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Time Efficiency in Routine Mid-Trimester Ultrasound Using Live ViewAssist™

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Introduction

Routine second-trimester ultrasound represents a milestone of prenatal screening and diagnosis, allowing for a systematic evaluation of fetal anatomy and growth[1]. Recent advances in artificial intelligence (AI) and deep learning have led to the development of automated tools designed to support sonographers during real-time acquisition of fetal anatomical views[2-4].

In this scenario, Live ViewAssist™ software (Samsung Medison Co., Ltd.– Seoul, South Korea) is a novel deep learning-based tool integrated into ultrasonographic platforms that automatically classifies fetal structures and continuously optimizes image acquisition by suggesting or replacing views in real-time. However, despite the increasing availability of such technologies, data assessing their clinical workflow in routine obstetric settings remain limited.

The aim of this white paper is to present real-world cases demonstrating how Live-ViewAssist™ enhances workflow efficiency and reduces scan time during routine second-trimester ultrasound examinations.

Materials and methods

Population

This was a prospective observational study including consecutive singleton pregnancies attending the antenatal clinic of the Department of Maternal and Child Health and Urological Sciences of Sapienza University of Rome for second trimester ultrasonographic examination at 19–24 weeks of gestation from December 2024 to April 2025.

Only women with a known gestational age as assessed by crown-rump length at the 11–14 weeks scan were included in the study. Cases with chromosomal, genetic, or structural anomalies detected at either the first or second trimester ultrasound assessment were excluded, as well as twin or higher order multiple pregnancies, as all these types of examinations inevitably require more time, thus affecting the consistency of the study. All the included women signed an informed consent.

Ultrasound examination

All the ultrasound examinations were performed by well trained two physicians to perform routine second trimester prenatal ultrasound assessment, using a HERA Z20 Ultrasonographic system (Samsung Medison Co., Ltd.– Seoul, South Korea) equipped with transabdominal volumetric and convex probes. (CMV1-10 & CA3-10A)

All women underwent a detailed evaluation of fetal growth and anatomy according to the local and ISUOG guidelines[1]. The structures qualitatively evaluated for the second trimester ultrasound are listed in table 1.

Furthermore, the following sonographic parameters were routinely measured for assessment of fetal size: biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), and femur length (FL)[1].

Second trimester ultrasound scans were performed conventionally by a randomly selected operator (i.e., by acquiring manually all the images related to the above-mentioned views) and then by another operator using Live ViewAssist™ software (Samsung Medison Co., Ltd. - Seoul, South Korea), which is software based on deep learning technology, that automatically classifies images in real-time and provides annotations of structures and measurement results, continuously updating and replacing the captured views during a live scan if a more optimal view is recognized.

Images acquired in both modalities (conventional and with Live ViewAssist™) were stored on a dedicated electronic database. At the end of the data collection, the images were retrospectively evaluated by two experts, each with over 10 years of experience in prenatal ultrasound who assessed diagnostic adequacy according to international guidelines. Only images fulfilling all these reported criteria were considered of adequate quality.

For each examination, the total duration of the scan was recorded, calculated from the first to the last acquired image.

Statistical analysis

Differences in examination time between conventional and Live ViewAssist™ modalities were assessed using the Mann–Whitney U test, due to the non-normal distribution of the data. Statistical analysis was performed using SPSS 27 (SPSS Inc., Chicago, IL, USA) and MedCalc (MedCalc Software Ltd. – Ostend, Belgium). A two-tailed $p<0.05$ was considered statistically significant.

Results

Eighty consecutive women attending the routine mid-trimester fetal ultrasound scan were included in the analysis. The general characteristics of the study population are shown in Table 2.

Live ViewAssist™ automatically acquires standardized planes during real-time ultrasound scans without requiring any keystrokes and leverages existing functions like ViewAssist™, BiometryAssist™, and HeartAssist™ to measure and annotate fetal biometry.

