

EP18.17 Machine learning for sonographic evaluation of fetal head station

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Introduction Accurate assessment of fetal head station and labor progress is essential for informed obstetric decision-making. Transperineal ultrasound (TPUS) provides a non-invasive, objective method for evaluating labor progression. Variability in acquisition and interpretation - especially among less experienced operators, highlights the need for standardization.

Objective To design and validate a deep learning-based algorithm capable of automatically identifying optimal TPUS frames and accurately measuring the angle of progression (AOP) with expert-level precision.

Methods Deep learning models were trained on TPUS scans collected from women at different stages of labor, comprising over 200 videos and 5,000 expert-annotated frames. Algorithm-derived measurements of AOP (Figure 1) were then compared with expert assessments to evaluate agreement.

Results Preliminary analysis showed high concordance between algorithm-generated and expert manual AOP measurements (Figure 2), supporting the algorithm's reliability and accuracy.

Conclusion The proposed deep learning algorithm measures AOP from TPUS scans with expert-level accuracy, potentially promoting standardization of intrapartum ultrasound evaluations

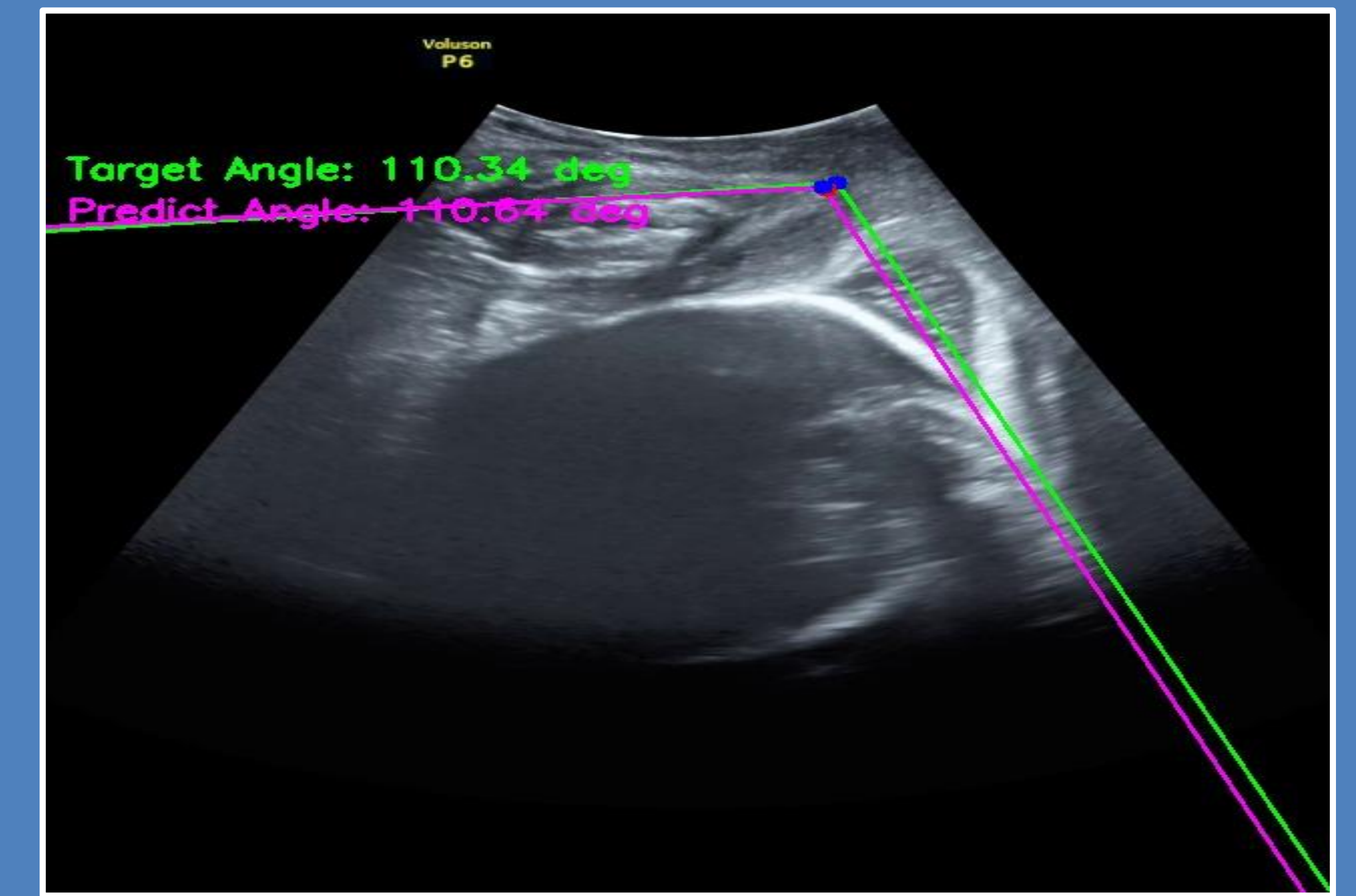


Figure 1. Transperineal ultrasound (TPUS) image showing fetal head and maternal symphysis pubis. Green lines represent the angle of progression (AOP) measured by an expert during intrapartum ultrasound (IPUS). Magenta lines represent the AOP automatically measured by the deep learning algorithm.

