News Release

Hitachi Power Solutions launches "Prognostic Solution" to improve the prognostic accuracy of predictive diagnostics

By utilizing the advanced prognostic algorithms of Cassantec AG, which allow to optimize the Remaining Useful Life of assets

Tokyo, October 31, 2017 - Hitachi Power Solutions Co. Ltd., (Hitachi Power Solutions) a wholly owned subsidiary of Hitachi, Ltd. (TSE: 6501), today announced that it launches "Prognostic Version" to help equipment operators optimize the Remaining Useful Life of their assets. The predictive diagnostic and prognostic solution helps improve production efficiency, stable operation of machinery, maintenance and asset management. The new product will be launched both in Japan and worldwide on December 1st, 2017. The system is based on the IoT Platform "Lumada" and is the result of a series of developments; Predictive Analytic System has provided leading technologies since June 2013. Its next generation "Edge Version" runs the same predictive algorithms on edge computing systems. Cassantec AG (Cassantec) is a software company with its main office in Switzerland. It has developed prognostic algorithms in-house using Artificial Intelligence and expert knowledge on equipment behavior. By utilizing this advanced technology, Hitachi Power Solutions improves its prognostic accuracy compared to conventional systems, specifically through calculating the explicit future time window until malfunction.

Cassantec's prognostic solution has started to spread worldwide in order to increase customers' equipment utilization and to decrease customers' maintenance costs, while avoiding failure. The bases of these benefits are condition-based forecasts of the equipment condition. Consequently, there is a growing need for such Remaining Useful Life prognoses for individual components and entire facilities.

Since June 2013, Hitachi Power Solutions has built its experience and know-how on various industrial facilities and on data mining technologies[1] in the IT industry. It has developed the practical application that supports the prevention of unexpected or unplanned outages of critical assets by predicting malfunctions. As a next step, "Edge Version" was implemented since October 2016. It enables Hitachi Power Solutions to perform predictive diagnostics on edge computing systems. Also, a simplified predictive diagnostics solution was launched to be deployed at the gateway on-site. Finally, "malfunction forecasts" and "Prognostics" were added since April 2017. Hence, Hitachi Power Solutions has continuously improved its predictive diagnostics solutions to help increase asset utilization and production efficiency by decreasing maintenance cost through better timing of maintenance and through avoiding major malfunction events that result in
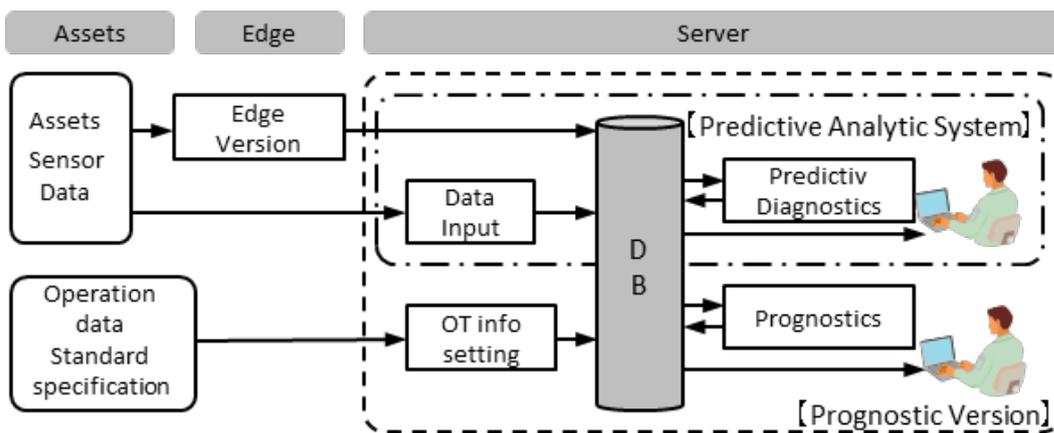
equipment damage and extended periods of outage.

Now Hitachi Power Solutions launches "Prognostic Version" by utilizing Cassantec's algorithms. On the basis of stochastic algorithms and machine leaning concepts that analyze collected historical sensor data the Remaining Useful Life of equipment is prognosticated. In addition to failure forecasts on the bases of conventional polynomial approximation, we can now determine when a malfunction will occur with at a higher accuracy than ever before, thereby helping to further increase the utilization of customers' assets and to further decrease their maintenance and management cost.

This system will be displayed at an energy booth in Hitachi Social Innovation Forum 2017 TOKYO, which is to be held from November 1 to 2.

Note:*1 Data mining technology: the process of analyzing big data mathematically and of finding (mining) new knowledge based on multivariate data analysis.

■Prognostic Version features
・It analyzes data with stochastic algorithms and machine learning, and evaluates the malfunction risk at any point in the future.
・It analyzes asset information and historical sensor data, and provides high-accuracy malfunction prognostics.
・It can simulate different load scenarios.

System Block Diagram

■Hitachi Power Solutions comments from Managing Director and General Manager of Public Industrial I & C Business Management Division, Katsuyoshi Murakami

"We are also delighted to promote developed Prognostic solution owing Cassantec. By combining predictive diagnostic solution of Hitachi Power Solutions, we will address more advanced maintenance solutions to our customers in Japan and abroad."

■Cassantec AG comment from CEO Moritz von Plate

"We are delighted to have won Hitachi Power Solutions as a strategic partner. Based on the combination of the deep industry expertise of our partner with our unique Prognostic solution we are looking forward to a global roll-out of the joint Prognostic offering across various markets and industries."

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges. The company's consolidated revenues for fiscal 2016 (ended March 31, 2017) totaled 9,162.2 billion yen ($81.8 billion). The Hitachi Group is a global leader in Social Innovation and has approximately 304,000 employees worldwide. Through collaborative creation, Hitachi is providing solutions to customers in a broad range of sectors, including Power / Energy, Industry / Distribution / Water, Urban Development, and Finance / Government & Public / Healthcare. For more information, please visit http://www.hitachi.com

About Hitachi Power Solutions Co., Ltd.

Since its establishment in 1960 as a member of the Hitachi Group, Hitachi Power Solutions Co., Ltd. has been providing various technologies, products, systems, and services to meet customer requests and the demands of society in such social infrastructure fields as energy, industry, and information systems. Fiscal 2016 revenues totaled 146.0 billion yen. For more information on Hitachi Power Solutions Co., Ltd., please visit the company's website at http://www.hitachi-power-solutions.com/en/index.html

About Cassantec AG

Cassantec offers a Prognostic solution to calculate the explicit future time window until malfunction by combining advanced stochastic algorithms and machine learning concepts. These have been developed in-house with expert knowledge on equipment behavior. Founded and incorporated in Switzerland in 2007 with branch offices in Cleveland, Ohio, U.S.A., and Berlin, Germany, Cassantec has a team of highly talented and experienced engineers. It is promoted by the Swiss government's CTI program, and collaborates with leading international research institutions, including Stanford University, RWTH in Aachen, Germany, and EPFL in Lausanne, Switzerland.

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