

Feature 1

F[ai]ND OUT Series Automated Inspection Using AI Technology



YUASA TRADING CO., LTD.

Yoshinori Tanimoto
Growing Strategy Division
New Business Development
Department

Naoshi Shindo
General Manager,
Food Tech Div.

connectome.design inc.

Akira Sato
CEO

Satoshi Otani
Director

In manufacturing settings, considerable effort is devoted to inspecting for scratches, cracks, chips, and other defects in finished products. The F[ai]ND OUT series of AI systems from connectome.design inc. (COD), a member of the YUASA TRADING Group specializing in AI development, was developed to automate product-by-product manual inspection, promote efficiency, and enable workforce reduction. Utilizing AI image recognition technology, these inspection devices are designed to be user-friendly and easily integrated into manufacturing lines. They are already in service in numerous settings, including metal parts manufacturing and food production. Participants in the development process shared insights into product features and future prospects.

connectome.design inc.

Head office:
MARUNOUCHI TRUST TOWER MAIN 20F, 1-8-3 Marunouchi,
Chiyoda-ku, Tokyo
Established: 2018
Representative: Akira Sato, President & CEO
Business fields: Manufacturing-related AI development and testing,
and related consulting services, etc.

When Automation Generates Extra Labor

Tanimoto (YUASA TRADING): Automated visual inspection using AI is not new. But conventional systems can only be trained with samples labeled defective. This means the system has to learn each defect pattern separately, whether it be cracks and chips or foreign objects such as hair. Training the AI involves considerable effort, with the paradoxical result that efforts to introduce automation actually add labor. We were determined to solve this problem. It all started when Mr. Akira Sato approached us and said, “I’ve been working on an idea. Would you be interested in collaborating?”

Sato (COD): As Mr. Tanimoto said, the conventional approach has been to train AIs on specific defects, one by one. But with advancements in image recognition technology, systems can be trained on a few examples of acceptable, or OK items. The system then identifies samples that deviate from the OK samples as defective or NG.

The basic features of current AI technologies are nearly identical. What matters is how instructions are tailored to match specific use cases, and how the training data is processed to make it easier to train the AI. No matter how advanced the AI’s capabilities, if these preliminary and follow-up processes are not handled correctly, the

system can’t realize its full potential. This was a key element in our development process.

Training an AI to Inspect in Five Minutes

Tanimoto: When I first tried F[ai]ND OUT, I was stunned by the precision of COD’s AI engine. It gave me goose bumps. When I heard the product was complete, I went immediately to the supermarket, bought some grilled fishcake, took photos, and trained the AI with OK examples. Naturally each sample differed in shape, degree of charring, even placement of embedded seaweed. Yet during inspection, the AI correctly identified all the samples as OK. When I placed a tiny scrap of plastic on one sample, the AI flagged it as NG. Seeing that level of accuracy after only five minutes or so of training convinced me. This technology is amazing.

Sato: Even if errors occur during the learning process, F[ai]ND OUT has a feature that allows for feedback on those mistakes. Once the criteria are established, they’re never forgotten, allowing consistent inspections with the same criteria.

Shindo (YUASA TRADING): One key advantage of AI-based inspection is that the criteria are highly consistent. The results of conventional inspection based on human judgment can vary by inspector, leading to inconsistencies and undermining product value. Moreover, with labor shortages and the likely decline in skilled inspectors, AI systems like F[ai]ND OUT that can consistently determine OK/NG thresholds are sure to appear more and more often on manufacturing lines.

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F[ai]ND OUT Series Automating Visual Inspection Processes

The Goal: User-Friendly AI

Tanimoto: We insisted on three criteria during this development. The first was unsupervised learning. That is, the system had to have the ability to learn from acceptable products. Number two, no monthly fees. And finally, a user-friendly interface.

Unsupervised learning speaks for itself. With the subscription model, from a business standpoint it certainly is ideal to generate recurring revenue through maintenance and support fees. But we believe strongly that a great product is meaningless if people don't use it. If charging monthly fees makes users hesitate to adopt, we'd rather eliminate that hurdle and make the technology as accessible as possible. That means no subscription fees.

Sato: When it came to the interface, the development team was totally committed to ease of use. Since the equipment is intended for everyday use by frontline workers, we couldn't make the training process too technical, such as requiring the workers to input prompts

into a command-line interface*. We spared no effort to deliver user-friendly operation, with training and feedback run from a convenient touch screen. As a result, from the outside the unit looks like an ordinary piece of factory equipment. You'd never guess that it incorporates AI. Our pursuit of user convenience became one more motivation to make everything about this product better.

Shindo: Because we refined the system to where frontline personnel could operate it easily, we received lots of praise from customers who told us the software was truly amazing after seeing it perform. But if performance and convenience alone were enough for adoption, our task would be simple. In practice, we get all kinds of suggestions when it comes to system integration, such as making the product more compact or adding functions that automatically remove NG items from the line. We strive to address each of these challenges, developing the product into a solution that truly resolves customer issues. And by maintaining this approach, we believe we can create a new market that no one else is serving.

The Market Is the Real Teacher

Otani (COD): The F[ai]ND OUT Series began development as a foreign-object inspection solution for beverages. Since then, its use has expanded into food and industrial products, and we have been working to enhance its inspection functions. But we believe plenty of scope remains to boost functionality.

By treating the market itself as a teacher, gathering feedback, and continuously updating versions, I think we'll be able to offer the product to more customers. To achieve this, we're looking for collaborations that leverage YUASA TRADING Group's frontline expertise and our software in conjunction with customers using a wide range of equipment on their factory lines.

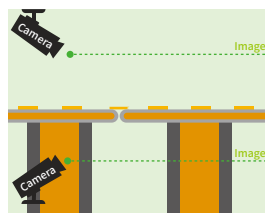
Sato: AI will be absolutely essential in future business. By planning with the strength of a united team and equipping ourselves with unmatched technology and value added, we will differentiate ourselves further and stand out from the competition.

Shindo: F[ai]ND OUT is the culmination of insights shared with us by manufacturing professionals. We will redouble our efforts to expand applications from the food sector to industrial fields and beyond while sharing information.

Explanation F[ai]ND OUT EX・EXW (AI visual inspection system)

Camera, lighting, and PC necessary for AI inspection in a single package

When integrated with a production line, the AI automatically detects foreign objects and surface abnormalities as products move along the line. The previous model, F[ai]ND OUT EX, could only carry out a unidirectional inspection at any one time. However, F[ai]ND OUT EXW features cameras installed both above and below the line, allowing simultaneous front and rear product inspection.



* An interface composed solely of text, used for tasks such as programming. It requires basic knowledge of software commands, which presents obstacles for IT novices.

