Enabling a New Era of Digital Pathology with the MetaLite Digital Pathology Edge Solution from JelloX Biotech, Inc.

MetaLite harnesses the power of Intel® Processors and the Intel® Distribution of OpenVINO™ toolkit to empower providers to improve patient preventative care through intelligent analytics and imaging.

About The Company

JelloX Biotech Inc. is a university-based startup company founded by a research team from National Tsing Hua University and a world-leading expert of 3D pathology. With innovative digital imaging technology and an AI analysis platform, JelloX provides the world's first 3D digital pathology solution in support of precision cancer diagnosis, optimizing patient treatment outcomes, and matching patients with the right prescriptions at the right times. With their AI software advantage, JelloX built the first and the largest 3D pathology database for making accurate predictions.

JelloX has earned multiple awards from the Taiwanese Ministry of Science and Technology and the Taiwanese Ministry of Economic Affairs.

High Barriers to Entry Inhibit Digital Pathology From Reaching Its Potential With AI

Digital Pathology is revolutionizing the way physicians and researchers examine and diagnose patients. Testing a patient's tissue sample and delivering accurate diagnoses used to be a time-consuming process that utilized glass slide samples that required manual shipping and multiple lab analyses. Instead of slide samples that need to be analyzed by microscope, correctly stored, and carefully transported, digital pathology uses whole slide image scanners to digitize glass slides that can be analyzed with readily available image viewers, like computer monitors. This process enables game-changing advancements in efficiency, such as providing the ability to consult with other pathologists in geographically diverse locations almost instantaneously rather than waiting the days or weeks it would take to pack, ship, and analyze the sensitive material with a typical glass sample.

When coupled with artificial intelligence (AI), digital pathology offers even greater promise for healthcare providers. AI-based digital pathology has the potential to dramatically improve healthcare by augmenting pathologist decision-making, fostering enhanced collaboration, accelerating analysis and diagnosis, and improving accuracy of diagnoses.

This technology is evolving at a time when pathology providers are experiencing pressure to do more with less:

- A key pathology application is cancer identification and experts forecast a 49% increase in US cancer rates by 2050.[1]

- One in three adults have multiple chronic conditions that require pathology expertise to identify and monitor.[2]

- A 15 million person healthcare worker shortage is predicted by 2030.[3]

Unfortunately, adopting AI-powered digital pathology solutions is out of reach for many healthcare organizations. A recent survey found that health care professionals' main concerns with AI were the cost of the technologies (36%), integrating AI into the organization (30%), and implementation concerns including AI risks and data issues (28%).[4]

- **Cost of the technologies:** In the digital pathology industry, there is a high cost barrier to entry for building and using AI systems due to the sizeable medical image data and hardware required. To train large quantities of data or enable sufficient inferencing speed of AI models, expensive GPU devices are needed, an investment that many healthcare organizations cannot afford.

- **Complex integration:** Hospital IT infrastructure consists of various underlying architectures, host operating systems, and network capabilities that can make it difficult to integrate new AI solutions. For example, AI platform integration usually requires a separate Wi-Fi solution and in-depth collaboration with IT teams. This can be both time and labor intensive and can even require new IT staff come onboard with the necessary expertise to execute the project.

- **Risks and data issues:** Whole slide images can produce files as large as 80 GB when uncompressed. Storing and transferring data over slow or disparate networks can take significant time and bandwidth, reducing efficiency and increasing costs.

JelloX Biotech Inc.'s MetaLite Digital Pathology Edge Solution is the first of its kind to avoid using GPUs and prioritize a headache-less integration process. By using CPUs and customers' existing servers, the cost-effective digital pathology AI solution enables healthcare organizations to implement AI in a way that works for them.

Solution Overview

MetaLite is a high-quality device management system that provides actionable insights into both medical operations and research. It offers healthcare providers the means to view, annotate, and analyze digital pathology images and develop their own AI models. In a research setting, it accelerates discoveries with its capabilities to gain a wide range of insights from large quantities of data.

As a Picture Archiving and Communications System, MetaLite can be integrated with many Radiology Information Systems or Hospital Information Systems, to provide practitioners with a scalable, AI-enabled imaging and digital pathology platform. Equipped with high-quality scanners and servers, along with the Intel® NUC to connect to additional devices, the solution provides actionable insights, and the AI interface allows for customization through the AI-auxiliary annotation function and other programmable protocols.

MetaLite Key Customer Benefits

Enhance Patient Care

Seeing a provider for a major health issue is never fun. MetaLite improves the care experience and research quality with a system that provides real-time data to help analyze patient conditions and augment decision making. When patients don't have to wait long for a diagnosis, they avoid unnecessary anxiety, start treatment faster, and ultimately heal faster. That efficiency coupled with a more accurate diagnosis means a greater chance for the patient to have a positive healthcare experience.

Overcome High-Cost Barriers to Entry

Healthcare organizations can save money with a low TCO solution that operates without GPUs and is easily scalable with edge hardware. At a time with providers are being asked to do more with less, MetaLite can give a healthcare organization's budget some breathing room while investing in AI. This means that digital pathology AI will be accessible to more healthcare organizations and enable greater benefits for both physicians and patients.

