Staff Interview

vol.24 Development Department

SHIMA SEIKI received the "Institute of Invention and Innovation Chairman's Award" and the "Invention Implementation Achievement Award" at the 2024 National Commendation for Invention Awards, for the invention of a 3D knit simulator that accurately represents knitted fabrics based on design data. We had the opportunity to speak with our President Mr. Shima (recipient of the Invention Implementation Achievement Award) and Mr. Terai of the Development Department (recipient of the Institute of Invention and Innovation Chairman's Award).

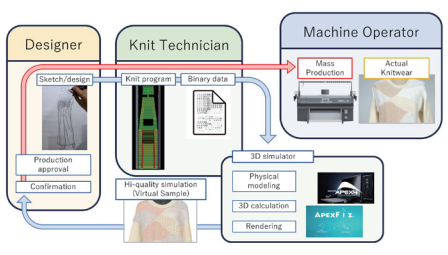
Profile

Mr. Mitsuhiro Shima
President

Mr. Terai
Development Department

Awards Ceremony

Production Workflow



Interview Scene

Q : What kind of work do you usually do?

A : Mr. Terai: I am involved in research and development related to design systems, as well as human resource development. I wish to pass on the experience I have gained so far to my juniors and to the next generation.

Q : Please tell us more about the invention that won the awards this time.

A : Mr. Terai: The invention is a technology that forms the core of the SDS®-ONE APEX series. Using knit programming, we can create simulated images that are so realistic they can be mistaken for actual samples. At SHIMA SEIKI, we call these "Virtual Samples," and they support the entire process of knit product development, from planning to production.

Q : It is said that the president made the decision to embark on this development. What initiated it?

A : Mr. Terai: There is an interesting development story with the president. At the time, Mr. Shima had just become the head of the Graphic System Development Department. We were developing software to easily create knitting programs for producing WHOLEGARMENT® knitwear. During development, Mr. Shima stated, "That's important, but even when samples are made and shown to designers, they often request design changes, and samples have to be knit over and over again. Let's eliminate this back-and-forth process by developing knit simulations to shorten lead times!" That was when our development direction was first announced. We had progressed with this development to the point where we could virtually reproduce the state of a knitted fabric placed gently on a surface. But suddenly, President Shima brought a Barbie doll dress-up kit and said without saying much else, "This is our next step!" and just left.

Mr. Shima: This Barbie doll kit was pretty neat. You start up the software, design the patterns yourself, print them out on sheets of fabric, cut them with scissors and dress up the Barbie doll. It allows 4- and 5-year-olds to design, cut, and dress by themselves. I thought, "This is it!" Our goal was already realized within the small world of Barbie dolls.

Mr. Terai: Thanks to Mr. Shima setting such a significant development direction for us, we were able to take bold steps on the way.

Q : Were there any difficulties or obstacles you faced during the development?

A : Mr. Terai: The software of the SDS®-ONE APEX series calculates and simulates each loop of the knit fabric in a 3D space on the computer to generate high-resolution CG images. If we calculate the loop shape for each stitch in the fabric, it would take forever to process that amount of data. We were constantly struggling with how to efficiently create high-quality virtual samples and what mathematical models would be optimal. Every day I would visit the knit sample stockroom and ponder while staring at knitted fabrics.

Mr. Shima: I often say, "Be foolish." To deal with this kind of foolish idea that had never been done before, you yourself must become foolish. Trying to process something so complex through programming was unheard of in the world of CG. But you see, because we broke through that barrier and turned the impossible into possible, SHIMA SEIKI was able to achieve a world's-first innovation.

Mr. Terai: When reproducing the fitting of clothing using conventional CG software, we map fabric images onto patterns and use illusionary techniques through CG processing to make it look real. However, with knits, this method has limitations because it results in an image that resembles someone wearing a garment printed with a knit pattern. On the other hand, with this invention, we have created a virtual knitting machine within the computer that can calculate the stability of each loop of the knit fabric in 3D space when worn. This ensures precision.

Once we established the processing method, we focused on higher processing speeds. At the time, SDS®-ONE APEX had four CPU cores for parallel processing, but that was still too slow.

Mr. Shima: It was a time before cloud computing existed, but we did consider sending processing tasks to high-performance servers on the internet. Additionally, companies like IBM, Sony, and Toshiba were developing their own microprocessor called Cell for home video game consoles like PlayStation 3. We even went to IBM to see their chip. Meanwhile, NVIDIA began proposing the use of GPUs (graphics processing units) embedded in graphics boards for purposes other than image processing. Eventually, we settled on GPU processing. Nowadays it's common to use GPUs for purposes other than image processing like AI training.

Q : What has changed with this groundbreaking invention?

A : Mr. Terai: The lead time from knit planning to production has definitely become shorter. Previously, there were multiple exchanges between designers and knit technicians in order to get the product right, and it took a lot of time and cost to complete a single product. By utilizing virtual samples, communication between designers and technicians has become smoother, the quality of the initial sample has improved significantly, and consequently products can be completed with minimal rework.

Mr. Shima: By replacing physical prototyping with virtual sampling in the initial stages of sample making, we have disrupted the knit planning workflow. Because we achieved something out of the ordinary, we received a lot of positive feedback from customers. This is grounds for "being foolish."

Q : What future direction do you envision for the development department?

A : Mr. Terai: We wish to continue creating things that other companies cannot make, as well as things that do not yest exist in the world, while contributing to the advancement of the industry and our customers. It's the spirit of our corporate slogan, "Ever Onward—limitless progress"!

Mr. Shima: I think it's important to always imagine things that people don't think about. Elon Musk isn't just making electric cars; he is providing an improved method of personal transportation. We need to have a broad perspective like that.

Ultimately, I imagine a world where every household has a knitting machine, materials can be bought at convenience stores, and robots knit personalized designs at home. Convenience stores would also have disposal boxes, and discarded yarn would be recycled into raw material again. It would be the ultimate in circular sustainability. I believe fashion should become more infrastructure-based, as the current apparel business model has its limitations. Mass production and waste have been long-standing issues, but if we establish an infrastructure where people wake up in the morning and make what they wear based on their mood for the day, concepts like leftover inventory would be eliminated.

Of course, we are actively working on finding immediate solutions that are beneficial to both people and the planet within the current business model. However, at the same time, I believe we must not forget about being foolish. Otherwise, life wouldn't be interesting.

Q : Thank you very much for your valuable time.

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