The application of artificial intelligence in sonography

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Introduction

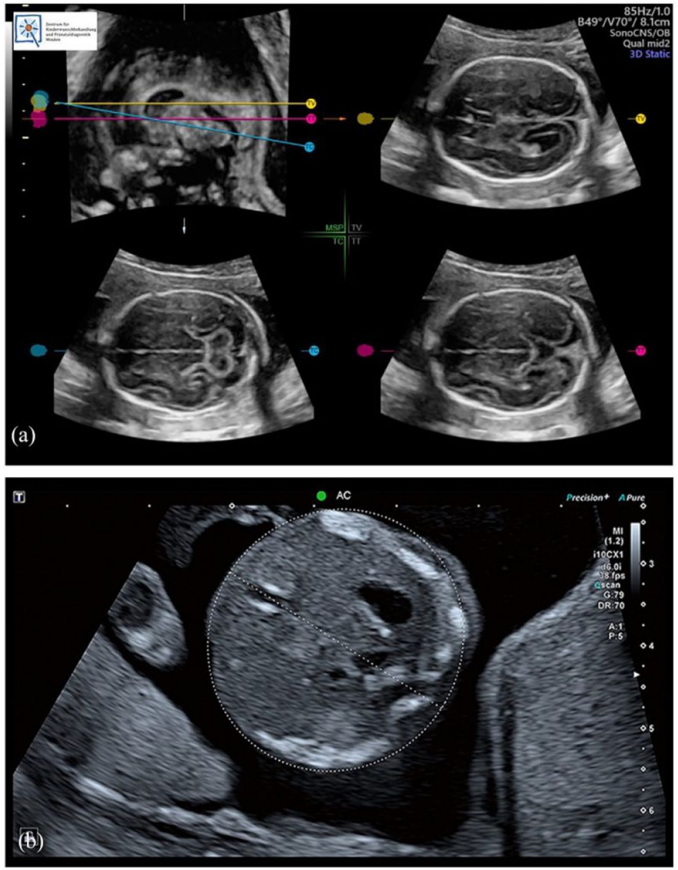
- The artificial intelligence (AI) can assist healthcare professionals in detecting abnormalities.
- It have ability to enhance the accuracy and efficiency of diagnosis.
- This is particularly accomplished by using deep learning algorithms .
- This can help to reduce the workload of radiologists and costs of examination.
- AI algorithms can detect early sonographic signs of breast cancer as an example.

Principle of machine learning

- The machine ‘learns’ from the input data only.
- This approach requires significant engineering and domain expertise to programme a system to classify patterns in the input data.
- The information collected depends on patient information in addition to scanning details to detect sonographic abnormalities.

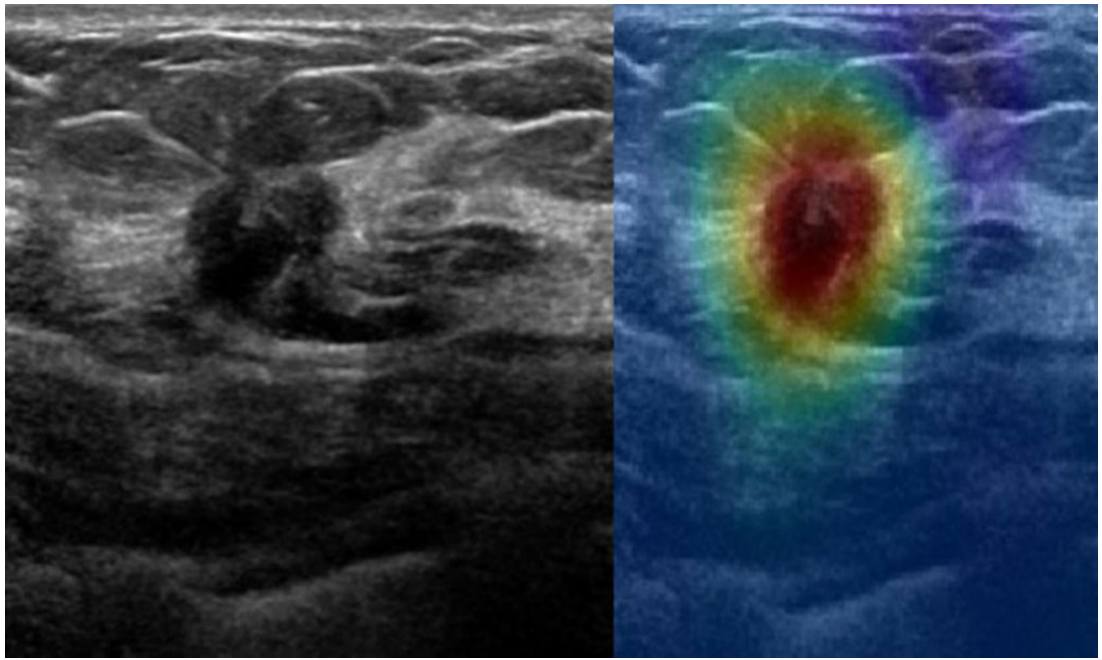
Application of AI

There are already several commercially available systems for fetal biometric planes of gestational age estimation like Mindray's Smart planes®.

