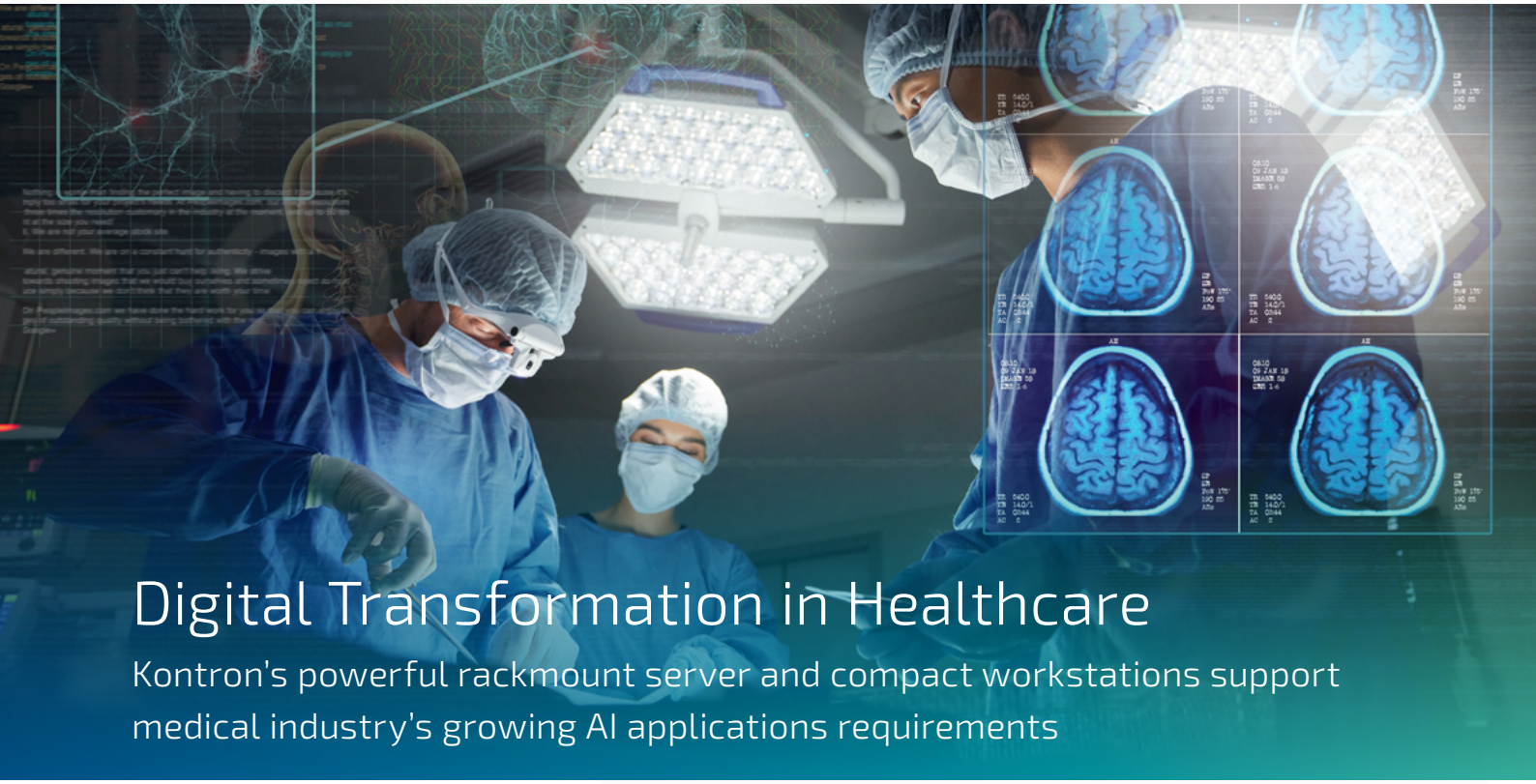

Digital Transformation in Healthcare

Kontron's powerful rackmount server and compact workstations support medical industry's growing AI applications requirements

The healthcare market is changing rapidly. Driven by the unprecedented connectivity and scalability of the Internet of Things (IoT), the possibilities are moving well beyond relatively straightforward data collection to enabling real-time, intelligent applications, adding practical value to patient care while also reducing costs. Mining and analysing big data far faster and more efficiently than before is bringing great advances, from timely diagnosis of diseases and treatment advice, to drug discovery.