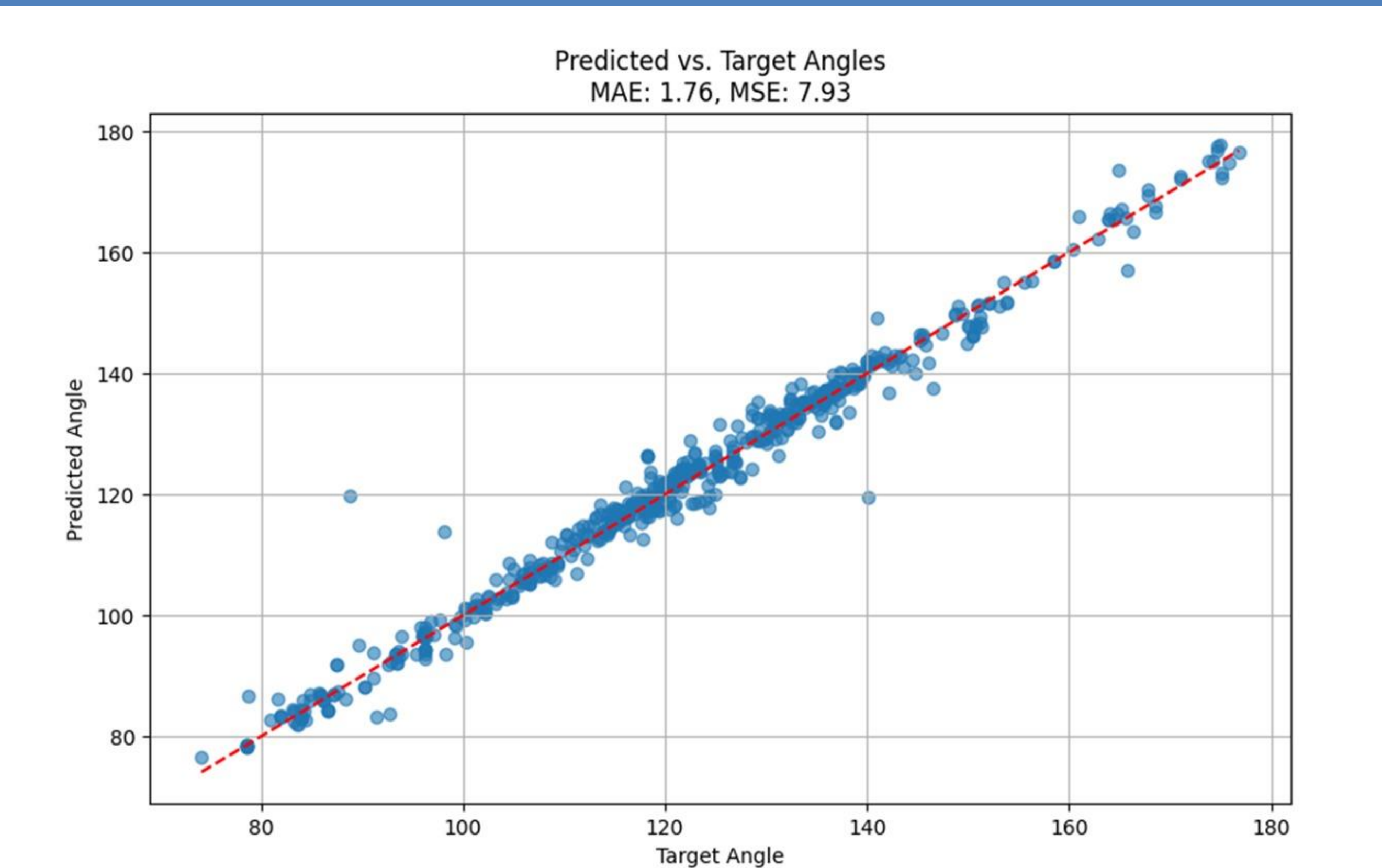


Figure 2. Agreement between algorithm-predicted and expert-measured AOP, demonstrating high concordance.