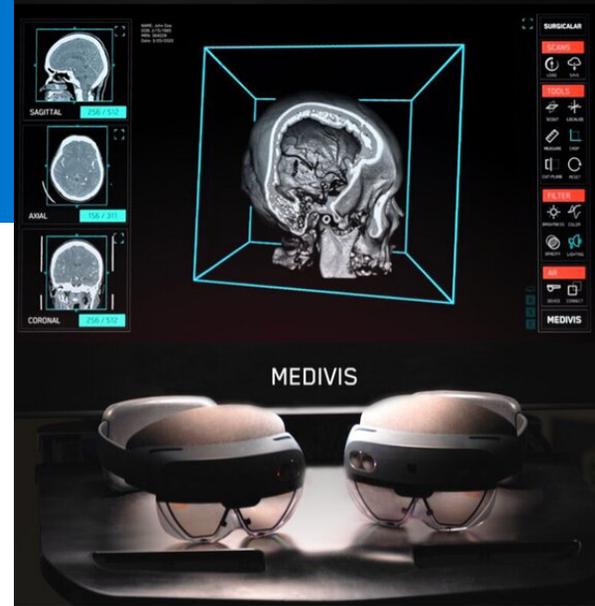# DELL Technologies

nVIDIA.

Building the future of computer-assisted surgery

New York-based company enriches surgical visualization with augmented reality and artificial intelligence.

MEDIVIS

Healthcare | United States

Business needs

Medivis needs the latest technologies available to harness the power of augmented reality and artificial intelligence in computer-assisted surgery.

Solutions at a glance

- Dell Precision 7750, 3640, 3240 workstations with NVIDIA Quadro RTX GPUs
- Microsoft© HoloLens™ 2 augmented reality headsets
- Dell EMC PowerEdge servers with NVIDIA GPUs
- Dell EMC data storage systems

Business results

- Advancing surgical visualization
- Improving surgical outcomes for patients
- Driving massive cost savings for medical institutions
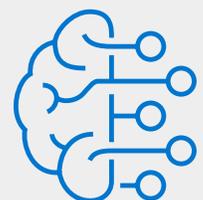- Building the future of computer-assisted surgery

In May 2019, Medivis announced that its SurgicalAR platform had received

FDA clearance
for clinical use

With 3D technology from Medivis, a holographic image enables

greater surgical precision

Bringing AR to life in the operating room

Medivis is building the future of computer-assisted surgery. The New York City-based medical technology company is harnessing augmented reality (AR) and artificial intelligence (AI) to build software designed to advance surgical visualization, improve surgical outcomes for patients, and drive incremental cost savings for medical institutions.

Medivis brings together doctors and engineers of all backgrounds from around the world to ensure that a comprehensive knowledge base backs up all projects the company undertakes. The company's in-house expertise encompasses neurosurgery, radiology, mixed-reality technology, graphics engineering, user-experience design, database architecture, web application development, 3D modeling and more.

Groundbreaking products

Medivis, which was launched in 2016, is more than a young company with a great vision. It's a young company with great products.

In 2019, the U.S. Food and Drug Administration granted 510(k) clearance for the groundbreaking Medivis AR technology platform for surgical applications, SurgicalAR. That cleared the way for the clinical use of the platform in the operating room.

The enterprise SurgicalAR platform integrates the latest advancements in augmented reality, artificial intelligence and computer vision to advance surgical planning. Leveraging the Microsoft HoloLens 2 AR headset, SurgicalAR enables physicians to visualize patient imaging holographically, allowing for superior precision and real-time decision making — in and out of the operating room.

SurgicalAR is designed to work in conjunction with a hospital's Picture Archiving and Communications System (PACS) — a huge server and storage system that stores all the medical imaging files that a hospital generates.

The AR/VR system on the frontend connects with the PACS system on the backend to enable a complete data processing and storage solution.

Creating an enhanced 3D view

SurgicalAR is realization of the vision of two physicians who founded Medivis, neurosurgeon Osamah Choudhry and radiologist Christopher Morley. The pair started laying the groundwork for SurgicalAR while they were senior residents at NYU Medical Center. Today, Dr. Choudhry serves as chief executive officer of Medivis and Dr. Morley holds the post of chief operating officer.

