

Next Generation of AI-Enhanced Ultrasound Productivity

The new Aplio i-series / Prism Edition offers a whole new level of diagnostic precision and imaging capability for ultrasound and features a whole spectrum of flexible, AI-assisted productivity functions powered by Altivity, Canon's new AI brand. Clinicians from across the world are discovering the difference this advanced new system is making to their clinical practice by streamlining workflows, delivering fast and accurate results, and enabling more personalized patient care. Some of the first users in Radiology, Cardiology and Women's Health to adopt the new Aplio system shared their experiences on how it addresses previously unmet needs in their work.

Canon's Aplio i-series is a trusted, premium ultrasound platform with powerful imaging, quantification and advanced analysis capabilities for a wide range of clinical specialties. It is renowned for its consistently robust performance and

efficiency across a comprehensive range of clinical applications.

The latest Aplio i-series / Prism Edition was launched earlier this year enabling users to achieve a new level in diagnostic precision.

What type of Artificial Intelligence (AI) technology is integrated in Canon's ultrasound machines?

Pattern recognition and the quantitative assessment of structures are important parts of reading diagnostic



Scan the QR code or click [HERE](#) to watch Canon Medical's video about the Aplio i-series / Prism Edition!

The logo for iBeam+ is displayed in a stylized white font against a dark, gradient background that transitions from purple to blue.

The system's new iBeam+ technology enables up to four times faster image processing to provide sharper images, better penetration and more clinical confidence – optimal conditions for AI-based technologies to be effective.

images and ultrasound is no exception to this. While expert users are able to consistently localize and characterize certain structures, it can be challenging for the less experienced sonographer. In addition, placing markers or tracing structures of interest for their quantitative assessment can be a time-consuming task, prone to errors or inaccuracies. Automated pattern recognition can therefore be useful to improve the workflow, quality, and consistency of exams for all users.

Machine Learning and particularly Deep Learning – a sophisticated AI method – can help to apply expert knowledge and skills to powerful algorithms that improve the recognizability of structures and simplify their quantification by automating the process. For this purpose, Machine Learning algorithms are trained with a large number of clinical cases, which have been evaluated by experts, in such a way that they can independently recognize or analyze certain structures. The training occurs at the factory before the algorithms are implemented in the product, so their behavior does not change.

Meeting new challenges

Ultrasound users are continuously challenged by a growing number of difficult-to-scan patients, increased complexity of cases and a growing demand for standardized documentation according to the guidelines issued by their respective clinical associations. Combined with an increased demand and shortened time per patient, sonographers are looking for ways to enhance efficiency, while at the same time improving their diagnostic confidence. Improved imaging technology creates higher resolution, which drives increasingly complex measurements and analysis that require time and skill. Through accurate automatic measurements on a number of parameters, the Aplio can provide clinicians with reliable information faster and more efficiently.

"In my clinical practice, the challenges comes from the patients. Obesity is an increasingly key issue and there are short time slots for the echocardiographic examination in ambulatory practice," remarked Professor Michel Zuber, formerly senior cardiologist at

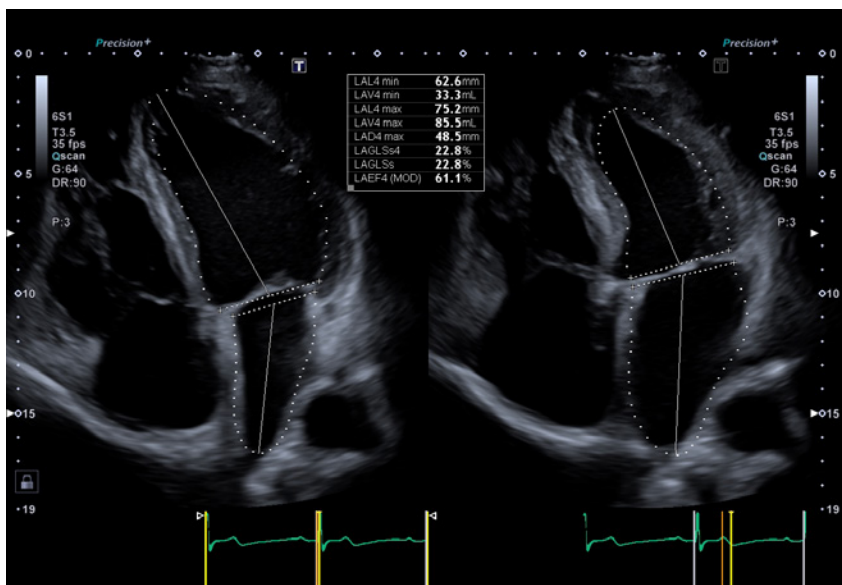
Cantonal Hospital Aarau, Switzerland. "Some years ago, it was not possible to get enough information from difficult-to-scan patients, as for example a patient weighing 125 kg, but now we can see that we have really good resolution with ultrasound, so we don't need an MRI to obtain a simple functional and anatomical assessment, even in very difficult patients."

