National College of Ireland

Configuration Manual

MSc Research Project
Data Analytics

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Project Submission Sheet
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Student Name:	Aboli Kapadnis
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Configuration Manual

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1 Introduction

The objective for configuration manual is provide details of the system setup, software specification, hardware platforms and steps for the implementing the research project: Brain Tumour Detection using Deep Learning with AlexNet

2 System Configuration

2.1 Hardware

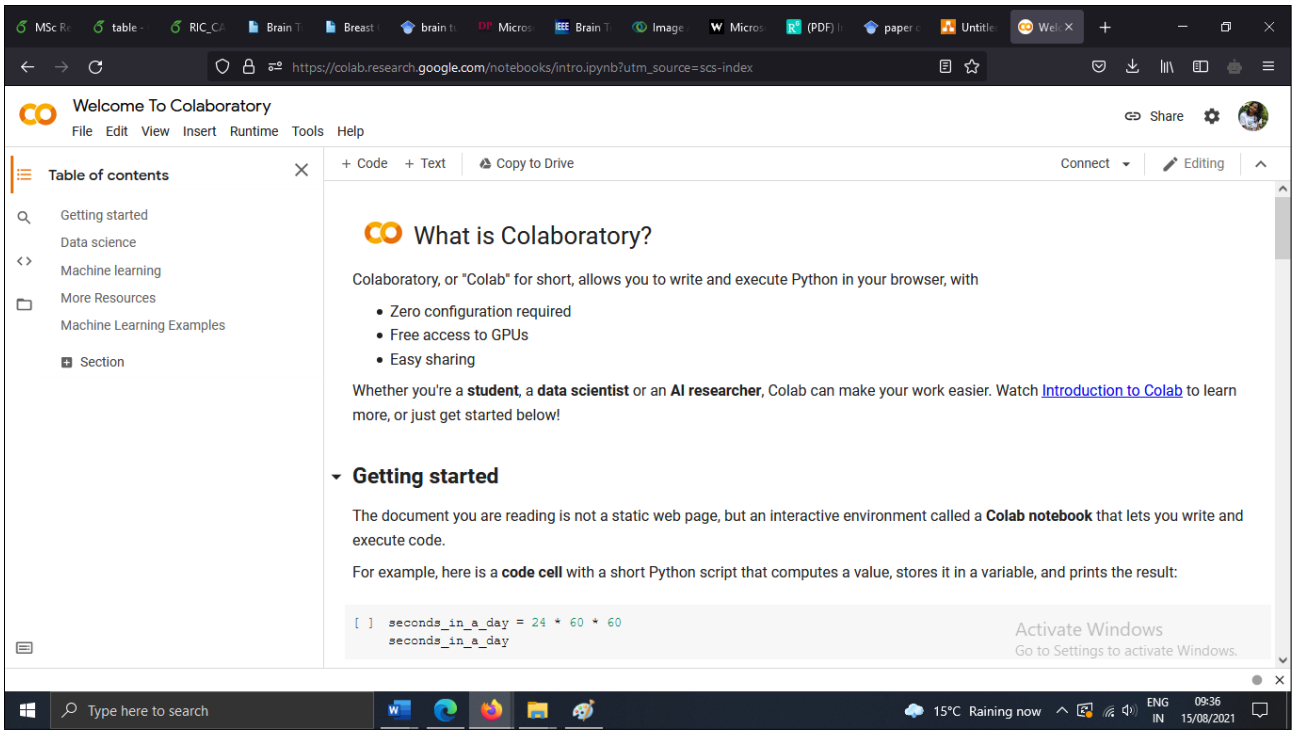
OS	Windows 10
RAM	Minimum 8GB (2.14 GB from Colaboratory)
Hard Disk Space	Minimum 100GB (100 GB drive space)

2.2 Software

Programming Language Tools	Google Colaboratory (Cloud based Jupyter notebook environment), Python version 3, Microsoft Excel, Overleaf
Web Browser	Google Chrome or Mozilla Firefox
Email	Access to a Gmail account

2.2.1 Google colab environment:

CNN and other models consume long time to process the visuals. The experiment is conducted on a Google Collaboratory environment with a 100 GB hard drive, 12.72 GB RAM, and a 48.97 GB run-time GPU. Because all models have additional layers, they take longer to execute on big picture data. The use of a GPU in real time speeds up the execution of CNN and AlexNet. The python libraries Keras and TensorFlow are utilized to implement all three models. On Google Collaboratory Notebook, Python version 3 is used. Google Drive has been used to store the data. Numpy and Keras packages from Python are used for image normalization, argumentation, cropping and up-sampling. 1. Sign in to Google colab with your gmail.



