

Detection and Segmentation of Tissue Markers in Mammography: Studying their Impact on an AI Breast Cancer Detection System

Layman's summary

Ana San Roman Gaitero

ScreenPoint Medical

a.sanromangaitero@students.uu.nl

Breast cancer is a disease in which abnormal breast cells grow out of control and form tumors. Advances in breast cancer screening are enabling healthcare professionals to diagnose breast cancer in early stages, reducing the number of deaths among women. One of these advances is the use of artificial intelligence (AI) systems to help radiologists detect cancer by analyzing mammograms. When a breast lesion is identified, radiologists place a tissue marker, also called a surgical clip, to locate the area for future reference. This surgical clip will, thus, remain in the breast for future screening examinations when the patient returns to the clinic for a follow-up examination.

The purpose of this study is to assess how these tissue markers affect the way AI systems make decisions in breast cancer detection. In order to create a quality control system that allows the AI system to accurately manage these scenarios, a deep learning algorithm capable of discriminating mammograms with tissue markers and segmenting these objects was developed. The location of the detected tissue markers was then compared with the lesions detected by the AI system. This comparison permitted the assessment of the effectiveness of a specific AI system in identifying breast cancer from mammograms with clips.

The results showed that deep learning models can detect tissue markers and achieve high accuracy in segmenting all clips within a 2D mammogram. Moreover, despite the presence of clips, AI breast cancer detection systems can identify areas of concern that may require further attention, with a low incidence of marking clips. However, the study of tissue markers in breast cancer detection and AI systems remains challenging. In the future, this approach should focus on understanding their impact on the model's decision-making process and ensuring that the predictions aren't influenced by these objects.