Faculté des Sciences El Jadida

Documentation of the Project

Detection and Segmentation of Brain Lesions in MRI Images

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Field:

Business Intelligence and Big Data Analytics (BIBDA)

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Practical Guide for Using Applications for Detection and Segmentation of Brain Lesions in MRI Images

Introduction

This guide explains how to use applications for detection, classification, and segmentation of brain lesions in MRI images. These applications rely on artificial intelligence models:

- **CNN-VGG** for classification and detection.
- **U-Net ResNeXt50** for segmentation.

1. Installation and Prerequisites

1.1. Required Environment

- Python 3.10.0
- TensorFlow/Keras
- PyTorch (for U-Net ResNeXt50)
- OpenCV, NumPy, Matplotlib
- User interface developed (provided with the project)
- streamlit

1.2. Installing Dependencies

Run the following command to install the necessary libraries:

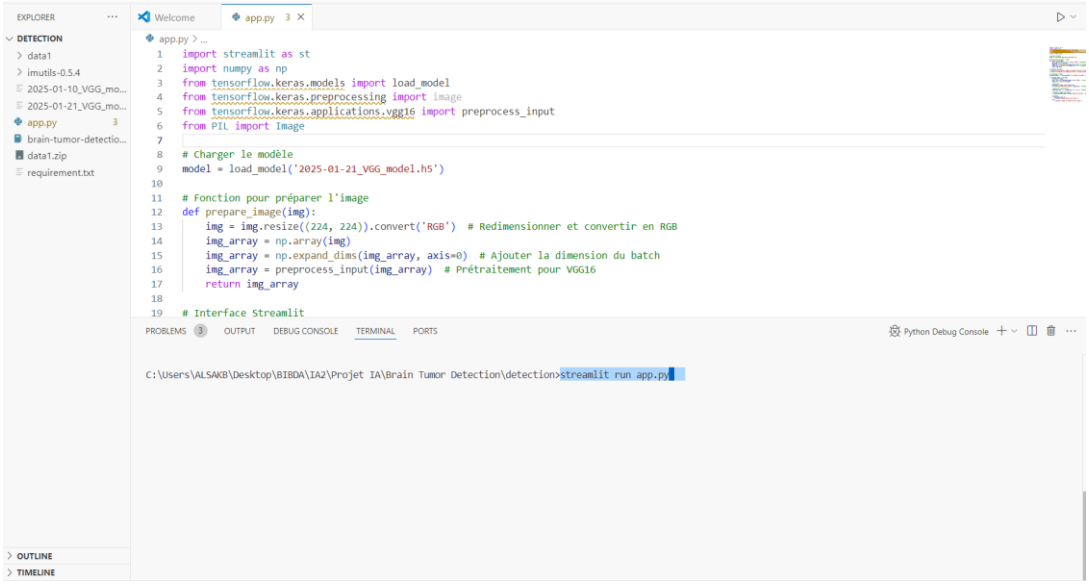
```
pip install -r requirements.txt
```

2. Using the Application

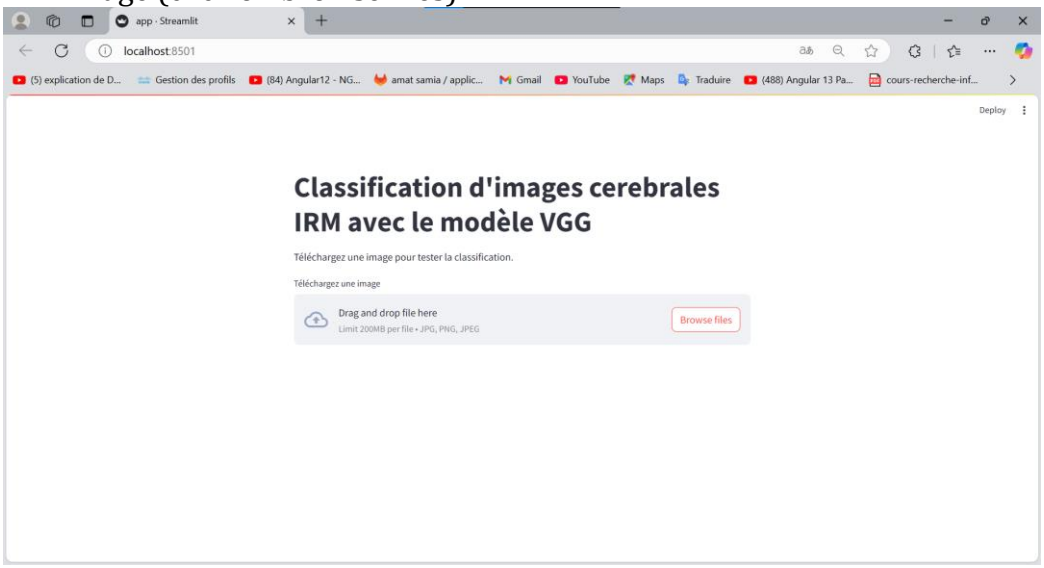
2.1. Classification and Detection Interface (CNN-VGG)

