

AI Joins with Embedded to Create Medical AI

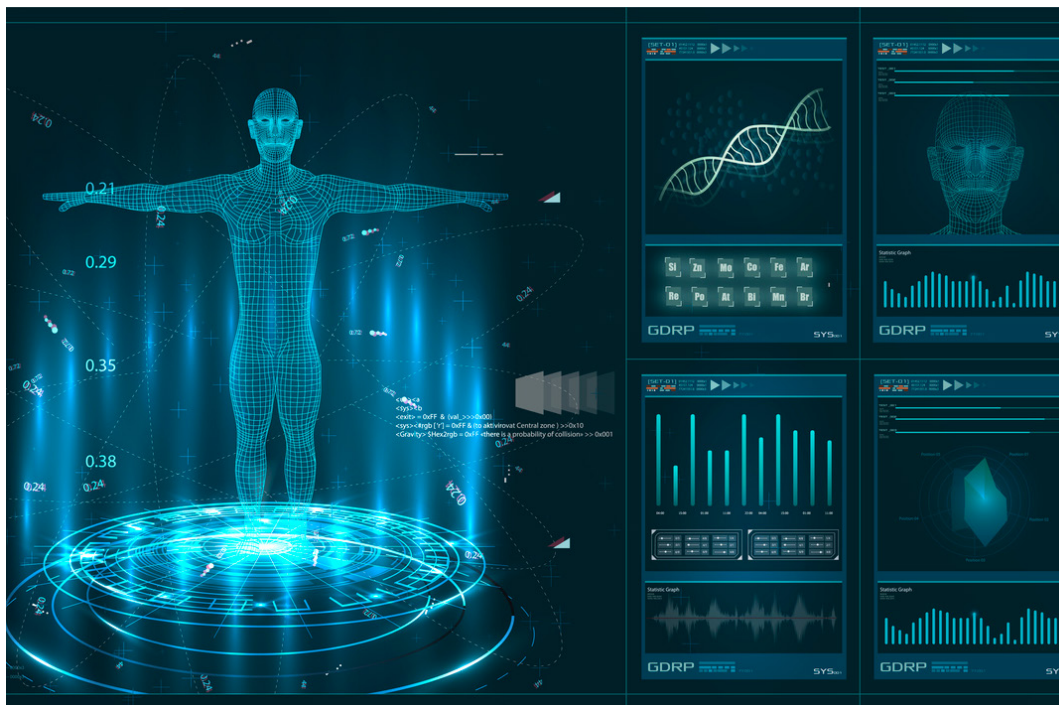
CASE STUDY

According to a paper in the Journal of Healthcare Engineering, “Medical artificial intelligence (Medical AI) uses computer techniques to perform clinical diagnoses and suggest treatments. AI has the capability of detecting meaningful relationships in a dataset and has been widely used in many clinical situations to diagnose, treat, and predict the results.”

We are seeing an increase in the use of AI for medical/healthcare applications. There are many advantages that can be realized through the use of Medical AI. In its most basic form, it simplifies the lives of patients, doctors, and hospital administrators by performing tasks that are typically done by humans. And those tasks are carried out significantly faster and for a fraction of the cost.

Today, there are real examples of Medical AI being used to:

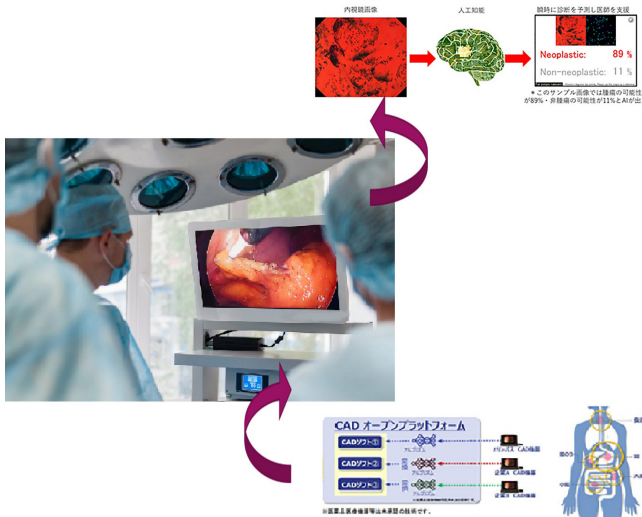
- Detect and diagnose cancer
- Diagnose and treat illnesses based on patient symptoms
- Diagnose blood diseases
- Analyze radiology imaging scans
- Develop new medicines
- Treat rare diseases
- Process clinical trial predictions



AI is making significant inroads in the medical space. The latest embedded systems are opening doors that didn't even exist previously, vastly improving quality of life. (Image source: Lucidworks)

The Need Is Obvious

It is clear that Medical AI is solving a serious problem in the medical/healthcare arena. Patients need better and faster care, doctors need techniques that are trustworthy, and hospitals and administrators need tools that are cost effective. Medical AI can answer all of these needs.