3 Project Development

This project follows a Cross Industry Standard Process for Data Mining (CRISP- DM) Methodology and the details of the research process such as data collection, processing techniques and algorithms are discussed below.

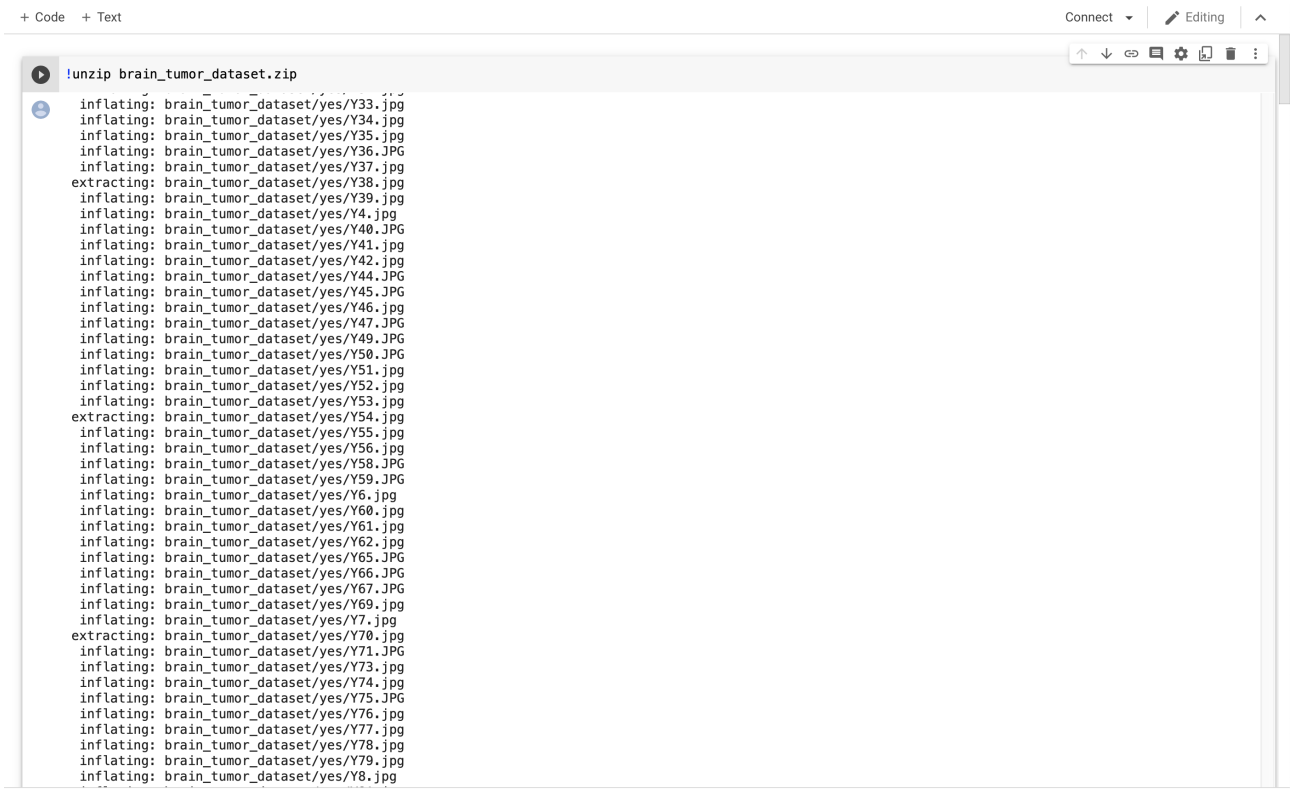
3.1 Google Colaboratory Environment Setup

The Google Colaboratory environment is used for perform the experiments. Google drive access is required for accessing Google Colaboratory and hence a valid Gmail account is essential. Once the URL is followed, a code is visible using which access will be granted to use the Google Drive for mounting the files and data.

