

Deep learning-based prediction of the fetal brain acquisition box from uterine localizers

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1 BACKGROUND & OBJECTIVE

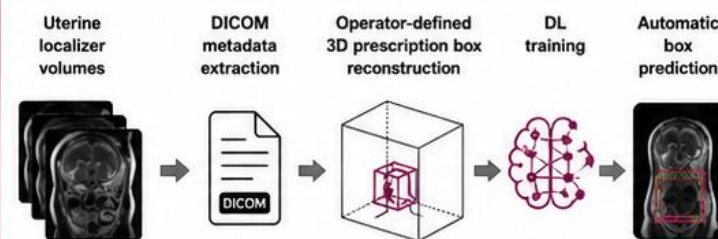
- In fetal brain MRI, operators manually define a brain acquisition box on uterine localizers before T2-weighted brain sequences.
- This step is time-consuming and operator-dependent.
- Objective:** develop a deep learning model that predicts the fetal brain acquisition box directly from uterine localizers.



3 COHORT

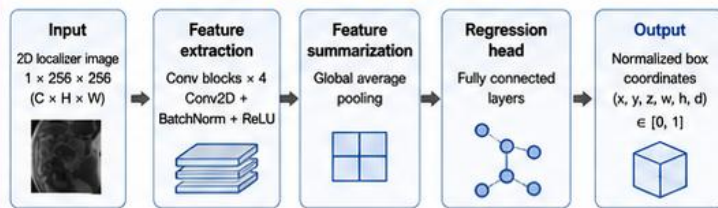
	Total MRI examinations	200
	Training	160
	Validation	40
	Median gestational age	32 [26–36] weeks
	Male fetuses	96/200 (48%)

2 METHODS



- Retrospective single-center study
- Normal pregnancies
- 1.5 T MRI
- Localizer volumes + fetal brain SSFSE T2-weighted sequences in axial, sagittal and coronal planes
- Ground truth:** operator-defined brain acquisition box extracted from GE DICOM metadata and reconstructed as a 3D box in patient coordinates
- Evaluation metrics:** 3D intersection-over-union (IoU) and center-point distance (mm)

MODEL ARCHITECTURE (CNN)

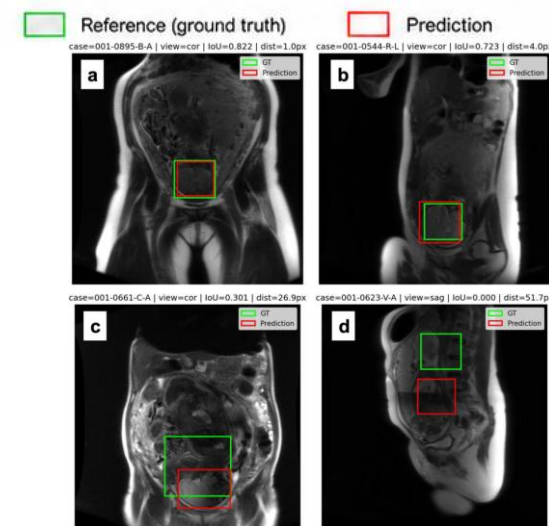


4 RESULTS

Mean 3D IoU = **0.82**

Mean center-point distance = **5.0 mm**

Good agreement between predicted and reference prescription boxes on the validation set.



5 CONCLUSION



Deep learning enables automatic and reasonably accurate prediction of the fetal brain acquisition box directly from uterine localizers.



This approach may streamline fetal MRI workflows and reduce operator dependence.



It has the potential to shorten acquisition time.