TITLE: EARLY IDENTIFICATION OF BREAST CANCER USING CONVOLUTIONAL NEURAL NETWORKS

ABSTRACT

Breast cancer is one of the leading causes of cancer-related deaths among women globally. Early detection is vital for successful treatment and increased survival rates. Medical imaging, such as mammography and MRI, plays a crucial role in breast cancer diagnosis. However, the accuracy of diagnosis depends on the experience and expertise of the radiologist interpreting the images. Hence, there is a growing interest in developing computer-aided diagnosis systems to support radiologists in identifying breast cancer in medical images.

This study aims to develop a CNN model for early identification of breast cancer using 50 anonymous MRI images obtained from Muhimbili National Hospital. The MRI images will be confidential and private, and all necessary ethical considerations will be taken into account.

The study will follow a cross-sectional design, where 50 MRI images of the breast will be collected from Muhimbili National Hospital. The MRI images will be pre-processed to remove noise, normalize the intensity, and resize the images to a standard size. The pre-processed images will be divided into two groups: a training set and a test set. The training set will consist of 80% of the images, while the test set will consist of the remaining 20% of the images.

The CNN model will be developed using the Keras deep learning library in Python. The model will consist of multiple convolutional layers, followed by max-pooling layers, and dense layers. The model will be trained using the training set, and the performance will be evaluated using the test set. I will evaluate the performance of the model using standard metrics such as accuracy, precision, recall, and F1-score.

The study's expected outcome is a CNN model that can accurately identify breast cancer in MRI images. The model's performance will be compared with that of a radiologist's interpretation of the same images. The study's significance lies in the potential to improve breast cancer detection rates, leading to early diagnosis and improved treatment outcomes.

This study has several limitations that should be considered. First, the sample size is relatively small, limiting the generalizability of the findings. Second, the study only uses MRI images, and the CNN model's performance may vary for other imaging modalities such as mammography or ultrasound. Finally, the CNN model's performance will be evaluated using a limited set of evaluation metrics, and other metrics such as positive predictive value and negative predictive value will not be considered.

In conclusion, this study aims to develop a CNN model for early identification of breast cancer using MRI images obtained from Muhimbili National Hospital. The study's findings may have implications for improving breast cancer detection rates, leading to early diagnosis and improved treatment outcomes. The study will ensure that all ethical considerations are taken into account, and the MRI images will be confidential and private. Further studies are needed to validate the model's performance on larger datasets and other imaging modalities.