

# Big Data supports decisions that help businesses succeed

It's not enough to know simply that trends exist – it's important to know why they occur. NEC's unique innovative technology takes Big Data, and analyzes it to make recommendations that allow decisions to be made more accurately.

Making management decisions for the future requires knowledge of previous conditions, and the ways in which these may be applied to the future.

Recent improvements in technology now make it possible to capture and store ever-increasing amounts of data from past events (Big Data). If conclusions can be drawn from correlations produced from this data, they can point the way to more accurate answers that increase profitability, safety, and an enterprise's overall well-being.



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Big Data Analytics

As one example of the way in which the analysis of Big Data can help decision-making, the production and distribution of food and beverage items depend on many factors. When Asahi Breweries, one of Japan's largest alcoholic beverage makers, introduces a new drink, decisions must be made. How well will the new product sell, and therefore, how much of it needs to be produced?

Consumables such as beer have a limited shelf life, and producing too much of a new product could lead to unsold stock, wastage, and reduced profitability. Too little, and the result is lost sales opportunities and frustrated customers. What about the weather and its effects on consumption? Previous similar product history? How will product promotion campaigns, and competitors' products affect the sales?

Since September 2014, Asahi Breweries has been using NEC's Heterogeneous Mixture Learning technology (HML) to analyze the Big Data related to products and distribution channels, such as historical sales records, weather, day of week, and other factors. The solution provided by NEC has improved the accuracy of the forecasting following a product's launch,

with a difference between predicted and actual sales of less than 10 percent, allowing the correct amount of stock to be produced and distributed. Kaoru Yamamoto, Deputy Manager, Digital Strategy Department, says, "It is still very early to say, but as we continue to enter more data, the accuracy of the system, and the resulting efficiency and profitability of the sales efforts, seem to show improvement."

**Leveraging existing skills and expertise**  
Dr. Ryohei Fujimaki, Research Fellow and Leader of NEC's Big Data Analytics Team, gives some background to this system.

HML is differentiated from other Big Data techniques since it combines, recombines and analyzes the factors of the data fed to it, and derives the relationships and rules linking the data points. Using HML, it is possible, for example, to predict the sales figures for a new product, even before it has been launched.

Not only does this produce highly accurate results, comparable to those produced by neural learning networks, it is a "white box" solution. When compared to competing technologies, Fujimaki emphasizes that HML allows the users of the technology to view the formulas and

the factors by which the results are obtained. "By understanding the mechanism that predicts the future results," he says, "users are able to regulate these factors more actively, to maximize the benefits for their business, adjusting them as necessary to meet changes in business conditions. This makes HML different from existing Big Data analytic solutions. Not just actionable intelligence, but accountable intelligence, is needed, and HML provides that."

Any Big Data-created value system consists of three major phases: acquisition of the data, through sensors, or through other means; analysis; and actuation. NEC has a long background in all relevant areas of IT, including data gathering, data processing, analytical techniques, and data scientist skills. Rather than providing a toolkit, NEC engineers provide a solution where Big Data helps to grow and develop the user's business.

#### Enhancing safety

One application for a proactive HML solution might be in the field of accident prevention. For example, a transport system operator or a trucking company might wish to improve the safety record of the drivers

of its busses, taxis, trains, or trucks.

By examining historical data related to drivers' records, and by taking real-time telematics data from the vehicles on the road, it is possible for HML to build up profiles of the type of driver at risk, and to identify them. Compared to conventional data mining methodologies, HML is more than twice as accurate in identifying such drivers.

Rather than shutting the stable door after the horse has bolted (retraining those drivers who have actually been involved in incidents in the past), the operator could apply a "preventative maintenance" approach to the problem, providing proactive remedial training even before an accident occurs, refining and improving the skills and competencies of "at risk" drivers.

Such a solution would bear fruit for the company, not only as regards the overall safety record, but also in terms of operational performance, productivity, customer satisfaction, and service standards.

HML's analysis engine, discovering unremarked relationships between data sets, and predicting trends, makes it ideal for such a scenario, where the future was previously unguessable and unpredictable.

#### An assistive business partner

Such an application points the way to the future of HML, as explained by Fujimaki, who says the next goal is to turn HML into a prescriptive actuation system, rather than a descriptive analytic system, assisting management and human experts by providing suggested courses of action for stated goals, such as increasing sales, cutting waste, or decreasing accidents or customer churn. For example, HML can help reduce churn ratio for service providers, such as mobile phone operators, by advocating the optimum marketing strategy for each individual customer.

Not just churn management, but other applications benefit from the use of HML, such as retail outlet management, production management, and utility (e.g., gas, water, electricity) supply, with HML currently supporting between 30 to 40 projects around the world.

As the use of HML becomes more widespread, revealing the mechanisms behind business trends and figures, more and more enterprises are expected to adopt this solution to assist and enhance their businesses, and to benefit society and society through the application of this uniquely accurate and transparent aid to business decision-making. — Hugh Ashton

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