From the outset, Dr. Choudhry and Dr. Morley recognized the need for 3D technology that could improve surgical precision by giving surgeons a more complete and immersive view of imaging, as opposed to today's commonly used 2D imaging tools.

"The surgical world continues to primarily rely on two-dimensional imaging technology to understand and operate on incredibly complex patient pathology," Dr. Choudhry says. "It is viewed on monitors, and it is viewed like slices of data, such as CT or MRI data. But patients and their problems are three dimensional. And imaging is so dense now with data that it does not need to be visualized in just one format, cross-sectionally."

Dr. Choudhry explains that imaging can now be done using advanced visualization, where images are reconstructed in 3D views. Medivis takes this approach to a higher level, reconstructing images holographically in its SurgicalAR platform.

"Holographic visualization is the final frontier of medical imaging and surgical navigation," Dr. Choudhry says. "It gives the surgeon a complete, three-dimensional, immersive view of the imaging. That was the vision that we set our sights on when we launched Medivis."

D&LL Technologies

Powerful partnerships

Medivis's rapid rise to prominence in the world of surgical visualization has been fueled in part by powerful partnerships with world-class companies, including Dell Technologies, NVIDIA and others.

"The way we work is that we take our imaging and we reconstruct it using our software technology," Dr. Choudhry explains. "And because the reconstruction is very compute-intensive, we do it using a Dell Precision 7750 workstation with an NVIDIA Quadro RTX 5000 GPU. That system uses parallel processing capabilities that allow the holographic rendering to be created in real time."

Another big piece of the SurgicalAR solution is the Microsoft HoloLens 2 AR headset. HoloLens receives the data from the Dell Precision workstation and visualizes it in immersive 3D.

With the power of NVIDIA CUDA® cores and software APIs such as NVIDIA PhysX®, Flow, FleX, and CUDA, the NVIDIA RTX 6000 enables accurate modeling of the behavior of real-world objects from virtual environments.

Dr. Choudhry notes that partnerships with global companies have enabled Medivis to move its technology from the lab to the operating room in a relatively short timeframe.

"Working with partners like Dell Technologies, we can really scale out, because Dell has so much experience within the healthcare industry," he says. "Dell works with virtually every hospital in the country. So we are able to work with them to deliver the solution in a way that fits best in hospital workflows."

In another partnership, Medivis is working with the U.S. Department of Veterans Affairs, Microsoft and Verizon to deliver the VA's first advanced, 5G-enabled, clinical care system, which is being deployed at the VA Palo Alto Health Care System.

This initiative, called Project Convergence, is testing the use of AR to enhance patient care, with an eye toward possibly using the technology throughout the VA healthcare system.

"This is an incredibly exciting partnership," Dr. Choudry says. "It allows us to work with the VA healthcare system, which is the country's largest healthcare system, and use this technology to help our nation's veterans, who really deserve the best of technology in their care."

Looking ahead

As he looks to the months and years ahead, Dr. Choudhry sees exciting innovations on the horizon.

"This technology is only going to continue to advance," he says. "Right now, we have what is basically version one of augmented reality for surgery. The future is going to be more incredible. We want this technology to reach something that is able to handle that data, process it even faster in the future to come up with the most incredible visual capabilities."

In subsequent generations of the technology, photorealistic 3D images will be rendered in real time, using very advanced algorithms to simulate light and calculate what different shadows would look like within a scan. These algorithms will be powered by Dell Technologies AI-enabled computing systems that perform hundreds of millions of calculations in real time.

As he reflects on the ongoing Medivis journey, Dr. Choudhry is clearly excited about what is yet to come.

"It gives me goosebumps to think about what is going to be possible in the not too distant future with this technology," he says. "It is the best of all worlds, because we are working on exciting technology, and it is visual technology that really captures the public's imagination. But, at the same time, it can really be used to help patients. Obviously, I am biased, but I cannot think of a better problem and a better solution to work on."
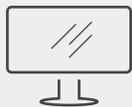
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Unlock the value of data with artificial intelligence

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