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Proc. of the 2017 IEEE International Conference on Signal and Image Processing Applications (IEEE ICSPA 2017), Malaysia, September 12-14, 2017

### Mammogram classification using Deep learning features

Syed Amal Saffar Gaderi<sup>1</sup>, Muhammad Anwar<sup>1</sup>, S. Ibrahim Fiqri<sup>1\*</sup>, Fabrice Moutonnet<sup>1\*</sup>

<sup>1</sup>Centre for Intelligent Signal and Imaging Research, Universiti Teknologi PETRONAS Malaysia, Department of Instrumental and Applied Science, Universiti Teknologi PETRONAS Malaysia, Department of Electrical and Electronics Engineering, Universiti Teknologi PETRONAS Malaysia, [amal.gaderi@utp.edu.my](mailto:amal.gaderi@utp.edu.my)

**Abstract**— This paper presents a method for classification of normal and abnormal breast in mammogram using a deep learning approach. VGG16 CNN deep learning architecture with convolutional filter of 3x3 is implemented on mammogram BIRx from the BIRx dataset. The deep feature matrix is compared from four fully connected layers. The results are evaluated using 10 and 20% test sets. The results are compared with SVM and KNN with 1x1, 3, 5, 7 classifiers. The method produced 100% classification accuracy with AUC 1.0.

**Keywords**— Deep learning, VGG16, Convolutional neural network, Mammogram Classification.

**1. INTRODUCTION**  
Breast cancer is one of the most common types of cancer diagnosed in women around the world. In one of the leading causes of death in females worldwide. World Health Organization (WHO), International Agency for Cancer Research (IARC) and American cancer society report that 1.1 million new cancer cases were recorded in 2012 worldwide [1]. Generally, breast cancer cells are divided based on genetic shape or microcalcification, masses and architectural distortion. In most of the cases, breast cancer cells are considerably indistinguishable to breast cancer cells and very subtle and vary in appearance at early stages [2]. To visualize the internal breast structure a few deep a variety of the breast are performed, this procedure in medical terms is known as Mammography. It is one of the most reliable techniques to detect breast cancer. Mammograms today expose the breast to much lower doses of radiation compared with devices used in the past [3]. In recent years it has proved to be one of the most effective of breast cancer [4].  
In literature, it can be seen that various researchers have utilized local and global texture information from the mammogram using techniques such as local binary patterns [5], gray level co-occurrence matrices [6] and other properties etc. Others have explored multiresolution techniques such as wavelets [7], variational Bayes feature extraction [8], [9], [10] and classification of mammograms.

978-1-5386-9118-3/17/\$31.00 © 2017 IEEE 485

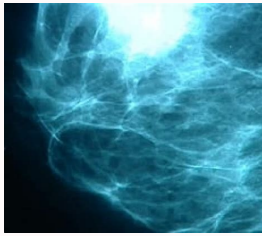


Fig. 1. Mammogram showing a bright circular area of interest.



As a result, Canadian researchers concluded that annual screening in women aged 40 years, at medication, does not reduce breast-de mortality more than a physical examination. And leading up to every 40 years, I hope this discussion and inform you include talking to your doctor, and of course, think of your family risk factors, as this can modify your own risk. "As the updated the guidelines were intended to give women more options suggesting that they and their doctor take a shared decision on screening, Hollingsworth is not Confident that these discussions are routine. 8-51 Originally published on December 13, 2019. These recommendations apply only to women in Mama's risk of breast carton of 40 to 74 years. (BC School Society) He echoed the confidence of the task forces in randomized tests, but allowed other observational studies to provide solid information - provided that their results are adequately vetted. Women aged 50 to 69 years are recommended to get a mammography every two years. I stayed astonished. Specifically points to randomization issues with the National Study of Canadian Breast Screening (CNBS), originally conducted in the DA © 1980, which involved tens of thousands of women and eventually occurred in 15 different urban centers throughout the Paás. More often than not, Seely said, these women were spoken by their family members, they should not be displayed because of their age. Produced by Sujata Berry. "I was devastated, I think it's absolutely ridiculous that they would say to a woman not to do [a] breast self-examination." "Start thinking about breasts' health," according to Dr. Colin Mar, B.C. Cacán's Agency, took steps to help inform women better, recognizing that the Mammography can be a complicated and confusing issue. There were extensive quality control measures to maintain the integrity of the study, it he (Weak recommendation; moderate quality evidence) for women aged 50 years "69 years, we recommend routinely screening with mammography every 2 to 3 years. She says she often see women in her 40 years that They found a node, which could have been found on a stage earlier "and more treatable" with a mammogram. While your authors say that your work is under attack, CNBS is weathered years of Skepticism and challenges. The 2011 Clinical Protection Guideline is no more current. At this point, Miller said, excluding women who may have palpable figures à € & €

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