1. Launch the application with:

```
streamlit run app.py
```

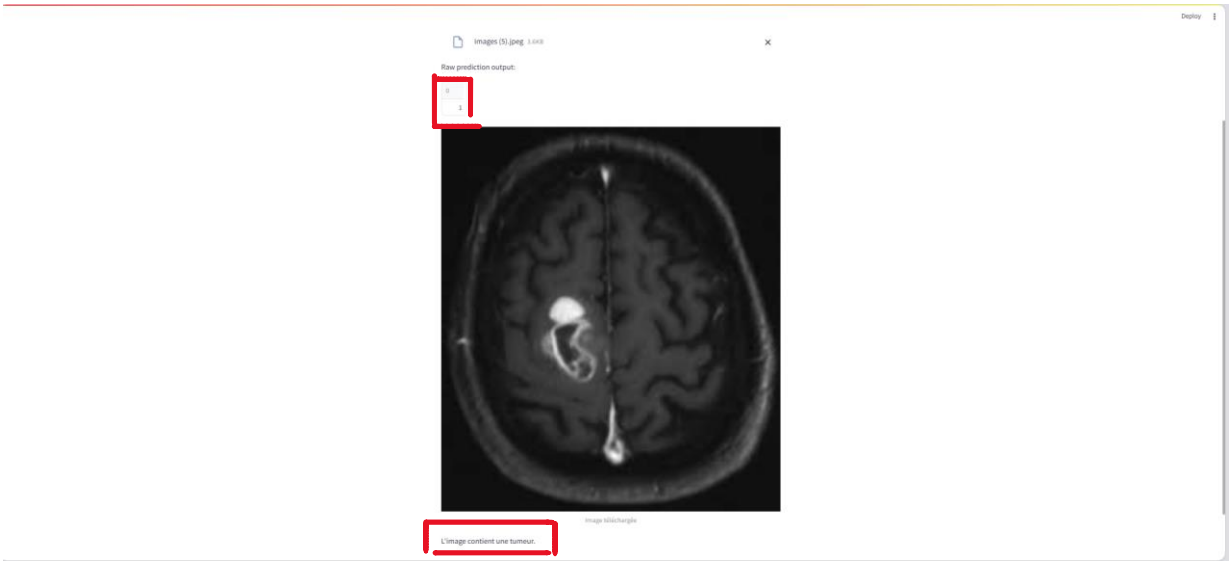


2. Load an MRI image (click on browse files).

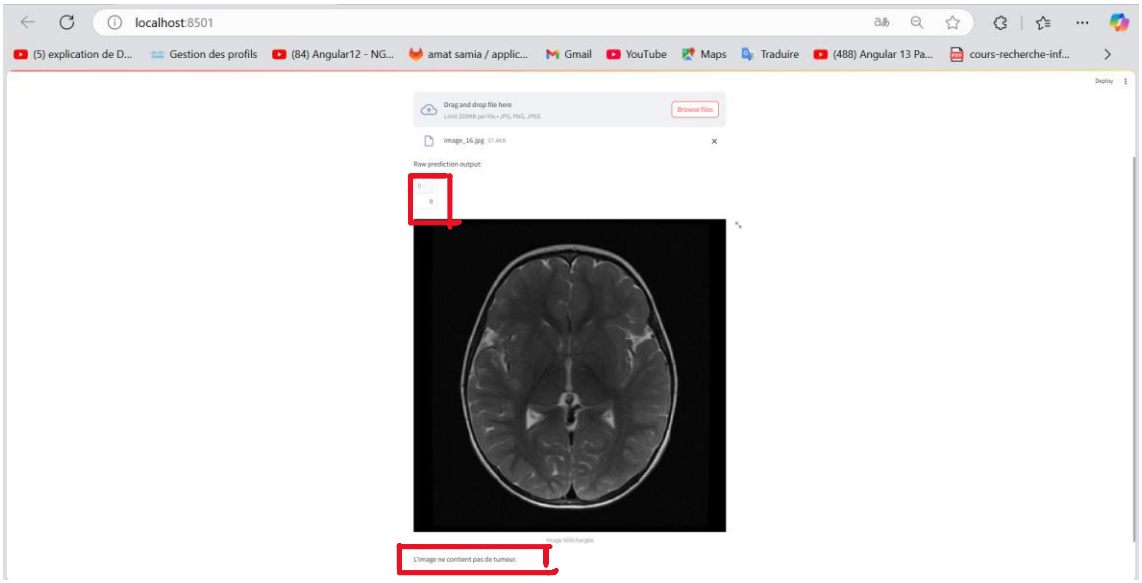


3. The results are displayed with a probability of belonging to each class.

first test with an image that contains a tumor



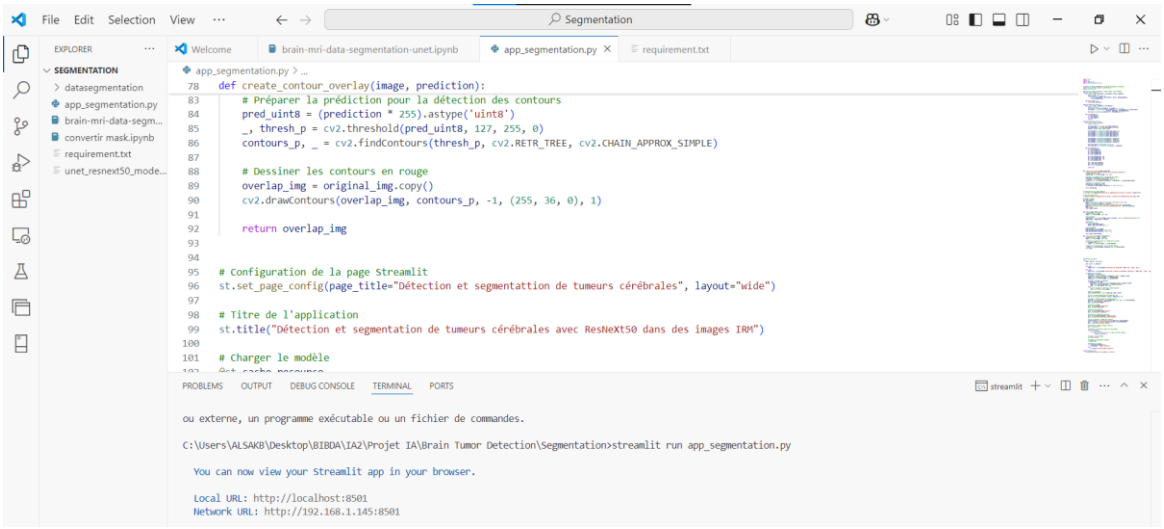
Second test with an image that does not contain a tumor