Figures 1–7 show examples of views, annotations, and measurements (where required by guidelines) automatically performed by using Live ViewAssist™ and considered as appropriate.

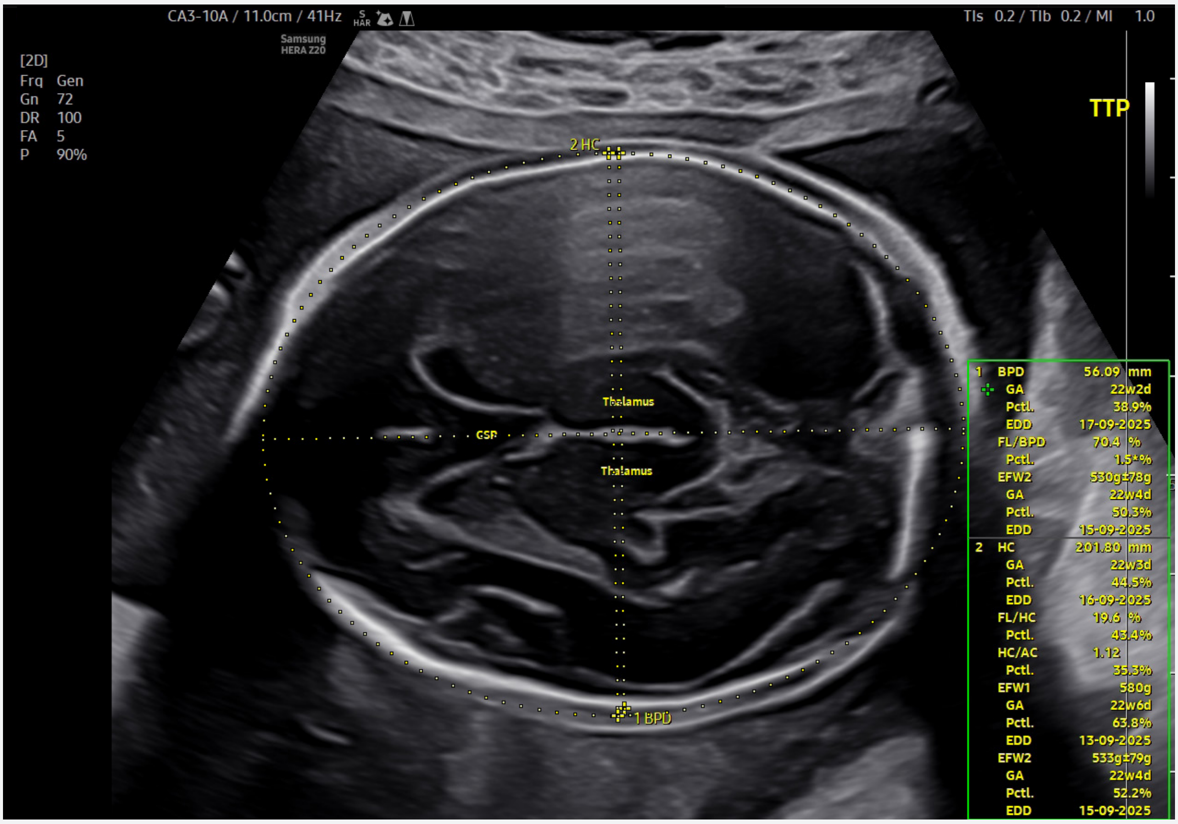


Figure 1. Transthalamic view acquired, annotated and measured by Live ViewAssist™

