DELL Technologies

HEALTHCARE
GERMANY

Universitätsmedizin Essen
Universitätsklinikum

Clinicians and AI unite to extend compassionate patient care

Essen University Hospital builds a Dell AI Factory with NVIDIA, relieving the administrative burden for clinicians and allowing them to focus on patients in critical need.

Business needs

Essen University Hospital is at the forefront of the use of AI to improve healthcare delivery. The organization took the next step forward to enable research and innovation with GenAI solutions based on large language models and multimodal large language models.

Business results

- Reduces time spent on administrative tasks, allowing more time for patient care.
- Provides instantaneous translation of patients' and caregivers' communications into their native languages.
- Allows development of robots that can communicate with patients in a human-like manner.
- Enables more teams to perform simultaneous research projects on GenAI use cases.
- GenAI achieved a 50% reduction time in inferencing, allowing chatbots to deliver information more quickly.

Solutions at a glance

- Dell AI Factory with NVIDIA
- Dell PowerEdge XE-Series servers with NVIDIA H100 Tensor Core GPUs

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50% reduction time in inferencing.

Healthcare leader in AI innovation

Artificial intelligence (AI) holds immense promise in revolutionizing medicine, especially amid the global shortage of nursing staff. By recognizing complex correlations, patterns and causalities in vast amounts of data, AI enables more individualized patient treatment. Simultaneously, it alleviates the burden on hospital staff, creating opportunities for a more human-centered approach.

Essen University Hospital (UK Essen), positioned as a leading healthcare competence center in the Ruhr region, is a pioneer in AI research and its application. With 32 clinics and 24 interdisciplinary research institutes, UK Essen treats approximately 70,000 inpatients and 380,000 outpatients annually. Through its seamless integration of AI technologies across all hospital operations, UK Essen prioritizes efficient, safe and proactive management. With a strong patient-centric approach, the organization is well on its way to becoming a smart hospital.

To unlock AI's potential for patients, UK Essen established the Institute for Artificial Intelligence in Medicine (IKIM), where its AI factory resides. At IKIM, there is a team of around 120 data scientists, researchers and doctors. The IKIM team developed a smart hospital information platform that boasts over 1.7 billion data records, making it Europe's largest database of its kind. This wealth of electronic health information spans various hospital systems, facilitating cross-departmental diagnostics and enhancing patient care.

More time for high-quality patient interactions

"AI is an extremely powerful tool that provides answers to the numerous challenges in healthcare," explains Armin de Greiff, Technical Director of IT at Essen University Hospital. "That's why we are conducting intensive research into new AI solutions and are already using many of these tools in everyday clinical practice." The spectrum of AI applications at UK Essen ranges from imaging procedures and augmented reality glasses to Generative AI (GenAI) and humanoid robots for initial consultations with patients. Large language models (LLMs) help with the processing of medical information, for example, by translating medical jargon into understandable everyday language or generating structured and machine-readable data from recorded doctor-patient conversations.

UK Essen's cutting-edge robots are transforming patient interactions and care. These AI companions handle administrative tasks, streamline data collection and empower patients with information, freeing up clinical staff from paperwork.

Overcoming language barriers during critical care

UK Essen relies on GenAI to provide multi-language capabilities for robots and chatbots that help the hospital address talent shortages of medical professionals and allow patients to register, provide information and receive answers to questions in their native languages. Moon-Sung Kim, CTO of the Institute for Artificial Intelligence in Medicine, explains, "GenAI enables us to make robots and other digital systems respond in a more human-like manner and interact more naturally with people. Patients will accept such robots more easily."

Thanks to GenAI, UK Essen's workforce — currently a staff of over 10,000 from 86 countries who speak more than 60 languages — can serve a similarly diverse patient population with more effective communication. GenAI instantly translates a patient's or caregiver's statements and highlights them on a device screen in people's native languages. De Greiff says, "GenAI-powered translation services and chatbots help us overcome language barriers by summarizing statements in people's native languages, thereby saving lots of time currently spent waiting for translators." A specially developed app also supports medical professionals from abroad. The AI translates live and thus overcomes language barriers when writing doctors' letters.

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> **Moon-Sung Kim,**
> CTO, The Institute for Artificial Intelligence in Medicine

NVIDIA

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>
> **Armin de Greiff,**
> Technical Director of IT, Essen University Hospital

Kim adds, "GenAI gives clinicians more time to interact with patients and lets them focus better on urgent or difficult patient challenges."

Optimizing the AI factory to transform innovation into value

By combining the Dell AI infrastructure and the industry-leading GPUs from NVIDIA with comprehensive turnkey strategies and automated workflows, the Dell AI Factory with NVIDIA gives organizations confidence to securely develop and deploy GenAI at scale. The hospital strategically deploys Dell PowerEdge XE9680 servers equipped with NVIDIA H100 GPUs to fuel LLMs. Plus, with the addition of NVIDIA CUDA-X AI, the software enables researchers to build high-performance, GPU-accelerated applications for conversational AI. With patient data privacy in mind, UK Essen maintains an on-premises computing cluster for LLMs. De Greiff says, "Dell PowerEdge servers with NVIDIA GPUs provide the ideal balance of reliability, performance and sustainability. Our long-term experience with Dell Technologies made this the first choice, especially as we could deploy securely on premises."

Kim adds, "We want the most powerful NVIDIA GPUs available in the PowerEdge XE9680 servers because of the complexity of our GenAI scenarios, where we train and use LLMs and multimodal LLMs that incorporate images, documents and language processing."

De Greiff concludes, "Dell Technologies delivers top performance and allows us to explore the possibilities of AI in all its facets. The research we do would not be possible without a partner like Dell Technologies." Since deploying Dell PowerEdge XE9680 servers with NVIDIA GPUs, UK Essen has achieved significant efficiency gains, reducing the time to perform GenAI tasks by 50%. Balancing AI assistance and clinician expertise, UK Essen prioritizes compassionate, personalized patient care.

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