Improve Physician Workflow

Metalite empowers pathologists, practitioners, and researchers with tools that minimize guesswork, streamline results, and give experts time back to pursue other tasks such as research or patient care. User-friendly tools make it easier for doctors to analyze and diagnose samples quickly, efficiently, and more accurately.

Improve Education and Drive Research

MetaLite's platform creates opportunities for medical students to learn diagnosis and practice building out their own digital pathology AI software. The possibilities are endless for what medical students and researchers can achieve with a solution that lets them use large amounts of data and create models to solve healthcare's pressing issues.
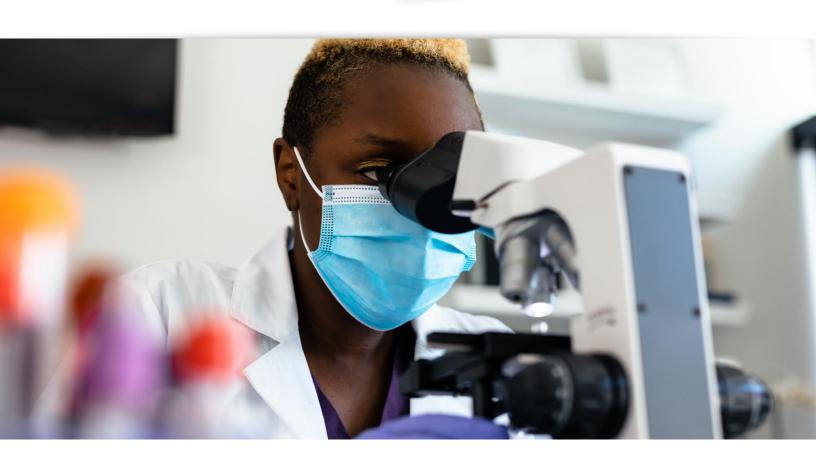
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How It Works

The JelloX MetaLite Digital Pathology Edge Solution is a GPU-less complete imaging and data analysis platform including Intel® NUCs, servers, scanners, and an AI platform. For a seamless and effective integration, JelloX engineers work with customers' system integrators to plan for each customer's unique situation. This process includes creating security protocols that are managed by an institution's PACS/HIS architecture and integrating with the customer's intranet. After integration, the solution is functional. Data is captured through the scanner and device interfaces and routed to the MetaLite platform, where it can be managed by users and analyzed by the AI diagnostics platform. To ensure sensitive medical data and privacy, all captured data is processed and stored in an on-premise server. Additionally, JelloX has established an ISO 13485 compliant quality management system and manages a customer support model that quickly addresses customer inquiries and technical issues.

MetaLite Enables Same-day Prostate Cancer Screening Results

Waiting for cancer screening results to come in can have negative impacts on both patient mental and physical health. Many patients experience significant stress and anxiety while waiting days or even weeks for results that could alter the course of their life. From a physical perspective, those days or weeks of delay could be the difference between an effective treatment and a treatment that came too late.

Seeing the need, JelloX Biotech Inc. created a MetaLite AI model for rapid screening of prostate cancer using high-resolution two-dimensional and three-dimensional images. The method, termed Prostate Rapid Optical Examination for Cancer Status (proSTAT) is made possible by the MetaLite AI platform. This approach can both decrease variation in diagnoses due to different observers and decrease the time it takes to confirm a diagnosis to 24 hours or less.

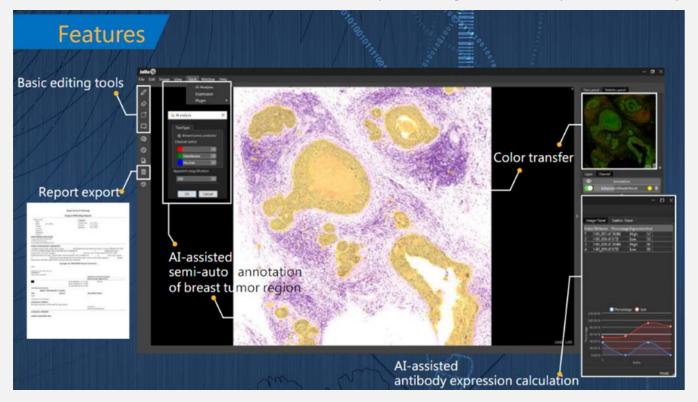Link to research in the Journal of Histochemistry and Cytochemistry

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Key Features

- Reduces AI inferencing time and time to diagnosis
- Provides a cost-effective option as the solution does not require a GPU to operate
- Operates as a stand-alone or server-connected flexible application and easily integrates with existing server architecture and multiple commercial image scanners
- Supports various WSI file formats and cross-platform analysis
- Enhances advanced data insights and analysis through AI-assisted feature recognition functions and other AI models, deployed in servers or at the edge, including pattern recognition, area analysis, and combinatorial calculation
- Provides nuclear and volume-based staining for 3D observation and analysis of protein expression and localization in tissues or cells, including tissue morphology, cell type, and alteration
- Scales easily with new and existing devices, locations, and networks
- Includes user-friendly annotation tools for simpler image analysis (See Image on next page)