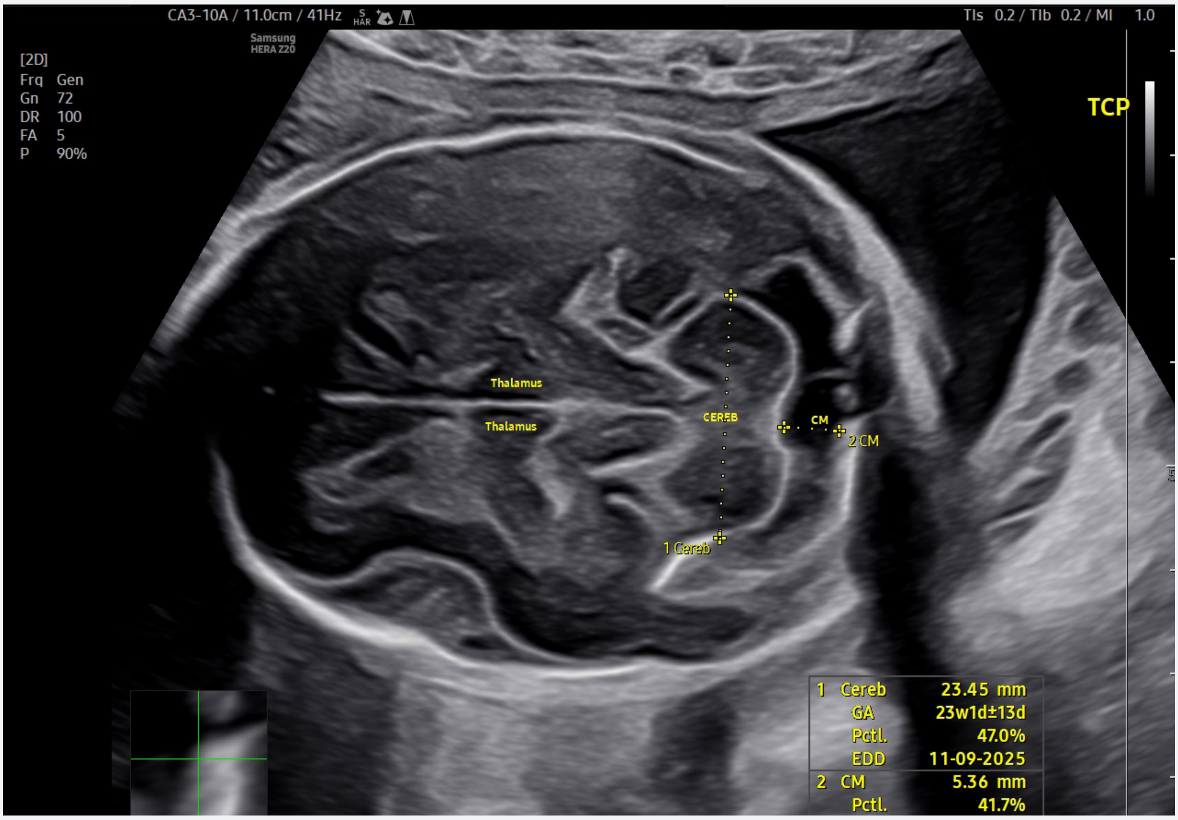


Figure 2. Transcerebellar view acquired, annotated, and measured by Live ViewAssist™

