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Conveying smells through a TV set?! Feasibility of smell generation technology that will change common sense

Smell Sensor vol. 2

In the previous interview, we learned about visualizing smells. If we can digitize smells, isn't it possible to generate smells? However, that was an unexpected challenge. The following is the story concerning smell generation technology.



Our navigator

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Turning the living room into a restaurant. Is it possible to develop a TV set that generates smells? New future brought about by smell visualization

Imagine that while you are watching a gourmet program at midnight, good smells come from the TV screen. It turns the living room into a restaurant. It will entertain viewers, and benefit program and CM directors.

Is such a TV set feasible? Following the previous theme, we interviewed Mr. Hattori, who is in charge of developing smell sensors.

We posed the above question to Mr. Hattori. He thought for a while, and then answered "Currently it's a little difficult to make such a TV set." However, he also considered the feasibility of the **Hattori**: We are currently developing smell sensors, which detect smells and visualize (digitize) them. The latter process depends on the TV manufacturers.

However, if we can visualize smells, I think it will be technically possible to generate the same smells by combining smell components based on the digitized data.

If a TV set or its remote controller has a mechanism for combining smells and releasing them, a TV set that generates smells might be feasible.



▲ MEMS Semiconductor Type Prototype Smell Sensors under development by TAIYO YUDEN

Connected with a smartphone to digitize smells in real time

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request.

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Smell generation is a technology for blending several smell components and then releasing the blend. Speaking of releasing smells, various products such as aroma diffusers and deodorants are on the market. According to Mr. Hattori, they only release a fixed smell.

— Deodorant products have been established as an independent category. What is the difference between smell generation and deodorants?

Hattori: Technically speaking, deodorants are easier. There are two methods. One covers a smell with a stronger smell. The other creates the opposite smell to cancel an existing smell. There have been some procedures, and we now know how to deal with each smell.

This is why hundreds of deodorant products are on the market. In contrast, generating smells consists of combining several hundred thousand smells that exist in nature, which is more difficult.



▲ Smell Sensor Development Site, TAIYO YUDEN R&D Center Mr. Hattori and other development staff are working on smell analysis.

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Smell information database in the cloud

Smell generation consists of several processes: sensing, identification, and digitization. For digitization, pre-learning by AI plays an important role. He talked about his struggles in development.

Hattori: There is a misunderstanding that our smell sensor can detect any smells, identify them and digitize them. In reality, pre-learning by AI is required. Our smell sensor determines the types of smells by matching them with learned patterns.



▲ Sensing and Identification (Schematic) Identifying an object through differences in the components

Hattori: The first task we carry out is to visit our customers and collect smell data and listen to what smells they want to detect. At our lab, we recreate these smells and teach their patterns to AI. When smell patterns are accumulated and a database is established, a smell, which is detected for the first time, could be identified as "similar to this smell" by matching to the database.

However, this technology still has a way to go. There is an issue across the industry.

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Hattori: There is no data compatibility between sensors developed by different companies. Large data accumulation can be used only within each company. For example, each sensor reacts differently to the smell of an orange because of different digitization. What the reference data should be is an important issue for the unified data standard, which will lead to a future smell database.

—— That reminds us of the home VCR war between VHS and Beta.

Hattori: Currently, we have not reached the competition stage. No smell sensors are on the market. We are accumulating specific data and suggest solutions to our customers who have smell issues. Solving these issues together with the customers is an important step toward commercialization. Only when various competitors commercilize smell sensors and accumulate data in the cloud will a smell database become effective. And we will talk about the standardization of smell data to maintain compatibility.



▲ Sensing the Smell of an Orange

Combination of the reaction in 16 channels (smell sensors) providing a determination

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Visualizing smells rather than sensing

—— Are there any promising fields and products for smell generation technology?

Hattori: Combining with deodorant technology could expand their applications. For example, pre-registering an ideal air conditions for a room, and sensing the status of the air, and releasing an appropriate odorant and aroma to maintain a consistent smell.

A robot cleaner with a smell sensor could spray deodorant in locations where it detects foul odors.

Demand is expected in sharing services, which have been growing recently.

Hattori: There are various types of sharing services, such as car sharing and room sharing. And deodorant is an important factor in these businesses. Our smell visualization represents smells with numbers rather than words such as "good smell" or "bad smell." With objective evidence, we can demonstrate to the customer that a car or room has been deodorized.



▲ During development, they had to smell some bad odors!



Hattori: Smell visualization has drawn attention from companies selling perfume. They want to digitize their perfume offerings.

The same thing can be said for consumers. By registering a favorite smell as data, it will be possible to buy perfume online. Al could recommend products according to the customers favorite smells.

In the previous issue, I talked about monitoring heath by sensing body odor. A pet robot with such a function could sense the smell of its owner and say "You look a little tired today."

Smell generation products with vast potential

When a smell generation technology is completed, products generating smells could spread rapidly. Sharing smells with others could become possible. Smell generation and smell analysis are a pair of technologies that are expected to enhance smell sensor technology.

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