Cancer Vision: Advanced Breast Cancer Prediction with deep learning

Artificial intelligence

SAI GANAPATHI ENGINEERING COLLEGE

PROJECT

Internship submitted in partial fulfillment's of the requirements for the award of degree of

Bachelor of Technology

In

Computer Science And Engineering

By

Team Id : LTVIP2023TMID07002

Team Leader : Akula Sivasaibalaji

Team member : Manikanta Sivakoti

Team member : Velamareddy Durgapraveenkumar

Team member : Enumula Naveen

Team member : Vurukuti Satishkumar

under the esteemed guidance of

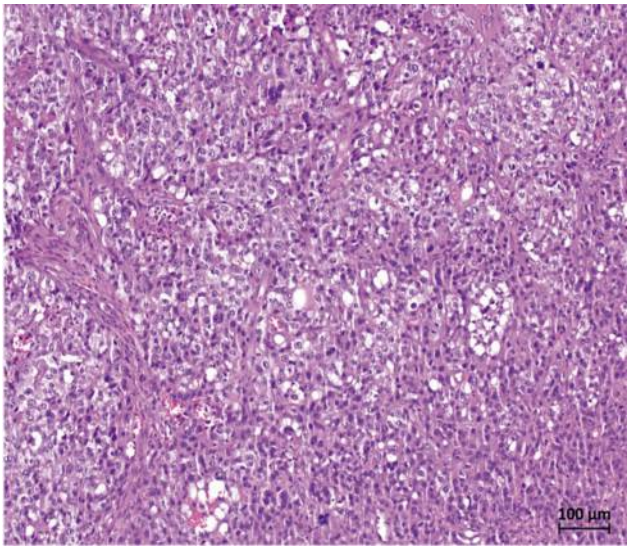
Department of Computer Science And Engineering

SAI GANAPATHI ENGINEERING COLLEGE

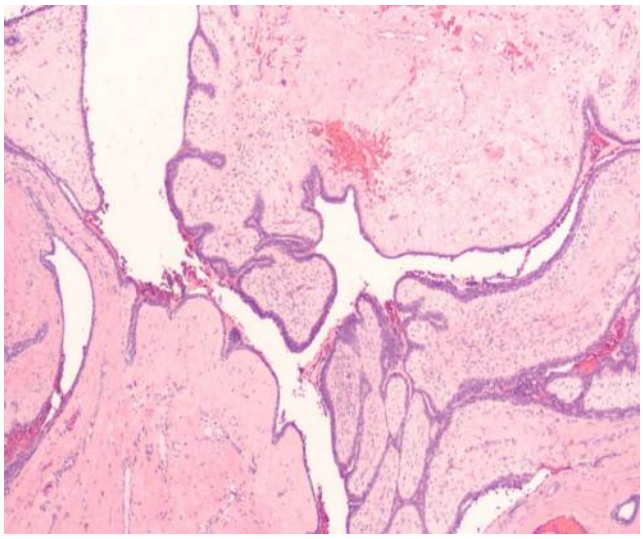
Approved by AICTE. New Delhi, Affiliated to JNTU GURAJADA,VIZAYANAGARAM

GIDIJALA(V), ANANDAPURAM(M),VISAKHAPATNAM-531173.AP 2022-2023

Breast cancer is one of the main causes of cancer death worldwide. Computer-aided diagnosis systems showed potential for improving the diagnostic accuracy. But early detection and prevention can significantly reduce the chances of death.