"The new Aplio i-series from Canon helps me a lot, because we can get information from very difficult-to-scan patients in a short time. How? It is possible with automatic measurements due to Artificial Intelligence. That's the keyword and the future of echo too," he continued "We can get the workflow through the navigator, and this guides the examiner through the examination from view to view, and from mode to mode. So at the end you will not forget any measurements. We get very reproducible information from patients, such as ejection fraction or global longitudinal strain in one view or three-dimensional view, within a very short time. This guided approach is important to get always a full data set."

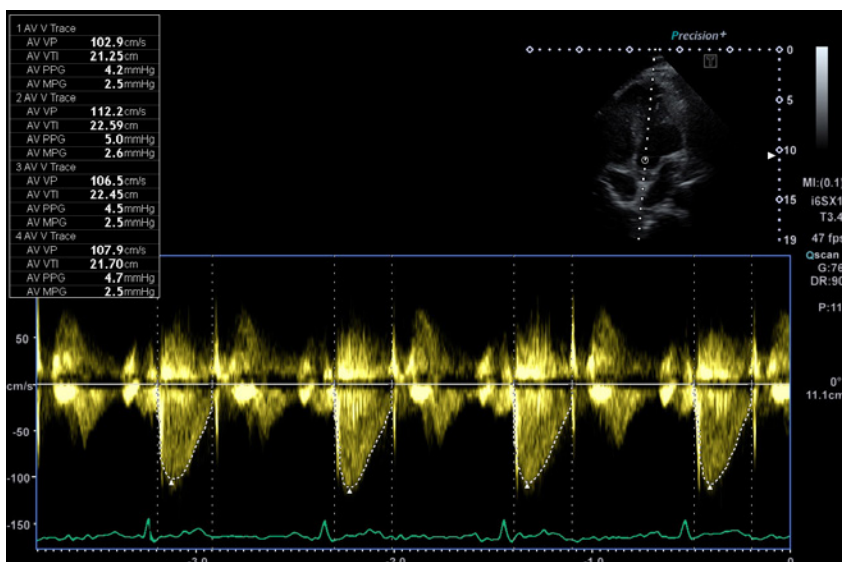
"It's very helpful to get information for my patients, such as ejection fraction or global longitudinal strain in one view, within a very short time, but in a very reproducible manner."

Prof. Dr. Michel Zuber
Othmarsingen, Switzerland





Auto EF LV/LA



Auto Doppler trace



Auto IMT measurement

Fast results made possible with accurate automatic measurements

Aplio achieves faster results through the use of accurate automatic measurements made possible by AI.

Measurement Assistant

Auto EF LV/LA

With conventional image recognition technology, automatic contour tracing of the endocardial border in noisy images with weak delineation is far less accurate than manual contour tracing performed by an experienced user. Machine Learning has been employed for Aplio to develop improved contour tracing algorithms to overcome this challenge, enabling faster and consistent analysis of all four heart chambers.

Auto Doppler trace

Machine Learning has also enabled the development of an automatic tracing function for Doppler waveforms. While conventional waveform tracing techniques have difficulties tracing steep slopes and separating artifacts from the waveform to achieve consistent and accurate tracing results, Aplio's AI-enabled algorithm allows multiple waveforms to be assessed, substantially increasing examination efficiency. Data obtained with a wide range of settings were included in training the Machine Learning algorithm to minimize operator dependency related to differences in for instance gain or scale settings.

Auto IMT measurement

Thanks to AI-enabled technology, Aplio allows the user to achieve accurate tracing of the intima media even in cases where layers cannot be distinguished clearly by eyeballing. Image analysis and tracing are performed at high speed, and the measurement results are updated immediately when the measurement ROI is moved using the trackball. Measurements can be performed at merely any relevant location.

