press Releases: NEC technology knows where you are looking, December 2016
https://www.nec.com/en/press/201612/global_20161216_01.html
- 2) NEC Press Releases: NEC Face Recognition Technology Ranks First in NIST Accuracy Testing, October 2019
https://www.nec.com/en/press/201910/global_20191003_01.html
- 3) NEC Press Releases: NEC Develops AI-based Customer Profile Estimation Technology, September 2016
https://www.nec.com/en/press/201609/global_20160902_02.html
- 4) NEC Press Releases: NEC and Macromill launch consumer insight marketing business using AI, March 2019
https://www.nec.com/en/press/201903/global_20190308_01.html

Authors' Profiles

SHIMOMURA Hanae

Corporate Business Development Division

TAKAGI Masashi

Senior Manager

Corporate Business Development Division

TSUCHIYA Hironori

Manager

Corporate Business Development Division

TAKEI Yutaka

Manager

Corporate Business Development Division

TOMARU Ryo

Assistant Manager

Corporate Business Development Division

Information about the NEC Technical Journal

Thank you for reading the paper.

If you are interested in the NEC Technical Journal, you can also read other papers on our website.

Link to NEC Technical Journal website

Japanese

English

Vol.14 No.1 AI and Social Value Creation

Remarks for Special Issue on AI and Social Value Creation
Data — Powering Digitalization and AI

Papers for Special Issue

NEC's Efforts Toward Social Applications of AI

NEC's Commitment to Its New "NEC Group AI and Human Rights Principles" Policy
Human Resource Development in the Age of AI

AI-Enhanced Services/Solutions to Accelerate Digital Transformation

NEC Advanced Analytics Platform (AAPF) Promoting "AI Co-Creation"
Use of Individual Identification Based on the Fingerprint of Things Recognition Technology
Visual Inspection Solutions Based on the Application of Deep Learning to Image Processing Controllers
Remote Vehicle Surveillance Solution Based on Communication Prediction/Control Technology
NEC's Emotion Analysis Solution Supports Work Style Reform and Health Management
Facial Recognition Solution for Offices — Improved Security, Increased Convenience
Outline of an Auto Response Solution (AI Chatbot) for Assisting Business Automation and Labor Saving
AI for Work Shift Support — Accelerating the Transition to Human-Centered Business Value Creation
NEC Cloud Service for Energy Resource Aggregation Leveraging AI Technology
Patient Condition Change Signs Detection Technology for Early Hospital Discharge Support
Effective Data-Based Approaches to Disease Prevention/Healthcare Domains
Co-creation of AI-Based Consumer Insight Marketing Services
"Anokorowa CHOCOLATE" Lets People Savor Delicious Chocolates that Reflect the Mood of Special Moments in History

Cutting-Edge AI Technologies to Create the Future Together With Us

Heterogeneous Object Recognition to Identify Retail Products
Optical Fiber Sensing Technology Visualizing the Real World via Network Infrastructures
Intention Learning Technology Imitates the Expert Decision-Making Process
Graph-based Relational Learning
Retrieval-based Time-Series Data Analysis Technology
New Logical Thinking AI Can Help Optimize Social Infrastructure Management
Deep Learning Technology for Small Data
A Computing Platform Supporting AI



Vol.14 No.1
January 2020

Special Issue TOP