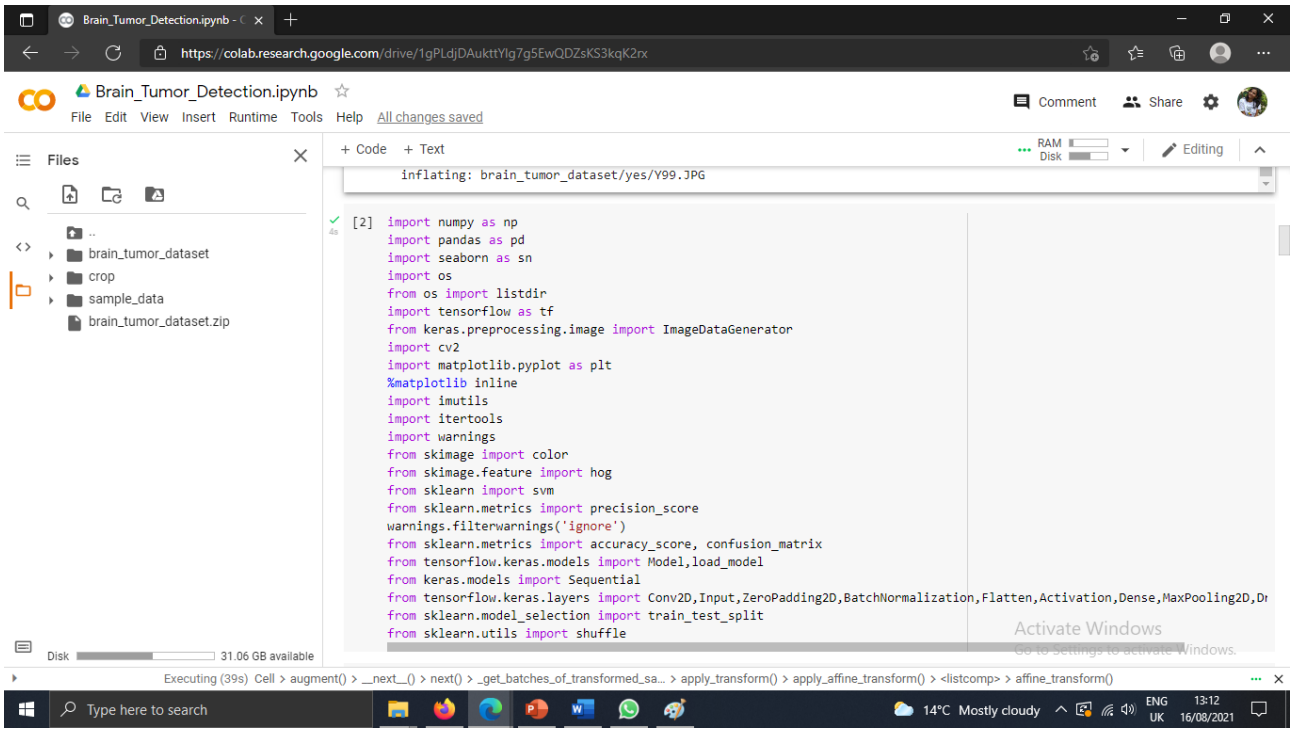
We have used Python 3 notebooks for all Experiments

