Paper ID:	1571068228
Paper Title:	Explainable AI (XAI) for Breast Cancer Diagnosis
Authors:	Awika Ariyametkul (King Mongkut's Institute of Technology Ladkrabang, Thailand); May Phu Paing (School of Engineering, Thailand & King Mongkuts Institute of Technology, Thailand); Sudarshan Tamang (King Mongkut's Institute of Technology Ladkrabang, Thailand)
Email:	63011114@kmitl.ac.th

Abstract

Breast cancer is the leading cause of mortality and incidence among women worldwide. Mammography, an essential imaging technique, plays a pivotal role in both screening and diagnostic processes by facilitating early detection, which helps improve survival rates. Despite its effectiveness, interpreting mammographic images presents considerable challenges, necessitating the expertise of highly trained radiologists. Artificial intelligence (AI) is a powerful tool for managing large amounts of data and is increasingly used across numerous sectors, including medical applications. In this research, we focus on applying Convolutional Neural Networks (CNNs) for the classification of breast cancer from mammograms. We explored six different CNN models including simple ConvNet, AlexNet, VGG-16, GoogLeNet, XceptionNet, and DenseNet201. Our results indicate that DenseNet201 is the most suitable model for this task, achieving 99% accuracy. However, a limitation of AI is the lack of transparency and explanation, often referred to as the "black box" problem. This vulnerability can be addressed through explainable artificial intelligence (XAI), which elucidates the processes behind AI's decision-making. We employed three different XAI methodologies, including LIME, GradCAM, and GradCAM++, to visualize the model's decision-making process.