Key to all of this is Artificial Intelligence (AI). Its potential in medicine is now considerable and already making an impact on traditional medical imaging techniques when it comes to data analysis and computer-aided diagnostics. It has the potential to touch almost everything, from tomography (MRT, CRT) systems to ultrasound and diagnostic devices, as well as mobile and ultra-mobile devices for use in diagnostics and care.

A major advantage compared to the human approach, the AI algorithms used in diagnostics can achieve results in a fraction of a second rather than hours or days, and shared very cost-effectively - anywhere in the world. Many areas of medicine including radiology, cardiology and orthopaedics can potentially benefit. In radiology, for example, x-ray images can be stored in ways that aid more precise and rapid diagnoses. With the help of AI, the error rate of diagnoses can also be significantly reduced, for example, in identifying skin and breast cancer.

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The Power of IoT

AI applications in healthcare

Currently, the most popular AI techniques applied are machine learning and deep learning which use neuronal networks to analyse data sets and learn from it to make specific predictions about patient healthcare concerning various medical conditions such as different types of cancer, kidney disease, cardio-vascular, and dementia. Deep learning, especially, has a kind of 'sixth sense' that can make predictions from discovery of data patterns that human's might overlook. What is known as Predictive Analytics & Therapy is therefore already on the rise thanks to the use of powerful, sophisticated and some cases, self-learning algorithms. However, it doesn't stop there. AI is in use also in healthcare infrastructure for capturing, analysing, storing and sharing data. Education and research is a further beneficiary.

But this is just the beginning. Increasingly sophisticated AI systems will involve the combination of multiple data sources including CT, MRI, genomics and proteomics, patient data - even handwritten files - to evaluate the presence of a disease and its treatment, even prevention. The more medical data becomes available for analysis and unification, the better AI will become at supporting medical professionals when undertaking complex analytical tasks.

It will also enable patients to receive medical advice via mobile applications at home. With the almost infinite numbers of variables involved, machine learning will deliver the powerful, high speed analytics necessary, presenting data and characteristics to show how well a patient is likely to respond using a particular type of treatment.

AI for growth and efficiency

Also with regard to economic efficiency in the medical profession AI-enabled developments are welcome, not least due to increasing budget pressures, lack of time available, and ongoing skills shortages. Market forecasts appear to support this optimism: In a global analysis, analysts at Global Data predict that the AI market in diagnostic imaging alone will reach 1.2 billion US dollars by 2027; robot-assisted surgical systems are expected to grow by 15.7 percent annually to 7.2 billion US dollars by 2033 with AI. PWC market research has shown potential AI-enabled cost savings within ten years, predicting billions of euros savings in areas such as child obesity through more efficient analysis of typical risk factors; dementia by earlier and more accurate warning signs; and breast cancer through faster, more accurate findings.

High requirements for medical systems

The overall requirements for planning and implementing medical systems are extensive and often arduous. There are significant challenges involved when considering the capital, personnel, and organizational issues. Furthermore, the need for real-time image processing of continuously growing mountains of data is creating significant design implications for developers.

Typical AI systems developer project requirements:

- Real-time parallel processing
- Powerful GPU graphics acceleration
- Easy server configuration and scalability
- Continuous 24/7 systems availability
- Security
- Server durability
- Long term availability
- Low server noise emission

It is perhaps not so surprising that the demands of AI software magnifies hardware systems requirements more than ever when it comes to available processing power, GPU performance and scalability. The medical sector also demands the highest security and reliability standards from computer systems, for compliance and certification purposes. In addition, long term availability to maximise return on investment, and low noise emissions bearing in mind the typical environments concerned. Robust hardware design is also an intrinsic part of ensuring high performance and reliability for medical systems.

With scalability and real-time capability absolute prerequisites, the quest to deliver substantially more processing performance more cost-effectively is resulting in a new generation of powerful server platforms. These are typically equipped with the latest multicore CPUs for enabling the massive parallel processing performance required in medical imaging and AI-supported diagnostics. Another important aspect is the parallelization on GPUs of AI-enabled medical systems. Here, the acceleration of deep learning algorithms on the industry-leading GPUs was an important milestone. Deep learning, for example, now benefits greatly from being ported to run on programmable graphics processing units (GPUs), reducing the neural network system learning time from weeks to a matter of hours. In turn, this has facilitated increasingly sophisticated neural networks with powerful image classification and speech recognition capabilities.