3.2 Data Preparation

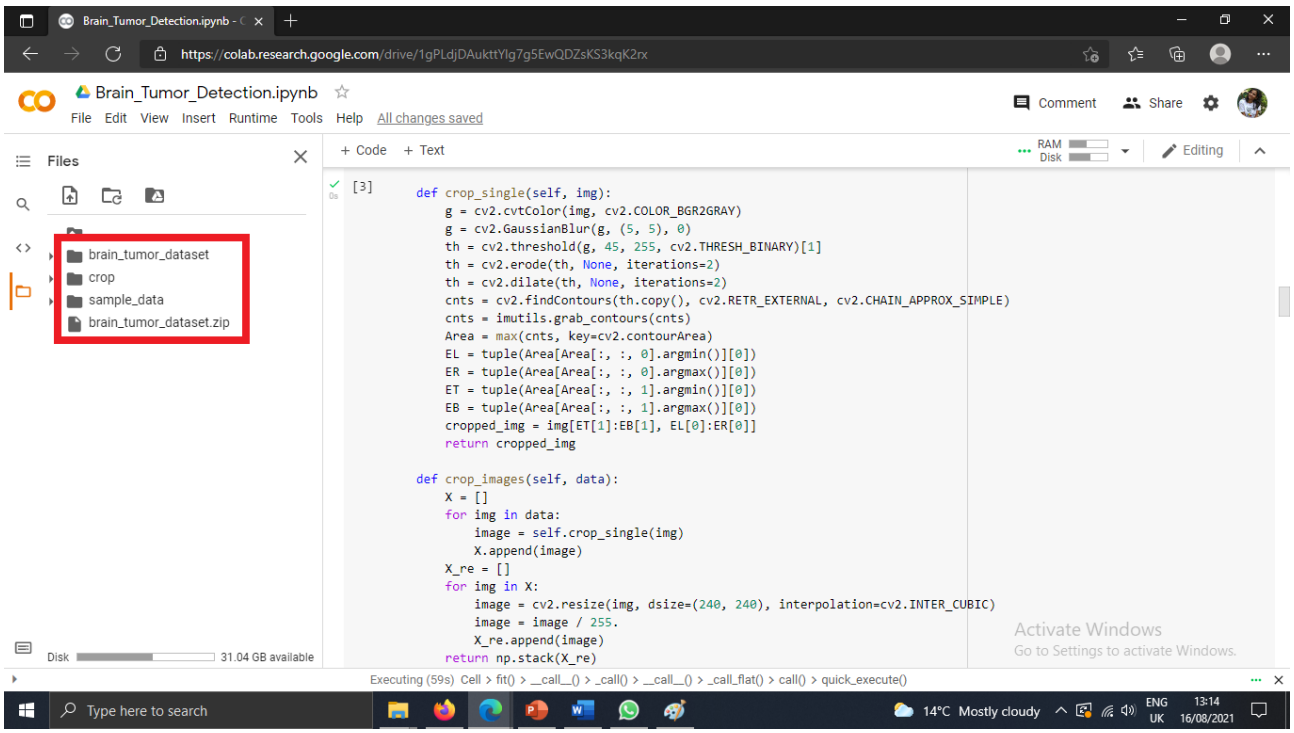
Step 1: Unzipping the dataset



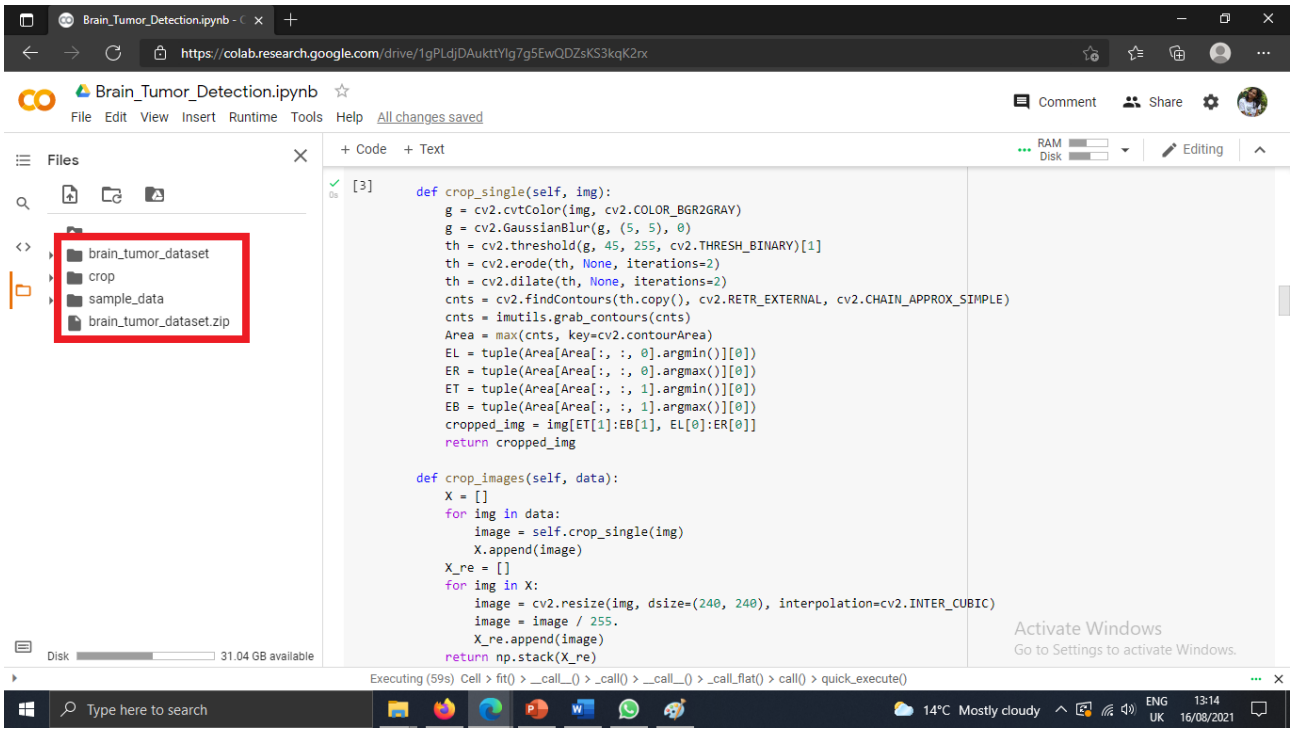
Step 2: Import Libraries



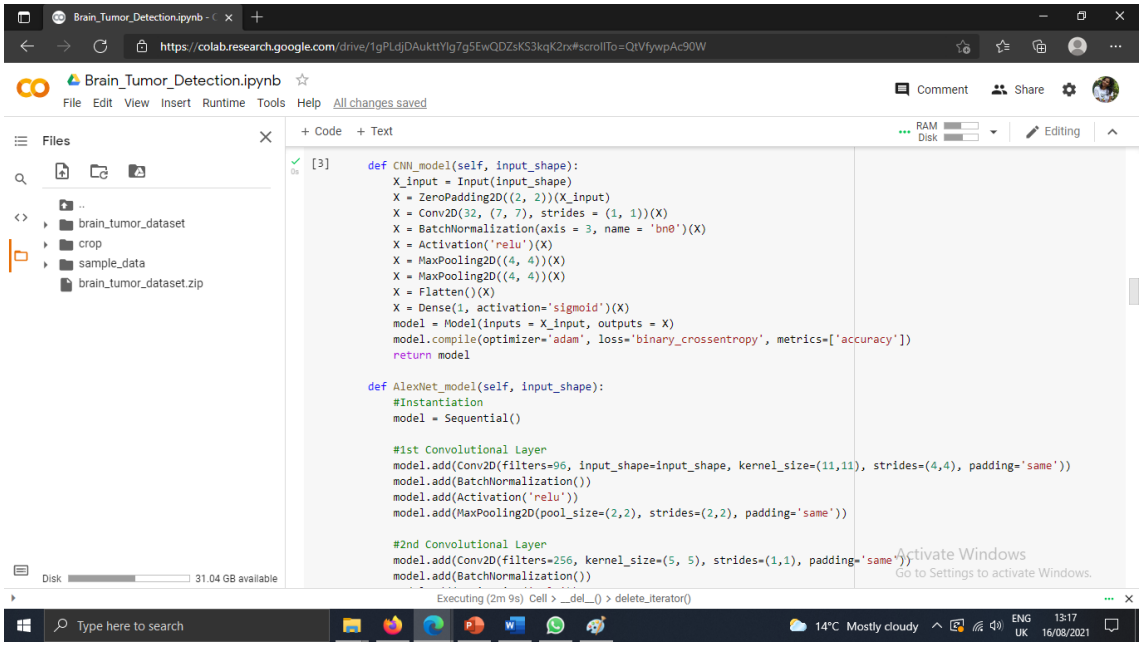
Step 3: Data Augmentation

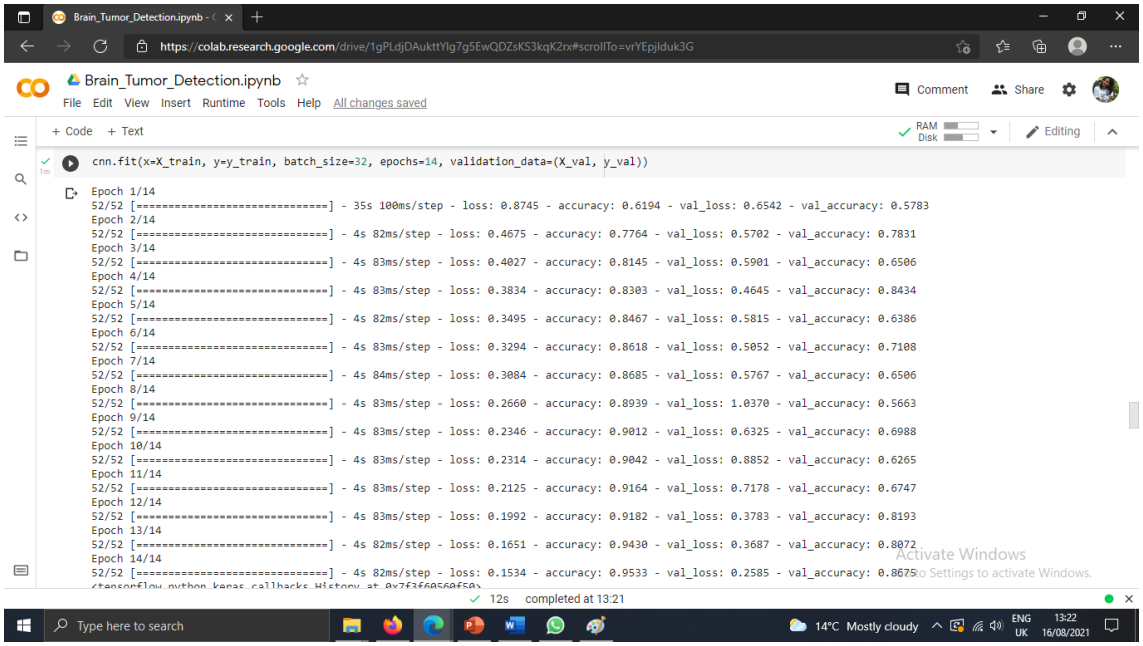


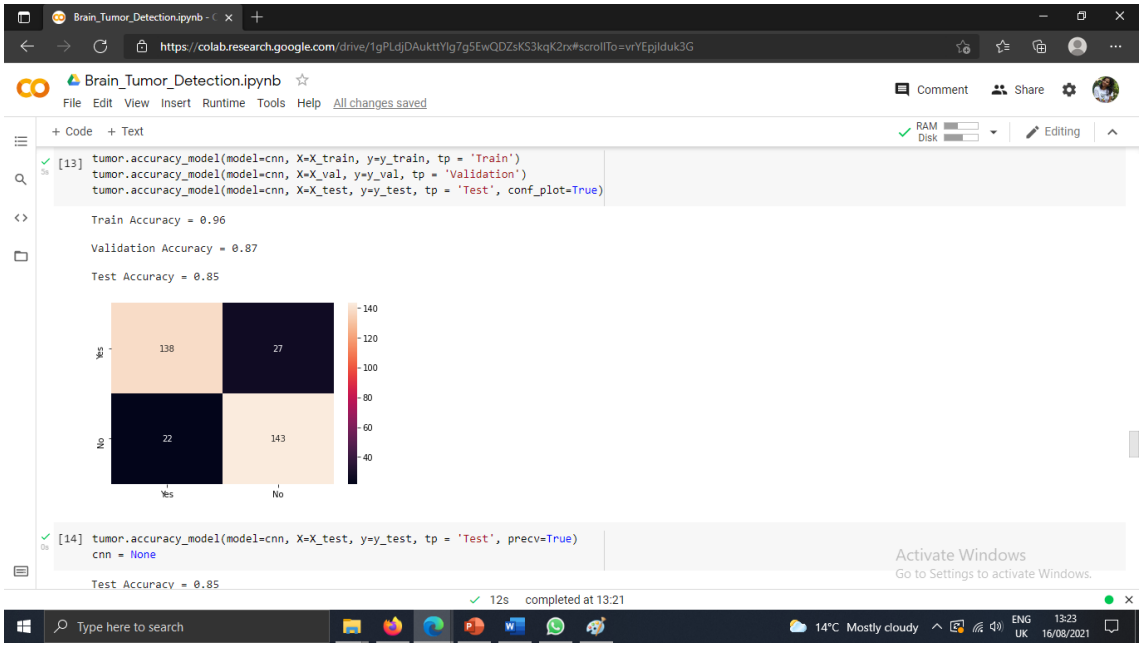
Step 4: Create Crop Folder



Step 5: CNN Model