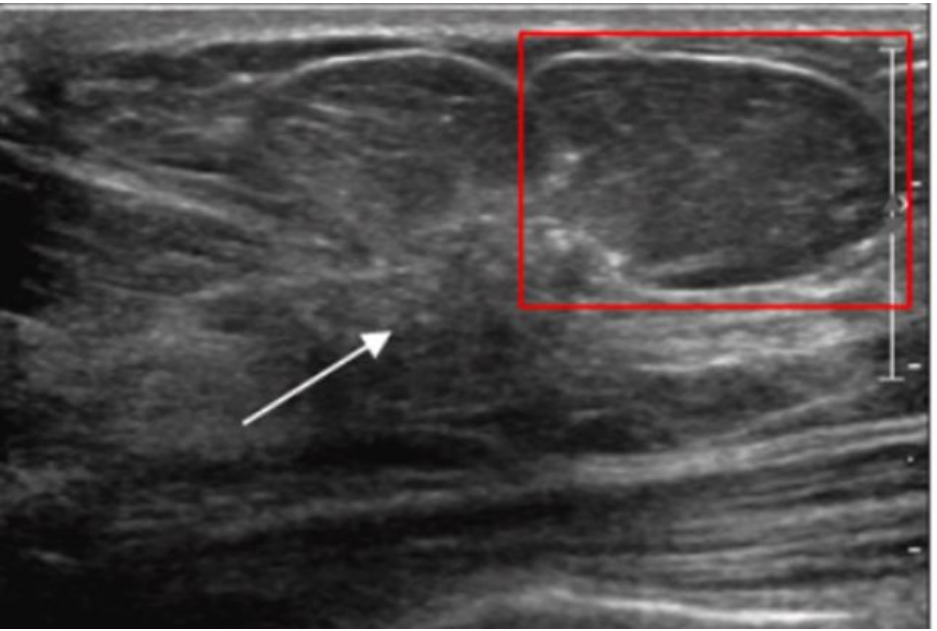


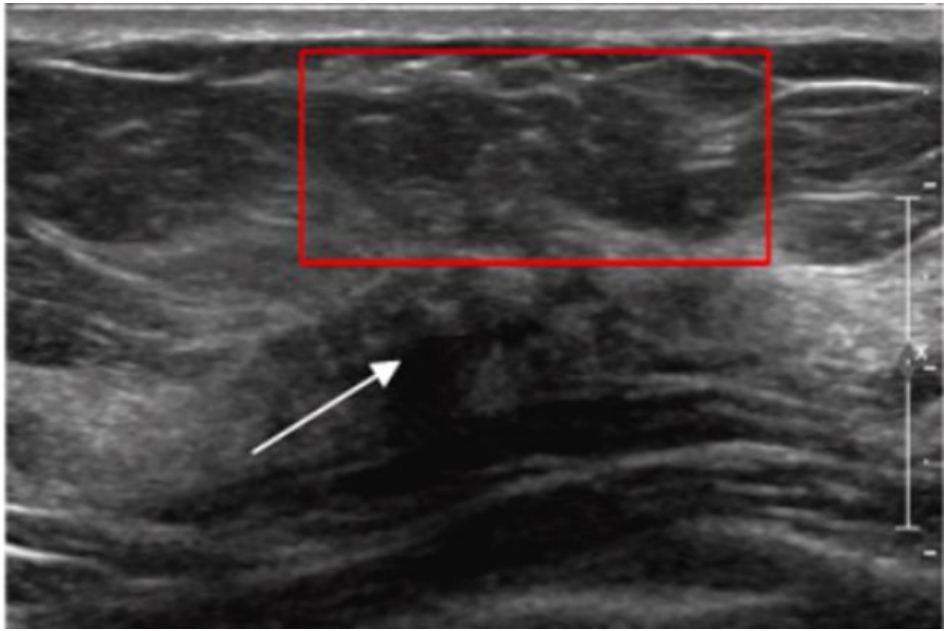
Breast cancer

The left is a pre-processing image, and the right is an image using a convolutional neural network (CNN). The CNN recognized the malignant mass well, and the probability of malignancy predicted by the CNN model was 99.25%.



False negative result





Limitations

- lack of radiologist, patient, and referring provider familiarity and trust.
- Inconsistent performance, significant cost, and IT requirements.
- False positive and negative results

Conclusion

AI is very promising and advancing quickly in the last five years especially in sonographic field with the presence of workload and subtle lesion misdiagnosis.

The application of AI still need the sonographer examination skills to cover the area of interest.


THANK YOU!