2D/3D Wall Motion Analysis

The performance of 2D and 3D Wall Motion Tracking on Aplio, which is used for GLS and regional myocardial wall motion analysis, has been significantly improved by employing automation technology developed using Machine Learning. Aplio allows the user to perform wall motion analysis on each of the four cardiac chambers with single-click operation. While the system recognizes standard views (2ch, 3ch or 4ch) automatically, initial contours are drawn, and measurement results are displayed automatically. Right ventricular analysis includes determination of TAPSE and FAC for a quantitative estimation of right ventricular function.



2D/3D Wall Motion Analysis

Smart Area Indication for OB

Deep Learning-empowered Smart Area Indication for OB applications can help obstetricians to identify standard anatomical views for faster workflow and enhanced uniformity in exam results. Aplio's intelligent algorithms can automatically identify standard anatomical structures used for the evaluation of gestational age and fetal growth, speeding up workflow and helping departments to enhance productivity while improving the quality of their services.



Smart Area Indication for OB

Getting the best view

While patients become larger and more difficult to scan and evidence-based reporting of ultrasound examinations is becoming increasingly important, the number and complexity of required measurements is rising, putting increasing pressure on the examiner.

New tools that employ Deep Learning were developed for Aplio, enabling the operator to automatically identify standard scan planes and to carry out routine measurements without any user interaction. This is particularly helpful in where the relevant guidelines require a wide range of measurements, such as in Cardiology and Women's Health.

"The biggest challenge we face in clinical routine is to perform examinations in crying children and across a wide range of patients ranging from fetuses to pre-term babies, children and up to adolescents with complex congenital disease," remarked Professor Giovanni Di Salvo, cardiologist at the University Hospital of Padua, Padova, Italy. "Aplio helps us a lot to meet these challenges because the current version is equipped with Artificial Intelligence. This makes the machine extremely helpful during the normal workflow because we can get accurate information in a fast way. For instance, the acquisition of volumes or ejection

fraction by using biplane Simpson or global longitudinal strain with the current series of Aplio is extremely fast and extremely effective and, of course, accurate. This is very important because those measurements are now the standards required by the guidelines."

"Aplio also allows us to implement a lot of measurements into our daily routine that before were considered too complex and too time-consuming. Nowadays, we can implement them routinely in our practice, thanks to Artificial Intelligence. This makes a lot more measurements fast, accurate and reproducible," he added.



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*Prof. Dr. Giovanni Di Salvo
University of Padua, Italy*

New possibilities

Significant upgrades and the incorporation of AI to existing imaging and quantification technologies for fetal imaging into the new system has brought new and exciting possibilities for obstetricians.

“The new Aplio i-series Women’s Health model is a fantastic system with very reliable B-mode, great imaging resolution, and very precise Doppler. The new SMI (Superb Micro-vascular Imaging) brings us very exciting perspectives when imaging the fetal heart at a later stage – something that was

not possible before. Now, you can use it in the late second trimester and also in early third trimester. It also gives a lot of information on the venous return system,” said Dr. Jader Cruz, fetal medicine specialist, Fetal Medicine Unit, Central University Hospital, Lisbon, Portugal.

“The new tool that I am most excited about is the introduction of Artificial Intelligence at a level that will be very helpful for education, training and even quality control of the images,” he added. “It is very interesting, and I am very glad to be working with it. I

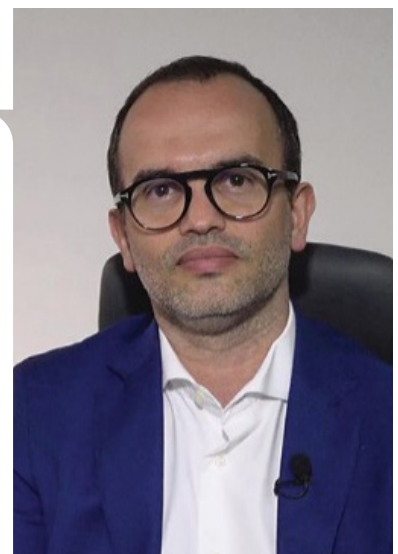
have been very satisfied working with Aplio for the past years and have fully explored it. And now Canon brings new technologies that enable us to go and learn even more. It is very exciting.”

Next generation ultrasound

Feedback from clinicians across the world indicates that the latest version of Aplio features technologies that enable significant improvements in the already outstanding image quality and clinical workflow truly representing a next-generation diagnostic ultrasound system. //

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*Dr. Jader Cruz
University Hospital Lisbon, Portugal*



References:

¹ <https://global.medical.canon/News/PressRelease/Detail/105723-834>

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