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Yokohama Rubber develops rubber compound design system that utilizes AI compound generation technology

Tokyo—The Yokohama Rubber Co., Ltd., announced today that it has begun applying a proprietary rubber compound design system that utilizes AI-based compound generation technology. The new system was developed with the cooperation of Hamagomu Aicom Inc., a Yokohama Rubber subsidiary specializing in information system development. The new system's use of AI to propose a compound that achieves targeted rubber physical property values enables the acquisition of new knowledge about compounds that humans could not have conceived independently. Yokohama Rubber expects this new system will enable it further speed up product development and develop higher-performance products.

The new system is the latest development promoting the use of Yokohama Rubber's HAICoLab[*] AI utilization concept. The previous system used to predict the physical properties of rubber compounds used AI to predict compound property values based on compound design parameters input by humans. This new compound design system takes the process one step further, with AI generating candidate compounds based on specific desired compound property values and then proposes compounds that satisfy the target physical property values. HAICoLab's AI has learned tens of thousands of rubber compounds and can generate candidate compounds that combine more than 100 types of compounding agents. The new system compares the predicted physical property values of the generated candidate compounds with the targeted physical property values and proposes the compounds that meet the targeted values. In addition to specifying the basic compound and compounding agents to be used, the new system makes it possible to search for data that is close to the specific selected compound, thus facilitating collaborations between humans and AI that will lead to the acquisition of new knowledge.

* An acronym for "Humans and AI ColLaborate" for digital innovation. It also has the meaning of a laboratory for joint research by humans and AI.

Yokohama Rubber established HAICoLab in 2020 as a new concept aimed at fostering digital innovations by facilitating collaborative efforts that merge human inspiration and creativity with the enormous data processing capability of AI. Yokohama Rubber aims to acquire new knowledge by creating and collecting data based on hypothetical conditions set by humans and then applying AI to predict, analyze and then search for the most optimal result. Since establishing the HAICoLab concept, Yokohama Rubber has been advancing technological developments by using AI in its material and tire design and development processes. For example, in 2020 it developed a system that utilizes AI to predict the physical properties of rubber compounds used in its tires, and in 2021 it began using a system developed to predict the values of specific tire characteristics. Under the HAICoLab concept, Yokohama Rubber is using AI to develop innovative products and services as well as processes. Through such efforts, the Yokohama Rubber Group will contribute to the realization of "Society 5.0", a future society that will enhance people's experiences and take advantage of innovative technologies such as AI and IoT, as advocated by the Japanese government's Cabinet Office.

HAICoLab conceptual diagram