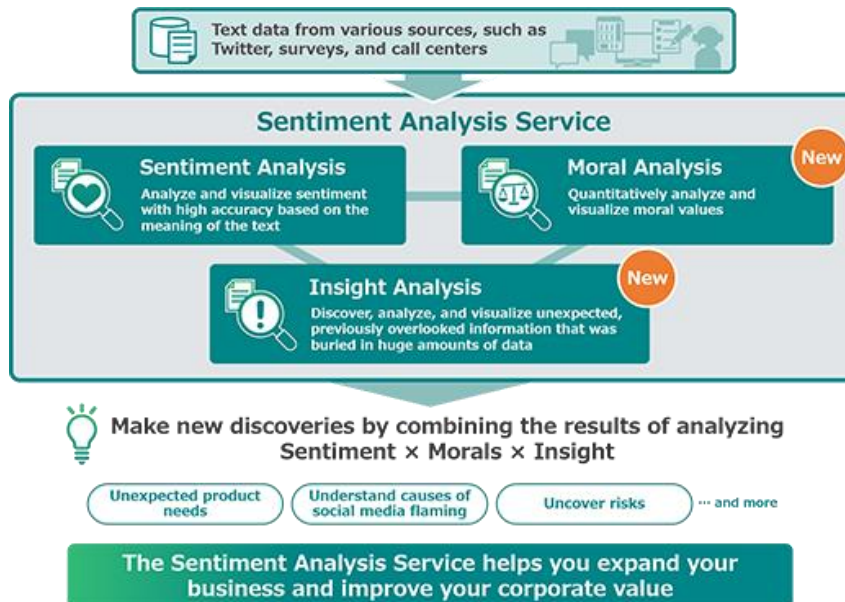


News Release

FOR IMMEDIATE RELEASE

Hitachi launches Sentiment Analysis Service with New Perspectives of "Morals" and "Insight"

Analyzing response from end users based on text data to enhance marketing (product planning, sales strategies, risk countermeasures, etc.)



Outline of the service

Tokyo, October 7, 2021 – Hitachi, Ltd. (TSE: 6501, "Hitachi") today announced enhancements to its Sentiment Analysis Service^{*1} (hereinafter, "the service"), which leverages AI to analyze and visualize, from the perspective of sentiment, response to a company or product based on text data from Twitter or other sources. Specifically, two functions, Moral Analysis (Patent Pending) and Insight Analysis, have been added. These new functions analyze response from the added perspectives of morals and insight. The service as a Lumada solution is available for customers today.

Developed based on the academically backed Moral Foundations Dictionary^{*2} and with advice from the Tokyo Institute of Technology's Sasahara Lab, the Moral Analysis function quantitatively visualizes moral values behind apparent sentiments. The Insight Analysis function uses Hitachi's original algorithm to extract unexpected information (such as small changes in response) that was buried in huge amounts of data.

These functions can lead to improvements in future business activities, including both aggressive marketing (product planning, etc.) and defensive marketing (detecting and handling flaming on social media, etc.).

^{*1} News release (October 1, 2018): [Hitachi Launches Sentiment Analysis Service to Classify and Visualize Voices of Customers into Around 1,300 Types of Topics, Feelings, and Intentions Utilising AI](#) Hitachi's Sentiment Analysis Service is one of Hitachi Lumada solutions and uses cutting-edge digital technologies to accelerate digital innovation.

^{*2} The service uses the following Moral Foundations Dictionary: [MFD](#) and [J-MFD](#).

Overview of using the enhanced service

The service can be used for marketing and various other purposes, such as to plan new products, formulate sales strategies, identify risks at an early stage, and counteract social media flaming. For example, an automobile manufacturer might utilize the service for marketing, by analyzing end users' sentiments and the underlying values that lead to such sentiments. This allows the manufacturer to understand the end users' sentiments as well as

the moral values behind those sentiments—moral values that emphasize the ingroup (morals that seek to create and maintain the group), etc. Based on this, the manufacturer can hammer out marketing strategies that encourage end users to buy. Furthermore, by perceiving responses not originally anticipated, the manufacturer can even plan new promotional campaigns.

