

SecondLook: Web Based Breast Cancer Detection, Visualization & Annotation tool

Breast cancer is the most common cancer among Canadian women. According to the Canadian Cancer Society, an estimated 22,700 women will be diagnosed and 5400 women will die from breast cancer in Canada in 2009. While mammography is the most widely used means for screening, it is one of the most difficult medical image to analyse. It is suggested to have two readings per mammogram to reduce error rates. However, with the sheer volume of mammograms prescribed, the process is not perfect. Computer-Aided Detection is essential to help radiologists sift through the large number of medical images and do effective diagnostics.

SecondLook is a web-based tool developed by a team lead by Osmar Zaiane at the Alberta Ingenuity Centre for Machine Learning to help radiologists and oncologists diagnose medical images effectively and with improved speed. The current version is dedicated to mammography and in addition to being a viewer, it is a diagnostic aid. SecondLook examines images and automatically determines if cancer is present and the detection confidence level. SecondLook uses advanced machine learning techniques to learn to identify relevant cases based on annotated instances provided by doctors. When a mammogram is examined by a radiologist, SecondLook highlights the regions of interest in the image for the specialist to focus on, and indicate its prediction confidence level using different colours: Red for positive detection of cancer, orange for regions of interest where tumors may form, and green for normal healthy cases. SecondLook allows specialists to do region-based annotation on the mammograms to share notes between those examining the image. Being web-based, it can be accessed by practitioners ubiquitously.

Features:

- Automatic detection of cancerous regions
- Highlights regions of interest
- Colour code diagnostic
- Cuts out unnecessary border space
- Zoom in and out and panning in images
- Localized annotation
- Web-based

SecondLook, with its localized annotation capability, is ideal for training new radiologists and medical students examine mammograms and identify cancerous cases. SecondLook could help self correct students on test mammograms and communicate their annotations to educators.