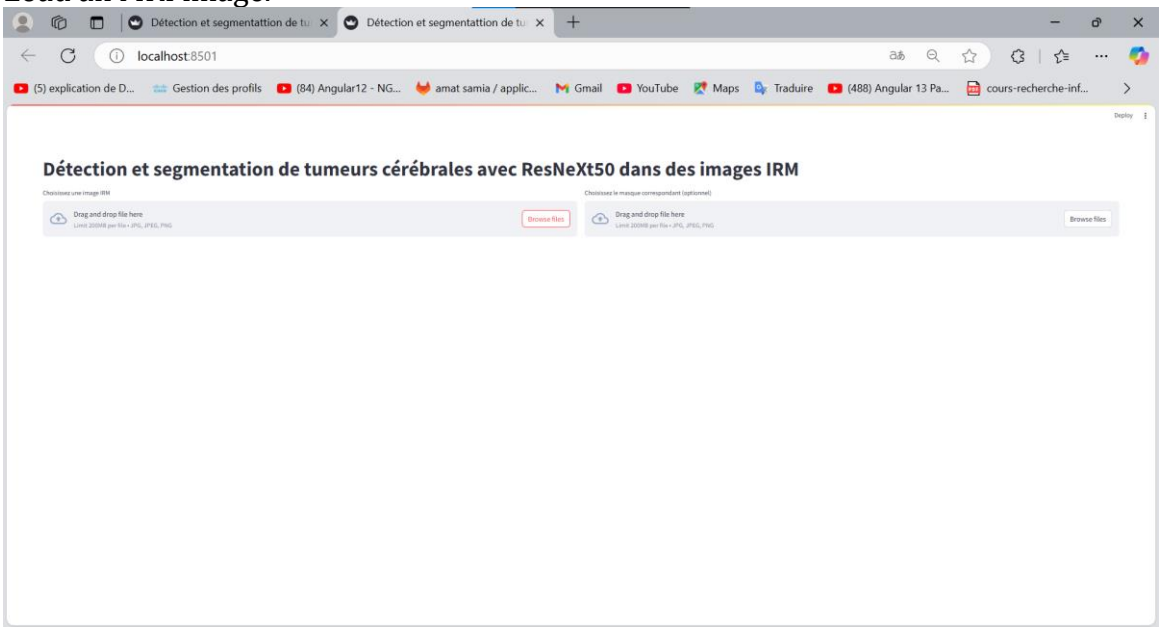
2.2. Segmentation Interface (U-Net ResNeXt50)