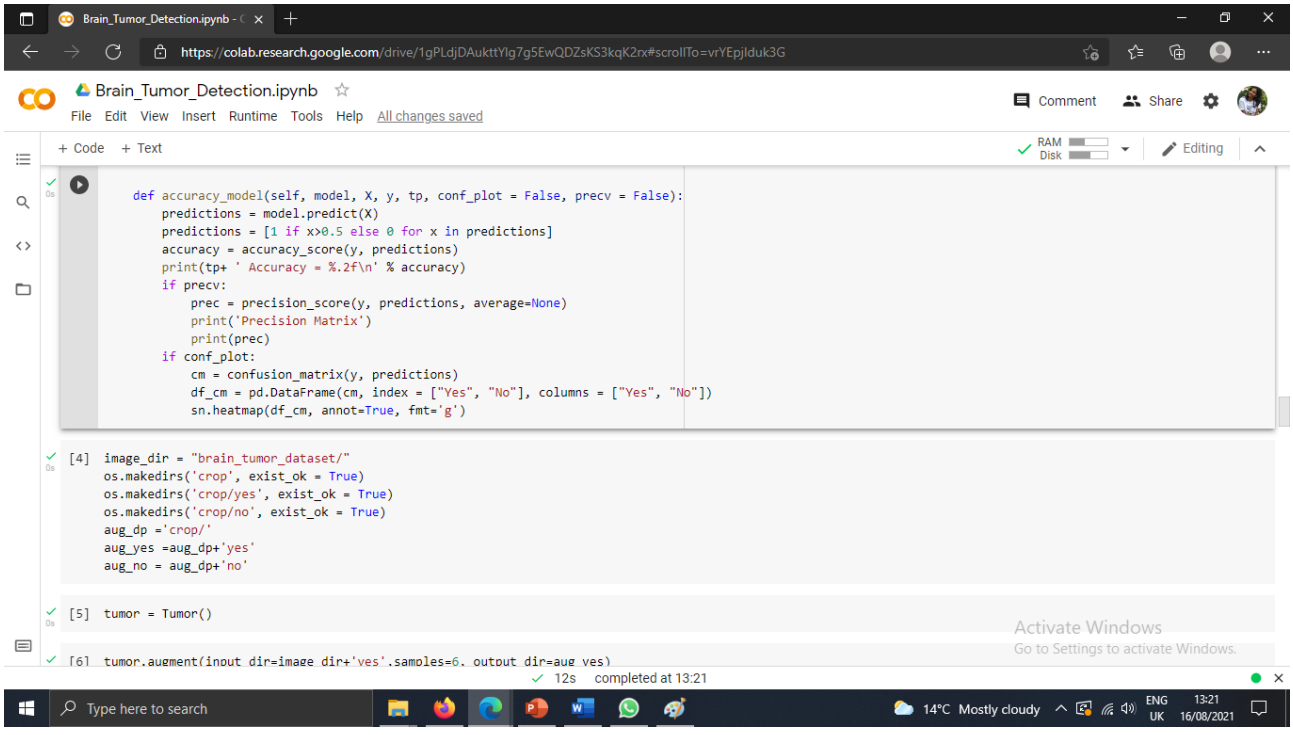


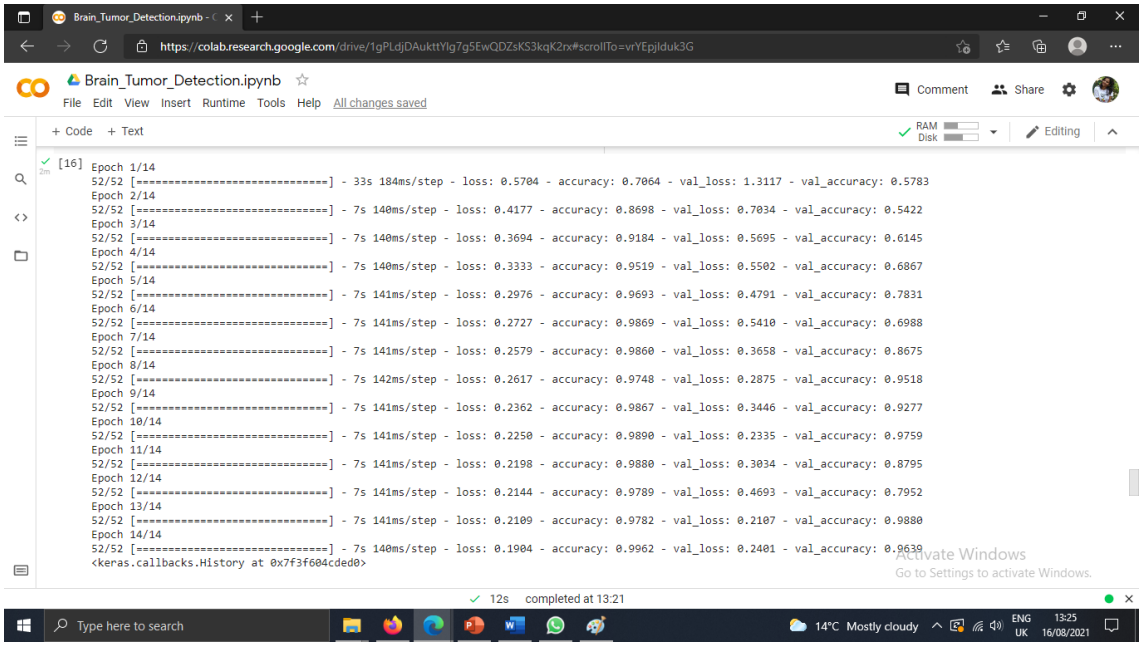




Step 5: AlexNet Model

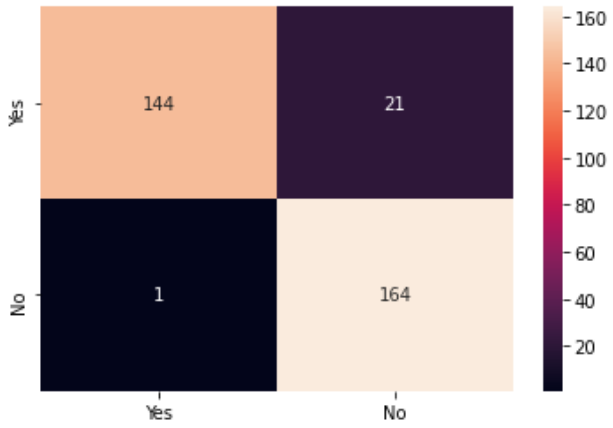
```python
def AlexNet_model(self, input_shape):
    #Instantiation
    model = Sequential()

    #1st Convolutional Layer
    model.add(Conv2D(filters=96, input_shape=input_shape, kernel_size=(11,11), strides=(4,4), padding='same'))
    model.add(BatchNormalization())
    model.add(Activation('relu'))
    model.add(MaxPooling2D(pool_size=(2,2), strides=(2,2), padding='same'))

    #2nd Convolutional Layer
    model.add(Conv2D(filters=256, kernel_size=(5, 5), strides=(1,1), padding='same'))
    model.add(BatchNormalization())
    model.add(Activation('relu'))
    model.add(MaxPooling2D(pool_size=(2,2), strides=(2,2), padding='same'))

    #3rd Convolutional Layer
    model.add(Conv2D(filters=384, kernel_size=(3,3), strides=(1,1), padding='same'))
    model.add(BatchNormalization())
    model.add(Activation('relu'))

    #4th Convolutional Layer
    model.add(Conv2D(filters=384, kernel_size=(3,3), strides=(1,1), padding='same'))
    model.add(BatchNormalization())
```