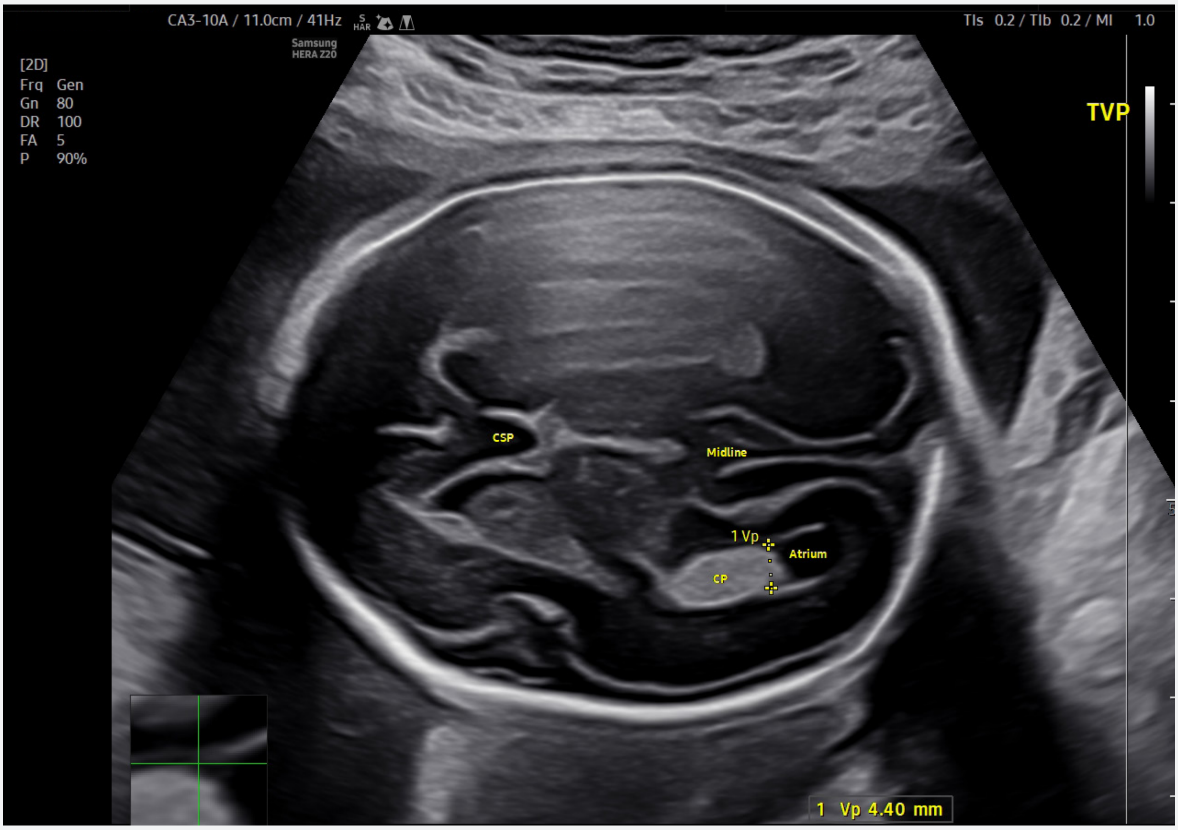


Figure 3. Transventricular view acquired, annotated, and measured by Live ViewAssist™

