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Mammography 3.0: Artificial Intelligence,
Feature Extraction and Personalized Screening

Recent advances in deep learning offer promising benefits to tasks in cancer care and research, including improved detection and interpretation of medical image features and more powerful clinical decision support systems. Improvements in the computing power of Graphics Processer Units (GPUs), advances in the performance of image segmentation and classification algorithms, and the availability of large clinical medical image datasets as training data have recently enabled deep learning applications to make a number of significant advancements in related healthcare fields, such as radiology, pathology and neurology.

Breast cancer manifest as four types of features in a mammogram: calcifications, masses, architectural distortions and asymmetric density. Radiologists make a clinical decision based on the significance of these finding in a mammogram. These features not only indicate the presence of cancer but also future risk of developing cancer.

The BC Cancer Breast Screening Program is the longest ongoing organized, population-based breast screening program in Canada. The program provides over 250,000 mammography studies containing over one million images per year. This data contains a wealth of information that can be extracted quantitatively and linked to long term outcomes data collected by BC Cancer. This presentation will describe how we are developing deep learning applications that combine this imaging and outcomes data with other breast cancer risk factors to develop a breast cancer risk model to facilitate personalized breast cancer screening.