In this way, by analyzing end users' response quantitatively and from more angles, companies can learn about their end users' values and hidden needs. Additionally, they can apply their new discoveries and ideas to their business, leading to further business expansion and improved corporate value.

Features of the enhanced service

The Moral Analysis function leverages AI to extract keywords from text and then uses the Moral Foundations Dictionary^{*3} (created based on the moral foundations theory) to categorize each word into one of the following five moral foundation categories. The function also uses Moral Foundation Dictionary to classify each text into virtue or vice with respect to the moral foundation, and quantitatively analyzes and visualizes the results (Patent Pending).

Moral Foundations	Description
Care	Moral value which focuses on not harming others and protecting the vulnerable
Fairness	Moral value which assumes equivalent exchange without cheating to be good
Ingroup	Moral value which concerns a collective entity instead of individuals, such as family, nation, team, and military
Authority	Moral Value which postulates respect for authority, resulting in maintaining the hierarchy
Purity	Moral value which involves a feeling of disgust caused by the impure

Finally, the Insight Analysis function utilizes Hitachi's original algorithm, which combines time information and the frequency with which each word appears, to identify and visualize the minority response and the relevant timeframe. The minority response refers keywords that are used a certain number of times, but not enough times to be displayed the Sentiment Analysis function or Moral Analysis function. Through the Insight Analysis function, customers can identify unexpected words or word combinations that suddenly appear during a particular timeframe and thus make new discoveries.

In addition to helping customers install these analysis functions, Hitachi provides total support, from the provision of response analysis reports to the formulation of policies based on analysis results.

*3 A theory advocated by social psychologist Jonathan Haidt. This theory posits that humans are born with five universal and cross-cultural foundations related to moral right and wrong.

Future plans

Going forward, Hitachi plans to expand use cases for the service beyond marketing, to include the HR field (human resources, hiring, employee training, etc.), deploying the service in a wide range of areas as a service that supports the creation of value through corporate activities.

Background

Recently, public interest in ESG^{*4} and the SDGs^{*5} has been growing. As such, many companies are being called on to conduct their business activities in ways that account for morals, including corporate social responsibility, corporate ethics, and human rights. In light of this, even within the context of marketing and other activities, it is important to consider the diverse moral values of end users, to develop new products and services that meet their needs, and

to identify and address incidents such as flaming on social media and human rights violations as soon as possible. However, consideration for the end users' moral values depends on the perception and experience of each individual employee, and it is difficult for companies to quantitatively analyze moral values and handle incidents in a timely manner.

*4 Environment, Social, and Governance

*5 Sustainable Development Goals

Statement by Dr. Morteza Dehghani, Associate Professor, University of Southern California

I believe analysis of moral language is vital in today's dynamic and ever changing environment for better understanding the concerns of audiences, and Hitachi's integration of the Moral Foundation Dictionary in their text analysis system should be applauded.

Statement by Dr. Jesse Graham, Associate Professor of Management, Eccles School of Business, University of Utah

I hereby endorse Hitachi's use of the Moral Foundations Dictionary, which I believe will provide value in measuring moral rhetoric in business settings.

Related Links

Website of Sentiment Analysis Service

<https://www.hitachi.com/products/it/appsvdiv/service/sentiment-analysis/index.html>

Notes on trademarks

- Twitter is a trademark or registered trademark of Twitter, Inc. in the United States or other countries.
- Other described company names and product names are registered trademarks or trademarks of their respective owners.

- End -

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, contributes to a sustainable society with a higher quality of life by driving innovation through data and technology as the Social Innovation Business. Hitachi is focused on strengthening its contribution to the Environment, the Resilience of business and social infrastructure as well as comprehensive programs to enhance Security & Safety. Hitachi resolves the issues faced by customers and society across six domains: IT, Energy, Mobility, Industry, Smart Life and Automotive Systems through its proprietary Lumada solutions. The company's consolidated revenues for fiscal year 2020 (ended March 31, 2021) totaled 8,729.1 billion yen (\$78.6 billion), with 871 consolidated subsidiaries and approximately 350,000 employees worldwide. For more information on Hitachi, please visit the company's website at <https://www.hitachi.com>.

Business Contact:

Inquiry Form: <https://www.hitachi.com/products/it/appsvdiv/inquiry.html>

Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