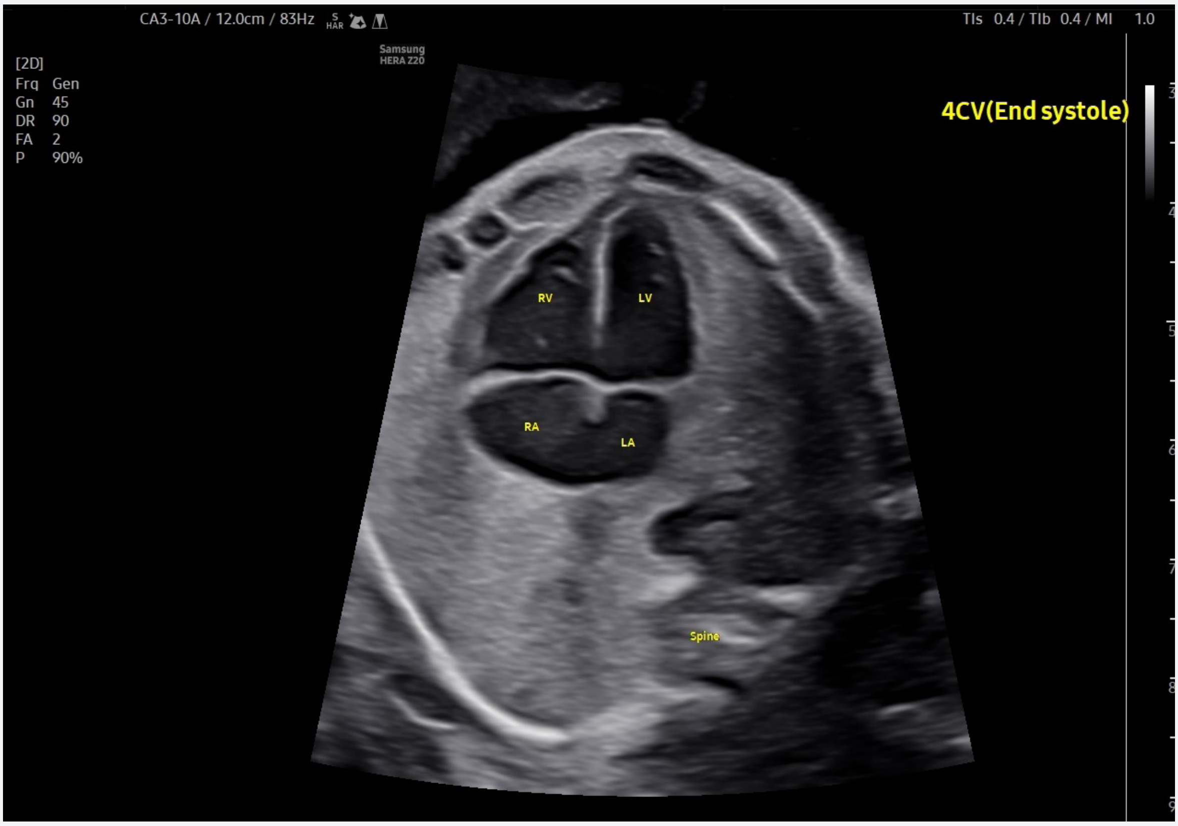


Figure 4. 4-chamber view acquired and annotated by Live ViewAssist™

Figure 5. Left ventricular outflow tract view acquired and annotated by Live ViewAssist™

