A Minor Project Synopsis

on

Project Title

BREAST CANCER DETECTION

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By

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Synopsis

1. Introduction

One of the most prevalent types of cancer among women globally is breast cancer, a type of cancer that affects the breast tissue. The likelihood of a successful therapy is considerably increased by early identification of breast cancer. Breast cancer can be found using a variety of techniques, such as mammography, ultrasound, MRI, and biopsy.
The most popular technique for finding breast cancer is mammography, which includes capturing X-ray images of the breast. Small tumors that might not be palpable (able to be felt) during a breast exam can often be found with this procedure. Ultrasound can help to distinguish between solid tumours and cysts that are filled with fluid by using high-frequency sound waves to create images of the inside of the breast. Another technique for finding breast cancer is magnetic resonance imaging (MRI), which offers fine-grained pictures of the breast tissue. Last but not least, a biopsy is a procedure that confirms a breast cancer diagnosis by extracting a sample of breast tissue for microscopic analysis.
Regardless of the method used, early detection of breast cancer is essential for improving outcomes and reducing the risk of complications. Regular screening exams, such as mammograms, are important for women of all ages, and women with a family history of breast cancer may need to start screening at an earlier age. Women should also be familiar with the normal look and feel of their breasts, and should report any changes to their healthcare provider promptly.

2. Motivation

With more than 2 million new cases diagnosed each year, breast cancer is one of the most prevalent types of cancer afflicting women worldwide. It is essential to find breast cancer early in order to increase the likelihood of a favorable outcome and prolonged survival. Mammography has long been the standard procedure for finding breast cancer, but it has its drawbacks. In some circumstances, a less intrusive and more accurate method of diagnosing breast cancer is available, but it is still an invasive operation that may cause discomfort and anxiety. Mammogram images and patient records are only two examples of the massive volumes of medical data that ML models may examine to find patterns and symptoms of breast cancer that conventional approaches might miss. Additionally, as they accumulate more data, these models may be taught to become more accurate, producing findings that can be trusted. There are many advantages to applying ML to the identification of breast cancer. It can improve the accuracy and affordability of breast cancer detection while lowering the frequency of false negatives and the danger of overdiagnosis. More women will be able to receive the necessary screening and treatment if ML models are made accessible to patients in isolated or underdeveloped locations. In conclusion, the application of ML to the identification of breast cancer represents a significant advance in the struggle against this illness. ML has the potential to save lives and enhance the quality of life for those affected by this fatal disease by offering a non-invasive and more precise method of detection.

3. Project Objective

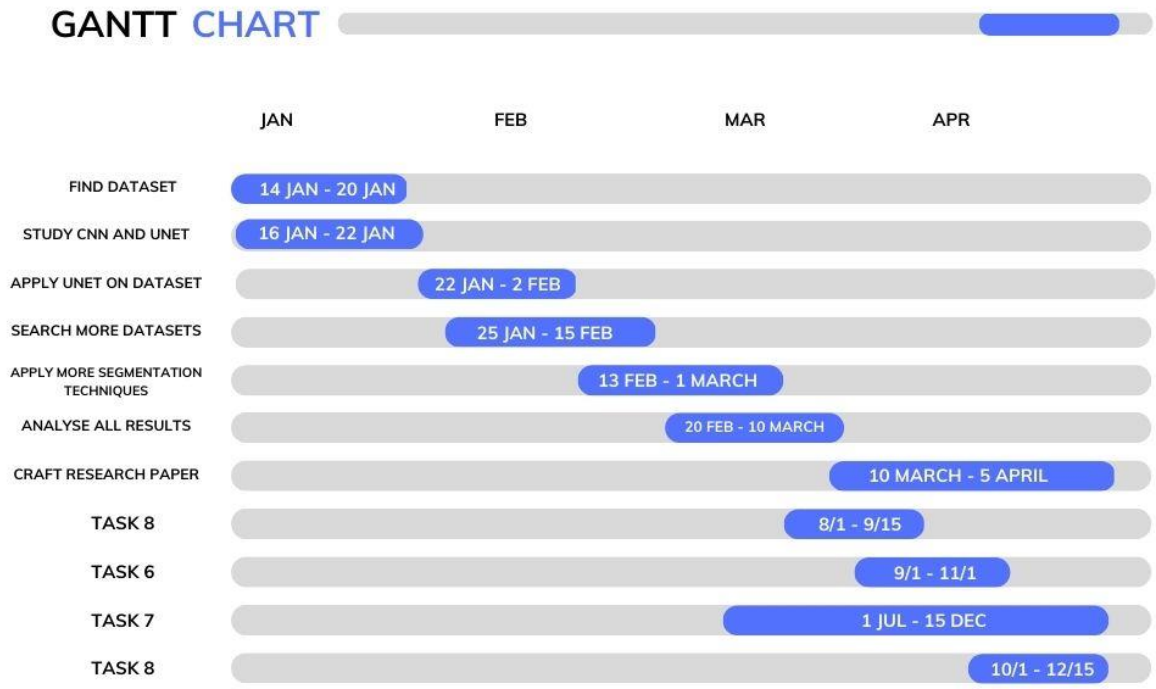
The goal of a machine learning breast cancer detection project is to create an algorithm that correctly recognizes the presence of breast cancer in mammographic pictures. The objective is to give medical practitioners a dependable and effective tool that can help with breast cancer early detection. You can accomplish this by:

1. To train the machine learning model, a sizable dataset of mammograms will be gathered and annotated.
2. Standardizing the photos' size and format through pre-processing the data to get rid of any noise or artefacts.
3. choosing and using the annotated data to train suitable machine learning algorithms.
4. employing a set of criteria, such as accuracy, sensitivity, and specificity, to assess the algorithms' performance.
5. Optimizing the algorithms' settings to enhance performance.
6. implementing the improved algorithms in a simple-to-use interface for healthcare practitioners.
7. maintaining the algorithms' correctness and dependability through ongoing monitoring and update.

4. Methodology/ Planning of work:

There are several methods that machine learning can be applied to the identification of breast cancer. Utilizing mammography image analysis is one typical method. Convolutional neural networks and other deep learning methods can be used for this (CNNs). The process is described generally as follows:

1. Data collection: A dataset of mammography images is gathered, and labels identifying the presence or absence of breast cancer evidence are added to the images.
2. Pre-processing: The images are enhanced with features that are important for detecting breast cancer, noise is reduced, the size and format are standardised, and the features are.
3. Training, validation, and test sets are separated: The dataset is split into three subsets; the majority of the data is used for training the model, a smaller amount is used for validation, and the remaining data is used to test the model's effectiveness.
4. Model Development: Using the training set of data, a CNN or other deep learning model is trained. To avoid overfitting, the model is refined using methods including regularization, hyperparameter tuning, and data augmentation.
5. Utilizing criteria like accuracy, precision, recall, and F1-score on the test set, the model's performance is assessed. The model's performance is also evaluated relative to other models by comparison.
6. Using the trained model to identify breast cancer in mammography images in a clinical context is called deployment.



It's crucial to remember that while machine learning can be a helpful tool for detecting breast cancer, it cannot take the place of a qualified medical diagnosis. Machine learning model results should be understood in the context of a comprehensive clinical assessment and other diagnostic procedures.

5. Facilities required for proposed work:
(Software/Hardware required for the development of the project.)
Software Requirements: -
Python
TensorFlow
CNN
Jupyter-Notebook
Anaconda
Hardware Requirements: -
Ram-Min 4GB
Processor: -Ryzen 5

Bibliography/References

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