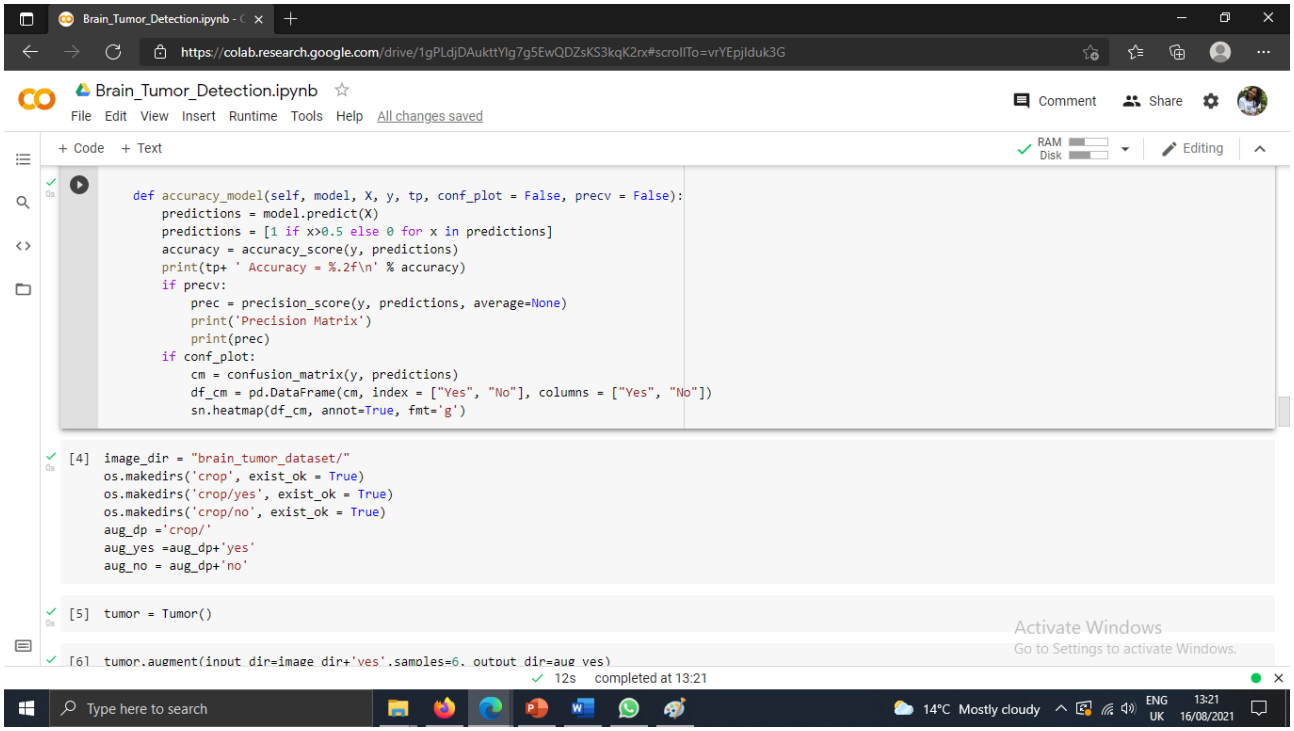



```
tumor.accuracy_model(model=alexnet, X=X_train, y=y_train, tp = 'Train')
tumor.accuracy_model(model=alexnet, X=X_val, y=y_val, tp = 'Validation')
tumor.accuracy_model(model=alexnet, X=X_test, y=y_test, tp = 'Test', conf_plot=True)
```

```
Train Accuracy = 0.97

Validation Accuracy = 0.96

Test Accuracy = 0.93
```



Step 6: Accuracy Model



Step 7: Histogram of Gradient and Support Vector Machine (HOG + SVM)