**Appendix 10: Limitations and Future Directions**

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| **Dataset Name** | **Limitations of Dataset** | **Future Directions for Improvement** |
| FPUS23: An Ultrasound Fetus Phantom Dataset with Deep Neural Network Evaluations for Fetus Orientations, Fetal Planes, and Anatomical Features | Not specified | Include annotated data of fetus phantoms at different gestation durations to offer a more comprehensive fetal ultrasound dataset |
| Large-scale annotation dataset for fetal head biometry in ultrasound images | Lack of DICOM format, resizing of images may compromise finer details | Enhance dataset compatibility, maintain high annotation standards, promote reuse in various medical and computational studies |
| The JNU-IFM dataset for segmenting pubic symphysis-fetal head | Not explicitly mentioned | Use dataset for developing automatic measurement algorithms, evaluating other ITU parameters, and tracking their efficacy |
| The construction and application of an ultrasound and anatomical cross-sectional database of structural malformations of the fetal heart | The anatomical database cannot fully replicate the physiological state of a live beating heart | Continuous update of the database with additional malformations, development of teaching software for global access |
| PSFHS: Intrapartum ultrasound image dataset for AI-based segmentation of pubic symphysis and fetal head | Class imbalance, variability in ultrasound image quality | Promote data sharing, establish comprehensive datasets, improve AI model generalizability |
| How much can AI see in early pregnancy: A multi-center study of fetus head characterization in week 10–14 in ultrasound using deep learning | Not explicitly mentioned | Further refinement with larger population, potential application in other obstetrical ultrasound examinations, release of full dataset and code for better model development and performance comparison |
| Generalisability of fetal ultrasound deep learning models to low-resource imaging settings in five African countries | Incomplete datasets from African centers, missing categories in some datasets | Further research to develop highly generalizable solutions for AI usability in low-resource settings, evaluate models on missing categories |
| Automated measurement of fetal head circumference using 2D ultrasound images | Data acquired from a single hospital using devices from the same vendor | Combine the system with methods aiding less skilled sonographers in obtaining the 2D standard plane, evaluate performance with multi-center data |
| Fetal Abdominal Structures Segmentation Dataset Using Ultrasonic Images | Exclusion of pre-term pregnancies, multiple pregnancies, and pregnancies with fetal structural or chromosomal anomalies | Potential for further research in improving AI-based segmentation techniques and expanding the dataset to include a broader range of fetal conditions |
| Automated annotation and quantitative description of ultrasound videos of the fetal heart | The method's performance is sensitive to the choice of features and parameters | Optimizing parameters systematically, extending the model to cope with and identify cases of congenital heart disease (CHD) |
| Real-time diameter of the fetal aorta from ultrasound | The method assumes the presence of the vessel in the current field of view and may require preliminary identification | Evaluating the solution in scenarios with lack of cyclic consistency, vessel movement, and concurrent estimation of cardiac cycle and vessel diameter |
| Values and validity of fetal parameters by ultrasound and Doppler as markers of fetal lung maturity | No single parameter alone could definitively predict fetal lung maturity | Further studies to validate the results and explore additional parameters for predicting fetal lung maturity |
| Generative Diffusion Model Bootstraps Zero-shot Classification of Fetal Ultrasound Images In Underrepresented African Populations | Current work integrates text prompts to generate images, which may lack semantically relevant features | Addressing limitations by integrating more detailed text prompts and exploring alternative fine-tuning methods, further research to improve the quality and utility of synthetic data for fetal ultrasound image analysis |
| Automatic detection of complete and measurable cardiac cycles in antenatal pulsed-wave Doppler signals | Dataset included only healthy fetuses; further validation needed with a larger and more diverse population | Extend the dataset to include fetuses with congenital heart diseases, integrate the algorithm into ultrasound machines, and develop automatic measurement extraction from detected heartbeats |