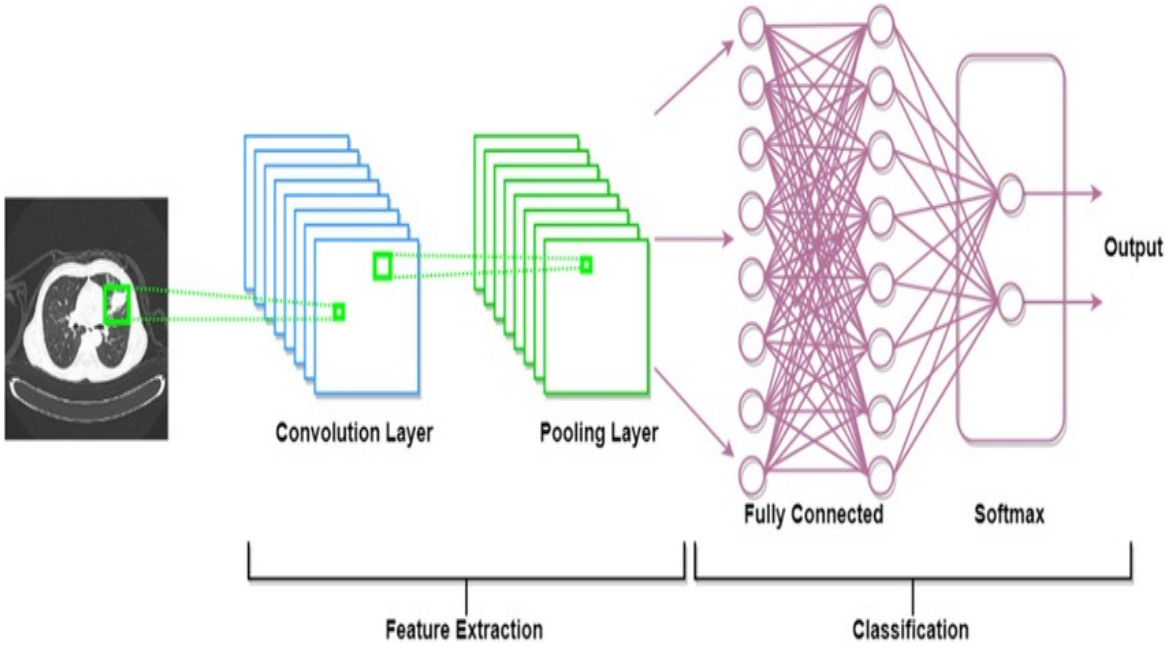
benign



malignant

It is important to detect breast cancer as early as possible. The goal is to classify images into two classifications of malignant and benign. As early diagnostics significantly increases the chances of correct treatment and survival. In this application we are helping the doctors and patients to classify the Type of Tumour for the specific image given with the help of Neural Networks.

Architecture of this project



Pre-Requisites
In order to develop this project we need to install the following software/packages:

Anaconda Navigator :

Anaconda Navigator is a free and open-source distribution of the Python and R programming languages for data science and machine learning-related applications. It can be installed on Windows, Linux, and macOS.Conda is an open-source, cross-platform, package management system. Anaconda comes with so very nice tools like JupyterLab, Jupyter Notebook,

QtConsole, Spyder, Glueviz, Orange, Rstudio, Visual Studio Code. For this project, we will be using a Jupyter notebook and Spyder

To install the Anaconda navigator and to know how to use Jupyter Notebook & Spyder using Anaconda watch the video

Python packages:

NumPy: NumPy is a Python package that stands for 'Numerical Python. It is the core library for scientific computing, which contains a powerful n-dimensional array of objects.

Pandas: pandas is a fast, powerful, flexible, and easy-to-use open-source data analysis and manipulation tool, built on top of the Python programming language.

Matplotlib: It provides an object-oriented API for embedding plots into applications using general-purpose GUI toolkits

Keras: Keras is an open-source library that provides a Python interface for artificial neural networks. Keras acts as an interface for the TensorFlow library. Up until version 2.3, Keras supported multiple backends, including TensorFlow, Microsoft Cognitive Toolkit, R, Theano, and PlaidML. Designed to enable fast experimentation with deep neural networks, it focuses on being user-friendly, modular, and extensible.

TensorFlow: TensorFlow is just one part of a much bigger, and growing ecosystem of libraries and extensions that help you accomplish your machine learning goals. It is a free and open-source software library for data flow and differentiable programming across a range of tasks. It is a symbolic math library and is also used for machine learning applications such as neural networks.

Flask: Web framework used for building Web applications

Deep Learning Concepts

CNN: a convolutional neural network is a class of deep neural networks, most commonly applied to analyzing visual imagery.

CNN Basic

Flask: Flask is a popular Python web framework, meaning it is a third-party Python library used for developing web applications.

Project Objectives
By the end of this project you will:

Know fundamental concepts and techniques of Convolutional Neural Network.

Gain a broad understanding of image data.

Know how to pre-process/clean the data using different data preprocessing techniques.

know how to build a web application using the Flask framework.

Project Flow
The user interacts with the UI (User Interface) to choose the image.

The chosen image analyzed by the model which is integrated with flask application.

CNN Models analyze the image, then prediction is showcased on the Flask UI.

To accomplish this, we have to complete all the activities and tasks listed below

Data Collection.

Data Collection.