Powerful and reliable rackmount server solution for AI in healthcare

Responding to the compute challenges and massive potential of AI in healthcare, Kontron has equipped its powerful KISS rackmount servers with the latest Intel® Core™ i processors of the 13th generation with up to 24 cores which enable compute-intensive real-time processes for analyzing large amounts of data.

The robust high-performance KISS rackmount servers in an industrial grade design are ideal for demanding medical applications thanks to their performance and reliability as well as the 'low noise design' (noise development during operation <= 35 dBA). Efficient cooling concepts, maintenance-free and customizable design, High Performance Computing (HPC) and high graphics performance predestine the rackmount systems for continuous and long-term use. The optional use of removable drives and various expansion cards as well as different height units in 1U, 2U and 4U and short versions enable the greatest possible customization and flexibility even where space is limited.

The KISS servers are particularly suitable for demanding applications such as high-end image processing, AI and machine learning. Crucially, it can be used for 24/7 operation at consistently low noise levels (<= 35dBA), demonstrating its reliability and qualifying it for operation in noise-sensitive areas in close proximity to people, i.e. patients. Long term availability and high security are guaranteed. The consistent use of components with long-term availability (5+ years) ensures systems are well-suited to meeting the medical industry's needs for longevity.

Kontron KISS Rackmount Series

- High computing power with 12th/13th Gen Intel® Core™ i9/i7/i5/i3 processors
- High data throughput with up to three GbE ports (2x 2.5 GB LAN; 1x GB LAN)
- High connectivity with up to 7 external USB-ports incl. USB-C
- Up to 4 DIMM sockets with up to 128 GB and optional ECC
- Additional internal and hot-swappable external storage media, RAID support
- Low noise design: <= 35 dBA
- Modular system concept for simple and fast adaptation
- High security and reliability
- Long-term availability (5+ years)

Compact high-performance workstation KWS 3000-ADL for AI workflows and graphics-hungry applications

The extremely compact KWS 3000-ADL workstation combines the advantages of an industrial PC in terms of robustness and long-term availability with those of an office PC in terms of design and user-friendliness. It effortlessly handles AI applications in medical applications such as machine learning with large amounts of data or AI workflows in performance-hungry processes thanks to 13th generation Intel® Core™ i processors with up to 24 cores and powerful GPUs, such as high-performance Intel® ARC™ GPUs and graphics cards, which can be freely selected as add-on cards. The flexible, modular design allows easy adaptation to customer-specific requirements.

The KWS 3000-ADL workstation can be individually configured; several front versions are available, up to four 3.5-inch drive bays can be equipped with either hot swappable or internal drives, and a slim DVD can also be operated.

Kontron Workstation KWS 3000-ADL

- Powerful workstation with 13th Gen Intel® Core™ i processors for machine learning, AI workflows and graphics-hungry applications
- Industrial-grade: shock and vibration-resistant, 24/7 use, long-term availability
- Freely selectable graphics cards and GPUs (e.g. Intel® ARC™ GPUs)
- Easy Customization
- Compact format: 380 x 190 x 380 mm (H x W x D)

Partner with expertise

Over the years, Kontron's rackmount server systems, workstations, PCs and embedded modules have proved popular choices among medical systems OEMs. As an experienced partner, Kontron offers application ready platforms and value added services for helping customers create sustainable and viable medical solutions. The company's products are found throughout the medical industry for enabling diagnostics, therapy, patient monitoring, home healthcare as well as clinical IT.

About Kontron

Kontron AG is a leading IoT technology company. For more than 20 years, Kontron has been supporting companies from a wide range of industries to achieve their business goals with intelligent solutions. From automated industrial operations, smarter and safer transport to advanced communications, connectivity, medical, and energy solutions, the company delivers technologies that add value for its customers. With the acquisition of Katek SE in early 2024, Kontron significantly strengthens its portfolio with the new GreenTec division, focusing on solar energy and eMobility, and grows to around 8,000 employees in over 20 countries worldwide. Kontron is listed on the SDAX® and TecDAX® of the German Stock Exchange.

For more information, please visit: **www.kontron.com**

About the Intel® Partner Alliance

From modular components to market-ready systems, Intel and the over 1,000+ global member companies of the Intel® Partner Alliance provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics. Close collaboration with Intel and each other enables Alliance members to innovate with the latest IoT technologies, helping developers deliver first-in-market solutions.

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