Figure 6. Orbits view acquired by Live ViewAssist™

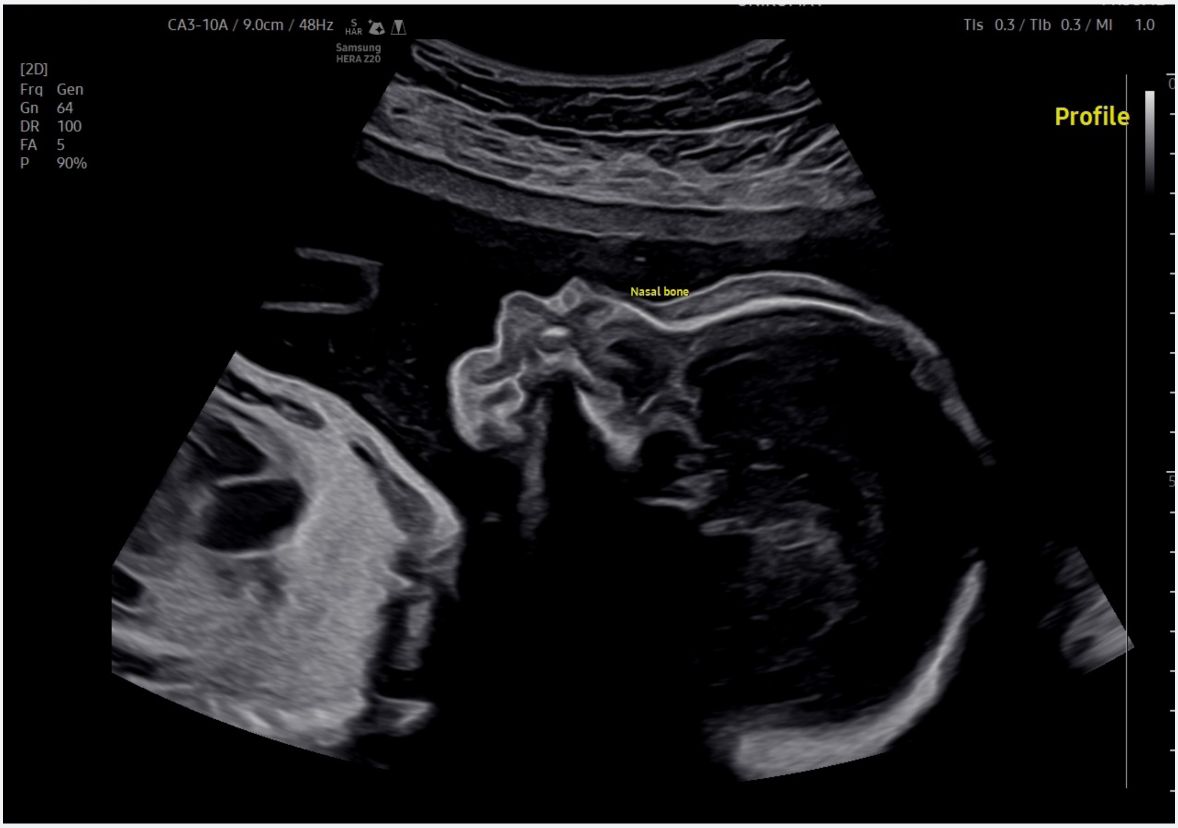


Figure 7. Profile view acquired and annotated by Live ViewAssist™

Time Efficiency

The time necessary for the whole routine mid-trimester scan was significantly higher when fetal anatomy assessment was performed conventionally by an expert operator, compared with the examination performed by using Live ViewAssist™ (21 minutes IQR: 18-25 vs 10 minutes IQR: 8-12; $p < 0.01$; Figure 8).

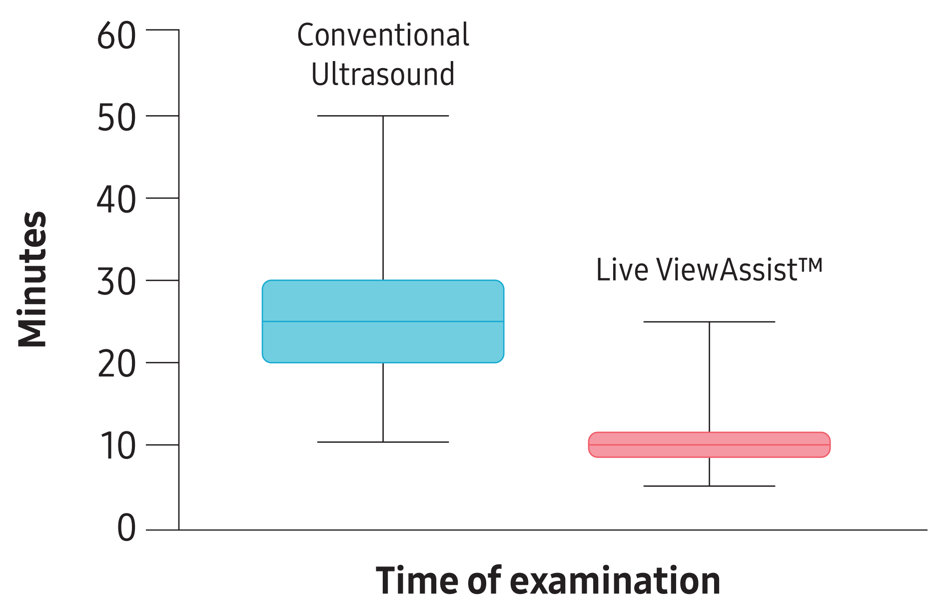
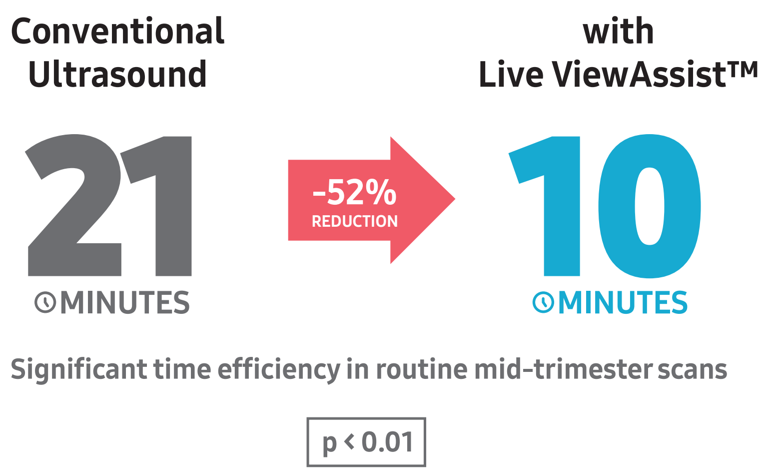