Create Train and Test Folders.

Data Preprocessing.

Import the ImageDataGenerator library

Configure ImageDataGenerator class

ApplyImageDataGenerator functionality to Trainset and Testset

Model Building

Import the model building Libraries

Initializing the model

Adding Input Layer

Adding Hidden Layer

Adding Output Layer

Configure the Learning Process

Training and testing the model

Save the Model

Application Building

Create an HTML file

Build Python Code

To train our model we used 3164 images in which 1582 images belong to benign and 1582 images belong to malignant

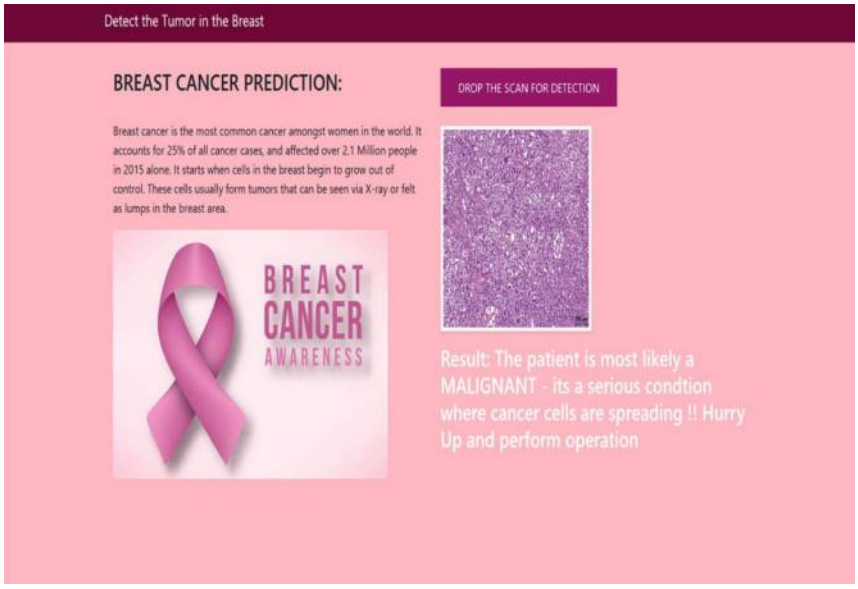
With the help of google colab we performed bulding and testing of our model

Finally we got accuracy about 95%

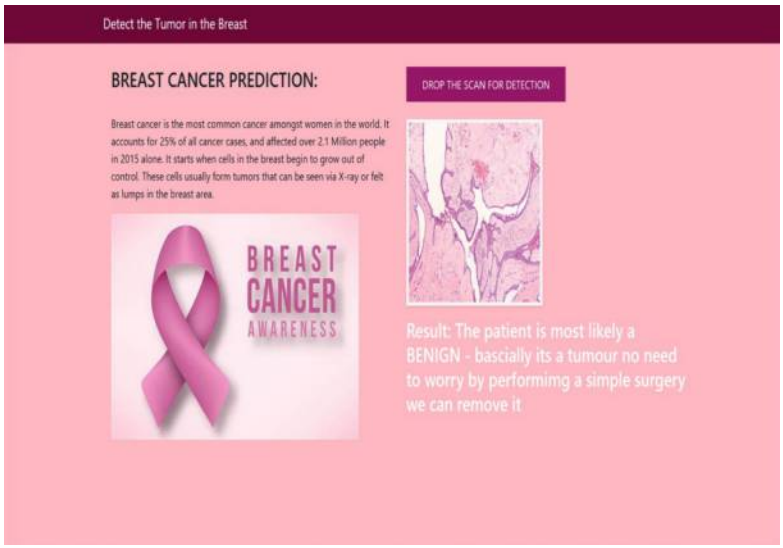
Next with the help of flask framework we deployed our application

page 1:

page 2:(case1)



page2:(case2)


Detect the Tumor in the Breast
BREAST CANCER PREDICTION:
Breast cancer is the most common cancer amongst women in the world. It accounts for 25% of all cancer cases, and affected over 2.1 Million people in 2015 alone. It starts when cells in the breast begin to grow out of control. These cells usually form tumors that can be seen via X-ray or felt as lumps in the breast area.
BREAST CANCER AWARENESS
DROP THE SCAN FOR DETECTION
Result: The patient is most likely a BENIGN - bascially its a tumour no need to worry by performimg a simple surgery we can remove it