Wincomm's WMP-K series of embedded computers serves as the processing engine for the EndoBRAIN diagnostic system, which assists a physician during a colonoscopy. (Source: Wincomm)

To make such a technology operate properly, different disciplines must work together. For example, the medical specialists must work closely with the embedded technology experts to develop the proper solution, especially when human lives are at stake. One such case is where the engineers at Wincomm worked closely with the team at CYBERNET SYSTEMS CO., LTD. to develop the EndoBRAIN® and EndoBRAIN-EYE® tools that deploy AI to detect and analyze colorectal polyps and other lesions in an endoscopy.

EndoBRAIN® is the endoscopic microscope used to photograph the inside of the patient's large intestine, as well as the artificial intelligence software that determines the presence of colorectal cancer using image analysis technology. After "learning" with 60,000 medical records, the tool's sensitivity rate is 96.9% and its accuracy is 98%, which is comparable to senior

specialists. Using artificial intelligence to automatically judge the key parts of the image enlargement, the diagnosis is brief, thereby reducing patient discomfort and reducing the burden placed on the hospital staff in terms of scheduling and training.

That hardware-software combination is deployed on Wincomm's WMP-K series of panel PCs. The system was recently approved for use by the PMDA (Pharmaceuticals and Medical Devices Agency), a regulatory body in Japan.

That's just one example of how Wincomm's technology can be deployed in this burgeoning application. To make such a technology operate properly, it was imperative that the medical authorities worked closely with the embedded technology professionals to develop the proper solution. That coordination is happening quite often these days, as the medical industry understands the advances that can be made through such a cooperation.



The Wincomm WMP-19K is an example of a panel PC that's aimed at medical applications. Designed with Intel's 9th Generation Core i7 CPU, it's up to the task of embedded AI. (Source: Wincomm)

The Solutions Are Here

While the AI technology is not new, in fact it's been around for decades in some instances, there's been a recent surge of microprocessors and algorithms that are designed specifically for AI in medical applications. Those CPUs are deployed in Wincomm Corp.'s AI-powered medical panel PCs (the WMP-19K/22K/24K). The platform is designed with Intel's 9th Generation Coffee Lake processor family and a touch panel that ranges in size from 19 to 24 in. The high-end CPU choice permits much higher performance when compared to conventional medical-grade platforms.

The WMP-K series touch panel PCs, which are highly flexible and configurable, have received the latest medical certifications, meaning that they are ready for deployment in a hospital or other clinical setting. The panel PCs are designed with an independent GTX-1060 graphic card with 6 Gbytes of dedicated video memory (and powered by an Nvidia Pascal GPU), and a PCIe expansion slot, features that are needed to handle complex imaging and AI applications.

Ready for Hospital Use

The WMP-K series takes advantage of the same anti-bacterial housing as earlier products in the WMP family. Both the housing and the touch panel are effective measures to guard against MRSA (staph) infection. Further ensuring patients' safety is the optional inclusion of a 4-kV isolation COM/LAN/USB module, which can help avoid expensive equipment damage from signal and voltage feedback loops.

Simple operation and cleaning are accomplished thanks to the platform's anti-microbial P-cap touch with frozen screen hot key design.

The model WMP-19K, which received PMDA approval, is being employed as the back end of endoscopic systems in hospitals around the world. In addition to handling colorectal diagnostics, it provides the horsepower to handle other medical AI applications, such as bronchoscopy detection, and lung vision investigation.

While not specifically stated, it's well known that systems designed for use in a hospital setting must meet the following criteria:

- Anti-microbial surfaces
- Fast boot time
- PCIe expansion slot for an AI module or video capture card
- 20 to 50 minutes of battery power
- Four to six USB slots

The WMP-K series meets or exceeds all of these criteria, making it an obvious choice for this sensitive application. Further, the sleek 3.3-in. thick medical panel PCs save even more space by allowing for direct attachment to operating room walls. Conversely, the small size allows it to be used on a powered medical cart so it can be moved to a patient's room, an operating room, or a lab.

Summary

As discussed here, medical/healthcare is one AI-related application with a huge upside. The ability to plan, learn, reason, problem solve, and manipulate extraordinary amounts of data in real time with no human interaction solves a multitude of problems, many of them stemming from human error. The key to AI is its ability to learn on the fly and make decisions in real time, far faster than can be accomplished by a human. The bottom line is that AI is a boon to the medical/healthcare industry. Your concerns about the back-end are now taken care of, thanks to Wincomm.



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