1. Launch the application with:

streamlit run app_segmentation.py

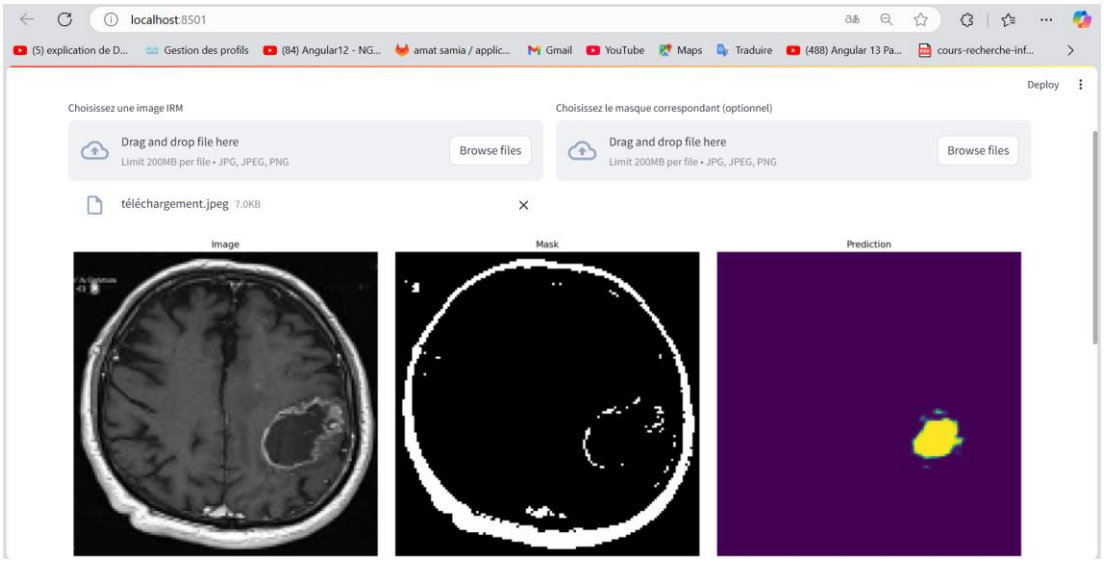


