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Categorization of Mammography Histopathological Illustrations

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Description

From the beginning of forensic medicine, histopathology-the study of tissue changes connected to a disease or disorder-has been a crucial component of diagnosis. Histology is necessary for an autopsy but is not often performed or required in our regular practise. In this situation, the evaluation begins with tissue sample during the autopsy, and then the tissue is processed for microscopic inspection. Enzyme and immunohistochemically methods are currently used less frequently in European forensic medicine, and *in situ* hybridization, molecular pathological investigations, and electron microscopic diagnosis are even less common. Histological organ and tissue investigations are currently performed or ordered by the authorities in only about 50% of all autopsies. Nonetheless, forensic histopathology is concerned with evaluating histological results in all forensic contexts.

Although there are overlapping procedures and diagnoses, this article does not cover clinical or surgical histology. The second-deadliest illness for women globally is breast cancer. One of the most effective methods for the diagnosis of tumour malignancy is breast histopathology image analysis. Nevertheless, manual image analysis for breast histopathology is subjective, time-consuming, and prone to human error. The popularity and viability of Computer-Aided Diagnosis (CAD) for medical image processing has increased recently because to improvements in computer speed and memory. To be used for practical reasons, the performance of the CAD models must be enhanced. Models based on Convolutional Neural Networks (CNNs) have shown promising outcomes. For the categorization of breast histopathology images. Instead of depending on a single CNN model, we present a unique rank-based ensemble technique in this study that combines the results of three transfer learning CNN models, namely Google Net, VGG11, and MobileNetV3 Small. The suggested ensemble model is aimed to solve a 2-class classification issue of breast histopathology images using the Gamma function. In comparison to state-of-the-art approaches, our method achieves better classification results, with 99.16%, 98.24%, 98.67%, and 96.16% for magnification levels of 40X, 100X, 200X, and 400X, respectively, on a publicly accessible standard dataset called Break His and 96.95% on another well-known dataset called ICIAR-2018.

Breast cancer is one of the most frequent illnesses threatening women's health globally. The World Health Organization (WHO) says, female breast cancer has the fifth highest fatality rate, while in terms of incidence; breast cancer is the second most common cancer form, behind only lung cancer. Cancer arises when healthy breast cells mutate and grow uncontrollably, resulting in a tumour, which is a mass or sheet of cells. Breast cancer is classified as either invasive or non-invasive. Non-invasive (*in-situ*) breast cancer spreads around the milk ducts or lobules of the mammary glands in the breast, whereas invasive breast cancer spreads into adjacent tissues and distant organs. Yet, early identification and diagnosis might not only save treatment costs but also raise the odds of survival.

Pathologists can histologically assess the microscopic structures and organelles of breast tissue using breast cancer samples. Histology plate processing is done to view and study breast tissue under a microscope in order to determine whether the tumour is (i) healthy or normal breast tissue, (ii) benign lesions, (iii) *in-situ* carcinoma, or (iv) invasive cancer. Pathologists grade tumours and evaluate morphological variables through visual examination. However, the manual evaluation procedure is time-consuming and creates inter-observer differences even among doctors with years of expertise.