Figure 8. Boxplot of the time necessary for conventional ultrasound vs Live ViewAssist™ assessment



Discussion

The findings from this white paper show that Live ViewAssist™ might support clinicians in performing routine mid-trimester fetal ultrasound examinations more efficiently by simplifying the workflow of fetal image acquisition and reducing overall scan time.

The significant reduction in scan time observed with Live ViewAssist™ is a noteworthy finding. Time efficiency in routine prenatal care not only improves resource allocation in busy clinical settings but may also enhance patient comfort and compliance. This benefit is particularly relevant in high-volume practices or in areas with limited access to specialized personnel, where AI-based tools could serve as valuable adjuncts to standard care.

These observations are in line with the recent growing evidence suggesting that AI can complement rather than replace, skilled sonographers[5]. The ability of Live ViewAssist™ to continuously monitor and optimize the acquisition process during live scanning may serve as a decision-support system that enhances consistency, particularly for less experienced operators, such as residents and fellows.

Some limitations should be acknowledged. This was a single-center study with a limited number of cases, and the generalizability of our findings to other settings with varying levels of expertise or equipment may be limited. Moreover, this white paper was not designed to assess diagnostic accuracy but rather to illustrate workflow optimization and time-saving potential. We plan to publish the accuracy data for the different anatomical planes in an upcoming white paper.

In conclusion, Live ViewAssist™ demonstrated a significant reduction in scan time during routine mid-trimester ultrasound examinations. These findings support the integration of AI-driven assistance into daily obstetric ultrasound practice, with the potential to improve efficiency without compromising diagnostic standards in real-world clinical workflows.

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Table 1. Fetal structures qualitatively evaluated for the second trimester ultrasound

Anatomical Area	Standard Plane
Head	Transventricular plane/ Transcerebellar plane/ Transthalamic plane
Face	Coronal view of upper lip, nose & nostrils / Both orbits, both lenses/ Median facial profile
Spine	Sagittal complete spine with skin covering
Heart	4 chamber view/ Left ventricular outflow tract/ Right ventricular outflow tract/ 3 vessels or 3 vessel trachea view
Abdomen and pelvis	Transverse section of abdomen with stomach & umbilical vein/ Transverse section of abdomen at cord insertion/ Transverse section of kidneys/ Transverse section of pelvis with bladder
Limbs	Femur/ Tibia and fibula/ Foot/ Humerus/ Ulna and radius/ Hand

Table 2. General characteristics of the study population

Characteristics (N=80)	Value
Maternal age (years)	32.85 ± 4.8
BMI (kg/m²)	25.80 ± 4.42
└ Underweight (< 18.5 kg/m²)	2.8%
└ Normal weight (18.5 – 24.9 kg/m²)	44.4%
└ Overweight (25 – 29.9 kg/m²)	36.1%
└ Obesity (30 – 34.9 kg/m²)	11.1%
Morbid obesity (> 35 kg/m²)	5.6%
Nulliparity	55.6%
Ethnicity	
└ White	71.9%
└ Asian and South-Asian	15.6%
└ Black	6.3%
└ Hispanic	4.7%
└ Mixed	1.6%
GA at anomaly scan	20w ± 3d
* Data are provided as N (%) and mean ± SD. BMI, body mass index; GA, gestational age	

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