The image below shows the MetaLite AI Platform's user-friendly interface. The platform enables tumor recognition, immune scoring, invasive detection, and biomarker scoring. Identified are its annotation tools for editing, exporting, semi-auto annotation, color transfer, and AI-assisted antibody expression calculation. These tools make it easier for doctors to analyze and diagnose efficiently and consistently.
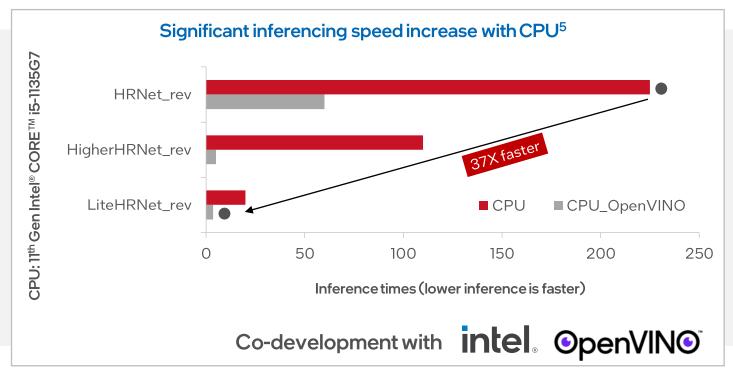
Intel Solution Components

Intel® Core™ and Xeon® Processors: The use of Intel® Core™ and Xeon® processors helps enable faster inferencing and increased performance. MetaLite is built on Intel CPUs and designed in collaboration with Intel engineers. Depending on customer needs, MetaLite can include an Intel® Core™ Processor or an Intel® Xeon® Processor for higher compute requirements. Intel® hardware enables JelloX to provide the performance needed with enhanced storage capabilities while maintaining affordable pricing.

Intel® Distribution of OpenVINO™ Toolkit: By using Intel® Distribution of OpenVINO™ toolkit, the AI models in use can be supported on multiple types of hardware. The toolkit allows developers to convert their AI models trained on familiar frameworks such as TensorFlow and PyTorch to an intermediate representation that executes efficiently across multiple processor architectures to quickly build, optimize, and scale deep learning and visual inference applications.

The Intel® Distribution of OpenVINO™ toolkit can help simplify the move from traditional to digital pathology as developers can start with pretrained models for inferencing on general-purpose Intel processors. The toolkit also supports multidevice inferencing using industry-standard APIs, giving solution providers more flexibility in setting up their configurations.

Intel® NUC 11: The Intel ® NUC 11 provides high-level performance in a small form— taking up significantly less space than a typical PC. This means easier set up and more time for customers to think about how the solution will work instead of where they will house it. By using an Intel® NUC 11, JelloX can customize the PC experience for digital pathology in a way that prioritizes quality, performance, and long-term reliability.

Significant inferencing speed increase with CPU[5]

CPU: 11th Gen Intel® CORE™ i5-1135G7

Inference times (lower inference is faster)

37X faster

■ CPU ■ CPU_OpenVINO

Co-development with **intel.** **OpenVINO™**

5. Data from internal test results of JelloX. Intel does not control or audit third-party data. Please review the content, consult other sources, and independently confirm if the data provided is accurate.

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MetaLite solution provides an intuitive and easy to use interface. It is a suitable tool whether for clinical research image annotation or bridging medical students to digital pathology. The multi-dimensional interface of MetaLite allow pathologists to analyze tissue slices more carefully, helping to improve the quality of patient care.

– Doctor currently using MetaLite

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Learn More

[MetaLite brief Introduction – YouTube VideoLink](#)

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[JelloX Company Website](#)

[Intel® Core™ i5 Product Page](#)

[Intel® NUC 11 Product Page](#)

[Intel® Xeon® Processors Product Page](#)

[Intel® Distribution of OpenVINO™ Toolkit Product Page](#)

In Summary

JelloX is enabling the next generation of digital pathology solutions and empowering doctors to improve patient care, experiences, and outcomes. Designed to meet the demand for accurate and reliable data, MetaLite's cost-effective solution ensures that medical professionals have the best medical imaging tools at their disposal.

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Sources

[1][Cancer Incidence Projections in the United States Between 2015 and 2050](#), Center for Disease Control and Prevention, 2021

[2] [Prevalence of Multiple Chronic Conditions Among US Adults](#), Center for Disease Control and Prevention, 2020

[3] [Global Health Workforce Labor Market Projections for 2030](#), World Bank Group Open Knowledge Repository, 2022

[4] [Smart use of artificial intelligence in health care](#), Deloitte Insights, 2020

[5.] Data from internal test results of JelloX. Intel does not control or audit third-party data. Please review the content, consult other sources, and independently confirm if the data provided is accurate.

Notices & disclaimers

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