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RING FOR EVERY FINGER

A locally-developed, virtual-reality solution allows shoppers to "try on" hundreds of rings in minutes. Try-On is a clever, interactive, easy-to-use accessory for jewellery-shop operators that links a sophisticated 3-D scanner to a database of high-resolution images of rings. The relatively compact technology scans a customer's hand and displays the image on a high-definition touch-screen. The customer selects rings from the library to "slip" on to any finger of the scanned hand.

FOCUS POINTS INCLUDE:

Characteristics of Technology

- interdisciplinary practice

Characteristics of Technological outcomes

- customisation of final product

Technological modeling

- virtual reality

Technological systems

- integration of design and construction components

Brief development

- initial stakeholder consultation

Outcome development and evaluation

- developing an initial concept; manufacturing of final product

RING FOR EVERY FINGER

Fastidious jewellery shoppers weary of searching for the perfect ring will relish a locally-developed, virtual-reality solution that allows them to "try on" hundreds of rings in minutes – without so much as lifting a finger.

Try-On is a clever, interactive, easy-to-use accessory for jewellery-shop operators, and it's best described as a happy marriage between a sophisticated 3-D scanner and a database of high-resolution images of rings. The relatively compact technology scans a customer's hand and displays the image on a high-definition touch-screen. The customer selects rings from the library to "slip" on to any finger of the scanned hand.

Customers can not only fit a large number of rings to their scanned hand very quickly, but can manipulate the image, and view the hand and ring from every perspective. They can also modify aspects of any ring's design instantaneously. The benefits to the customer? Infinite flexibility in searching for the perfect ring, and the ability to see it on the hand immediately. The benefits to the jeweller? No need to carry thousands of dollars worth of slow-moving stock; the ability to offer the customer a more satisfying experience; and ultimately, a much greater likelihood of a sale.

Try-On is the brainchild of Auckland's Dale Mooney, a jeweller who developed the idea after years of frustration serving indecisive customers. A jewellery shop necessarily stocks a limited range and, inevitably, customers will like features from different rings. Typically, someone will like a ring, but want variations – platinum rather than gold, a thicker band, a sapphire rather than an emerald, or a different setting.

"No jeweller on earth can carry all of those variations, and the best we could offer was a physical sketch of the customer's ideas in a bid to crystallise his or her vision. Apart from the time issue – the sketch would often take days to create – it wasn't really satisfactory: the customer wants to see the ring on his or her hand, and that's perfectly understandable given they're about to invest a few thousand dollars on the item. So I figured there had to be a better way."

Development

Though a self-confessed computer illiterate, Mr Mooney instinctively knew where to look for a solution, and began researching scanning technology and 3-D imaging software. As there was no existing system anywhere in the world that did what he had in mind, he knew he'd be sailing into uncharted waters. In 2001 he established HGM Design Ltd (now defunct), and after months of experimentation developed a basic concept: a three-dimensional hand-scanning system, marrying the image with the database of rings, and allowing the customer to manipulate it and see the hand and ring from every angle.

He showed the concept to a number of potential investors, and managed to convince one that the system had promise. With that early funding, Mr Mooney recruited a team of software engineers and jewellery-modellers, and a prototype began to take shape. He eventually applied for and received additional funding from Technology New Zealand. He took the prototype to DeviceWorks, a wholly-owned Industrial Research Ltd subsidiary, to refine the hand-scanning facility.

DeviceWorks, says General Manager Jillian Laing, "takes concepts and early prototypes and engineers them to a marketable reality". Their mechanical, electrical, electronics and software engineers handle all aspects of design including CAD (Computer Aided Design), machine vision and embedded microprocessors. Typically they find, she says, that start-up companies' research and development is usually great, but they need a lot of work to get a product to market. People come to DeviceWorks with a concept, and they help to develop it.

In 2004 HGM Design, with its team of jewellery modellers and computer programmers, was invited to join the Auckland University of Technology's incubator for high-tech companies in Penrose, Auckland.

Fast-forward to October 2006, and the first commercially operating Try-On unit will open in new jewellery store, Select – The Ring Specialists, in Auckland's recently-opened Sylvia Park supermall.

The technology

The scanning unit comprises an array of optical and laser-scanning devices in a 360° configuration. The scanning process takes around 40 seconds.

So how does it work? The only "obvious" component of the system is the hand-scanning unit. Ms Laing says it comprises an array of optical and laser-scanning devices in a 360° configuration: "It is fairly specialised, as we had to precisely match hand-geometry with hand-texture. Precision synchronising of the scanning processes was crucial."

She says most conventional three-dimensional scanning systems capture images with a camera mounted on one side of a rotating turntable. "Clearly, we couldn't detach a customer's limb for this application, so we had to devise a different solution." DeviceWorks solved the problem by building a carriage on which the hand rests, and which moves through the circular array of scanning devices.

To allow the scanned hand-image to interface with the library of rings, two pieces of software were required. 3-D images of the rings are built by HGM Design Ltd's modellers. They use dedicated modelling software called Matrix 3D, which runs as a plug-in application on Rhino, a designer platform.

Two-dimensional images of the rings are provided by local and international designers. "We measure them up and reproduce them in 3D," says Jason Mobberley, one of the jewellery modellers. He explains that the database contains hundreds of designs, and the software means each ring can be modified "on-the-fly" to cater for customers' wishes. Each ring, he says, has around 800,000 variations, and can be manipulated to vary features such as the metal, stone, setting, band dimensions and detailing. "One of the biggest software obstacles we faced," adds Mr Mooney, "was the ability to 'morph' the images. When the customer wants to look at a variation of a ring, say a different thickness or a different metal, it helps if the transition between the two is seamless."

Ring manufacturing

What happens when customers eventually find a ring they like? "We manufacture it," says Mr Mooney. To do that, HGM Design makes a wax model of the ring, in preparation for casting. The company imported a multiple-axis computer numerical control wax milling machine – a Revo 540 – from Gemvision in the United States. The only one in the country, it creates an extremely accurate wax mould ready for casting. Previously, such milling would have been tackled by hand, which was much slower. Moulds are sent to a casting specialist (Regal Casting), and then to contract jewellers for finishing. HGM Design supplies all the gemstones.

Try-On allows customers to select a ring to fit their budget and aesthetic preferences. And if they don't find exactly what they're looking for in the existing designs, they can tweak those designs in infinite ways. It reassures them by showing how the chosen design will look on their own hands.

While Try-On is being rolled out on a franchise basis around New Zealand, Mr Mooney's prime focus will eventually be stores in the United States and Europe.

Once a design is finalised, HGM Design mills a wax ring. The milling is computer controlled and produces an extremely accurate mould ready for casting.

< GO BACK TO PAGE 1