

Turning moon boots into Cinderella's slipper: a breakthrough in MRI

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Do doctors need to fear being replaced by Artificial Intelligence (AI)? No, they do not. But they need to be aware that in the near future they will be replaced by doctors who use AI applications. The numbers speak for themselves: AI in healthcare has seen a significant rise over the last couple of years, especially in radiology.

The 2017 PwC DIQ Survey found that 39% of healthcare managers were planning to invest in AI, which indicates its rapid growth. When it comes to quick, accurate, and personalized diagnostics, AI algorithms and their ability to process big data in cloud-based environments provide the ideal support for medical experts.

Radiology serves as a good example of the benefits of big data analysis, as conclusions and subsequent clinical decisions can be made within seconds via access to large databases of CT and MRI images all around the world. AI applications have access to more data than any expert could ever learn. Furthermore, MRI images show patterns that the human eye cannot detect. This kind of data transparency helps identify rare diseases or uncommon variations of common diseases.

Naturally, the more doctors participate in cloud-based AI collaboration and digitize their data, the faster the development towards comprehensive databases will proceed, since algorithms need to be provided with validated data sequences that detail treatments and corresponding survival rates.

A quest for comfort in MR
For more than a decade, the patient experience has been at the forefront of product research and development at GE Healthcare. The initiative to humanize MR with the launch of the Caring MR Suite and apps like Silent Scan was clearly

focused on addressing one of the key limitations of MR imaging: patient discomfort and non-compliance due to claustrophobia, noise and bulky, heavy coils. Across the MR industry, there has been a concerted effort to make these coils more comfortable and flexible for patients so they conform to a variety of patient sizes and are easier for a technologist to lift and position.

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When a patient enters a Magnetic Resonance Imaging (MRI) scanner, technologists use something called a "RF coil" to capture and listen to the electro-magnetic waves coming from the part of the body the radiologists want to examine further. The coils act like an antenna picking up signals from a patient's body

and converting them to images. But they're usually heavy and uncomfortable for patients and technologists alike.

AIR Technology Coils are designed to conform to the human body just like a comfortable blanket. This is possible thanks to innovative conductor material designed for ultra-flexibility, and the fact that each coil is lightweight and flexible to closely wrap around patients for incredible image quality. Frazer Robb, Chief Technology Leader for MR Coils, says, "We started a project almost ten years ago with the goal of developing the ultimate blanket coil. We had looked at other concepts because we found traditional hard shell coils often severely restricting due to patient size. In the end we realized we can't beat physics. The coils have to be close to the patient to capture the electromagnetic radiation coming from the patient."

The new coil design is 60 percent lighter than conventional coils and conforms to a variety

of patient sizes – in fact, the 48-channel head coil is designed to fit 99.9 percent of patients, from prematurely born babies to professional American football linebackers. Its ultra-lightweight and flexible design makes it easier for the technologist to position the coil on the patient.

"The beauty about being able to wrap your anatomy is that where the coils overlap, they don't decouple. That's a pretty substantial technological advance," says Tom Schrack, ARMRIT, MRSO, Manager of MR Education and Technical Development at Fairfax Radiological Consultants in Fairfax, Virginia. Fairfax has been using AIR Coils on the SIGNA Architect MRI scanner. "You can literally wrap up your anatomy like a hot dog bun and not have to worry about it. That makes our life a lot easier and makes the scans go a lot quicker," says Schrack.

The new technology uses innovative conductor material designed for ultra-flexibility. "A radiologist once reacted to a traditional MR coil by saying 'I don't want Neil Armstrong's space boots, I want Cinderella's slipper!'," said Frazer Robb, PhD, and manager of MR RF Coils at GE Healthcare. "It was ironic as GE actually did design Neil Armstrong's space boots a long time ago. So we set out for Cinderella's slipper and we made our dreams and vision a reality with the AIR Coil."

