Model Development Phase Template

Date	29 October 2024
Team ID	SWTID1727274979
Project Title	Deep Learning Techniques for breast cancer risk prediction
Maximum Marks	5 Marks

Model Selection Report :

Breast cancer risk prediction using deep learning is an evolving field that leverages advanced algorithms to analyze data such as imaging, genetic information, and clinical records. The models aim to improve the early detection and personalized risk assessment of breast cancer. This report evaluates and summarizes the applicability of Convolutional Neural Networks (CNNs) model for breast cancer risk prediction .

• Types of Deep Learning Approaches for breast cancer prediction :

1) Convolutional Neural Networks (CNNs) :

• **Image-based analysis :** CNNs are particularly well-suited for analyzing medical images, including mammograms and ultrasound images.

• **Feature extraction :** CNNs can automatically learn relevant features from images, such as texture patterns, densities, and other subtle indicators of potential malignancy.

• **Classification:** Trained CNN models can classify images as high-risk or low-risk for breast cancer development.

2) Recurrent Neural Networks (RNNs) :

a) Time-series analysis: RNNs can analyze sequential data, such as longitudinal medical records or genetic information.

b) Risk factor modeling: By considering the temporal evolution of risk factors, RNNs can potentially improve risk prediction accuracy.

Comparison between both the models :-

Features	CNNs	RNNs
Data Type	Primarily image-based data (e.g., mammograms, ultrasound images) .	Sequential data (e.g., longitudinal medical records, genetic sequences) .
Core Operation	Convolutional layers to extract features from spatial patterns .	Recurrent layers to process sequential data and capture temporal dependencies .
Best Suited for	Tasks involving spatial patterns and local features .	Tasks involving temporal patterns and sequential data.
Breast Cancer Risk Prediction	Well-suited for analyzing medical images to identify potential tumor characteristics .	Potentially useful for analyzing longitudinal patient data to identify risk factors and trends .

Model Selection Report :

Finalizing the best suited technique / approach for our project :

- For the breast cancer risk prediction project we have utilised the Convolutional Neural Network **(CNN)** to train and test the model as it is one of the most efficient deep learning technique for analysing images .
- CNN fits perfect as our dataset is in the image (PNG) Format .

Model	Description
Convolutional Neural Networks (CNNs)	• Convolutional Neural Networks (CNNs) are widely used for analyzing medical imaging data, including mammograms and histopathological images . • CNNs are effective in detecting patterns, such as microcalcifications and architectural distortions, that may indicate malignancy . • The hierarchical structure of CNNs allows them to learn both low-level and high-level features, making them suitable for identifying subtle differences in breast tissue .