PROJECT 1 ON COMPUTER VISION		
Student's name	AIMS African Institute for Mathematical Sciences SENEGAL	Deadline
Jean Bayiha		**May 25 2025, 11:59 pm**
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Lecturer: Dr Jordan Felicien Masakuna		

1 Project description

Design a complete image classification pipeline for the dataset brain_cancer. Research and select appropriate techniques for each stage of the pipeline (e.g., preprocessing, augmentation, normalization, etc.).
Note: The data folder name was **breast_cancer** but inside it we found **brain cancer** images.

2 PyTorch model

Here we design a CNN model with PyTorch from scratch and we trained it on the brain cancer images. We preprocessed the images in the prep.py file, we designed the model in cnn.py file and we trained in using the code in train.py file. We had 92.37% of accuracy on the test set. Here is the architecture of the model.

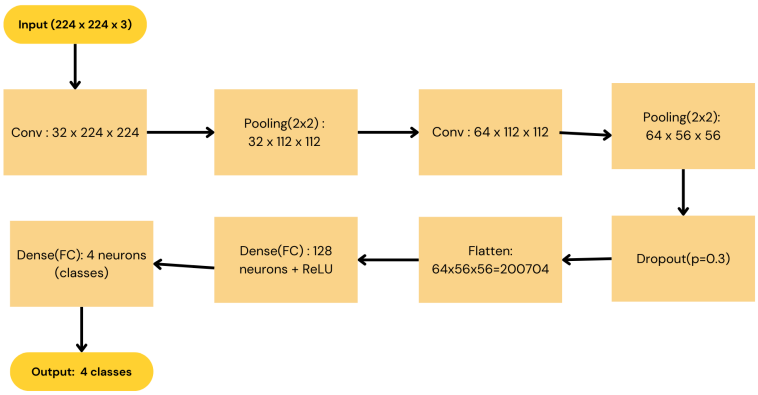

Figure 1: PyTorch CNN architecture

3 TensorFlow model

Here we used the pre-trained model **MobileNetV2** which is very light compared to ResNet and takes 96×96 images as input, so we had to reshape our images. We flattened its output with a global average pooling layer and added a fully connected layer with 56 neurons that we trained on our data. We had 95.19% accuracy in the test set. Here is the architecture of the model.

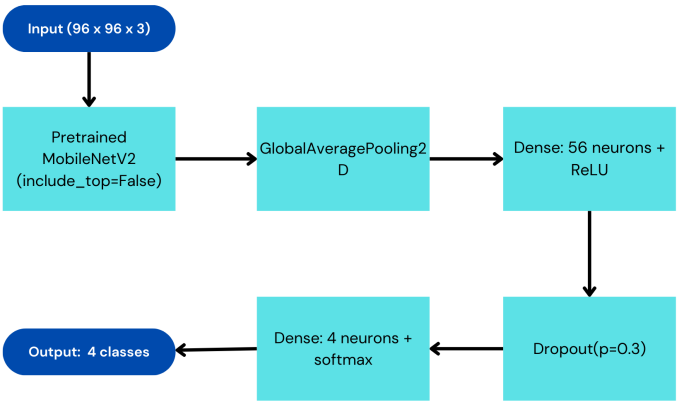

Figure 2: TensorFlow model architecture

4 Challenges

Here is a list of some of the challenges that we faced during this project:

- **Computational resources** : Our GPU resources were limited, so our 1^{st} trainings took a lot of time and we could not add use some techniques like data augmentation to improve the model. In the beginning, we wanted to use the pretrained model **ResNet50**(easy to use with PyTorch) but it is not easy to access it using TensorFlow so we decided to test another one.
- **Model file extension** : We were able to save the PyTorch model using **.torch** but for TensorFlow we were obliged to use the extension **.h5** to save the weights because **tensorflow.keras** is not able to load model files using other extensions than ***.weights.h5, *.h5 and *.keras**.
- **Deployment issue**: We tried to deploy our web application on platforms like **PythonAnyware and Render** but they did not give access to enough storage and RAM space (less than 1 GB) to install libraries.

5 Web page and GitHub link

We created a web page to classify an image using your models. We used Python, Flask, HTML, and CSS to do it.
Here is the GitHub link of our final submission: `https://github.com/jeanbayiha24/brain_cancer_image_classifier.git`

An article about the pretrained model **MobileNetV2** : `https://arxiv.org/pdf/1801.04381`