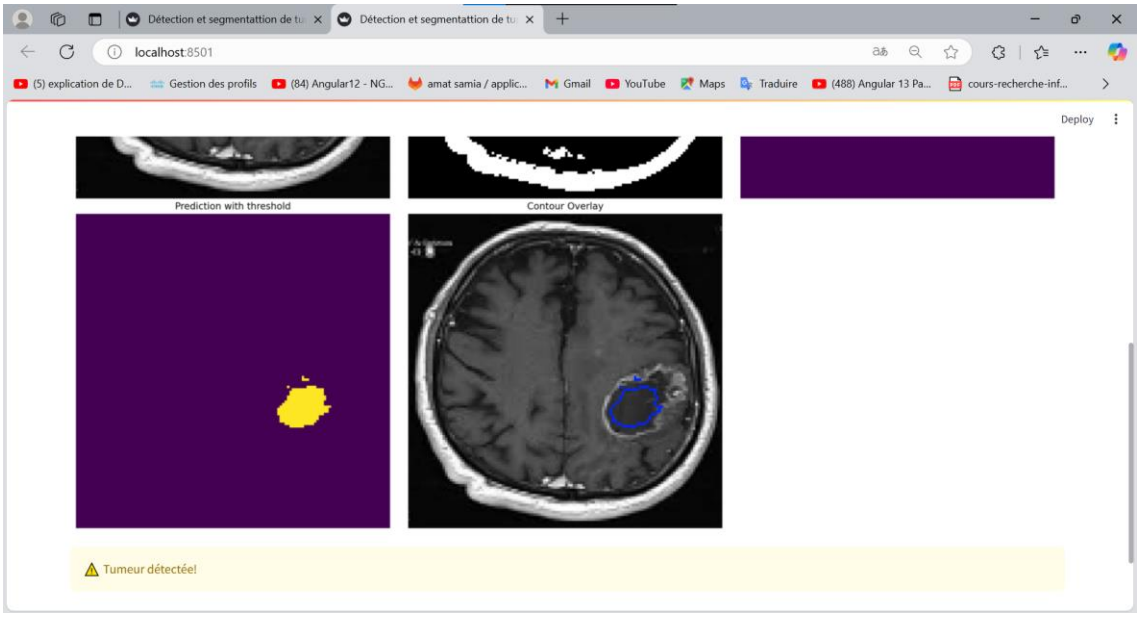
2. Load an MRI image.



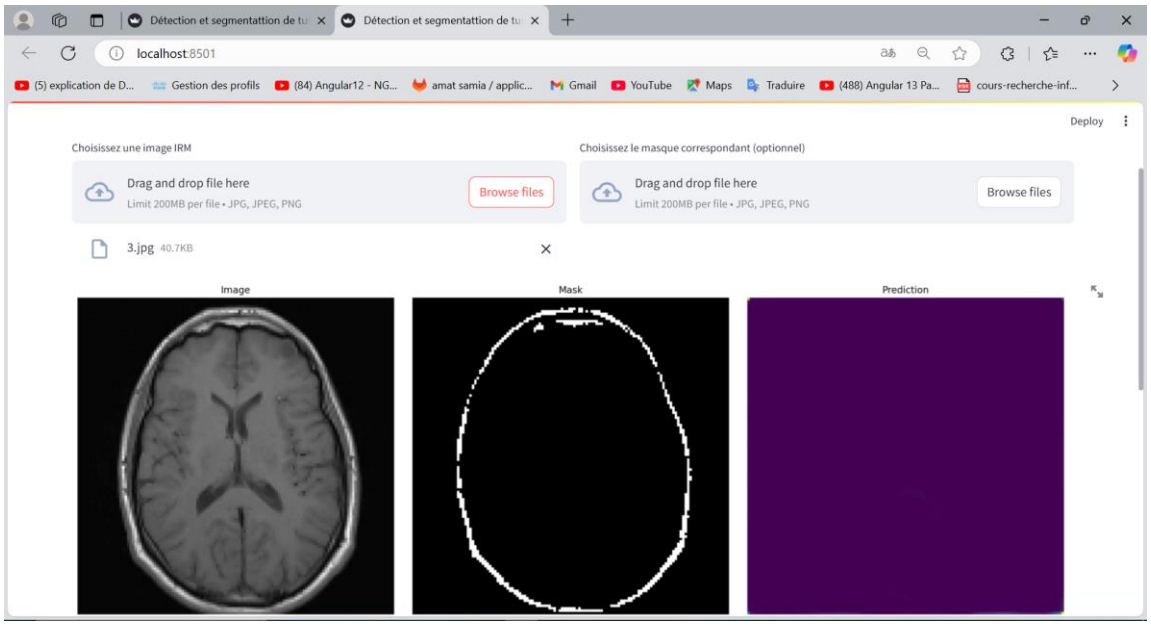
3. Displaying results.

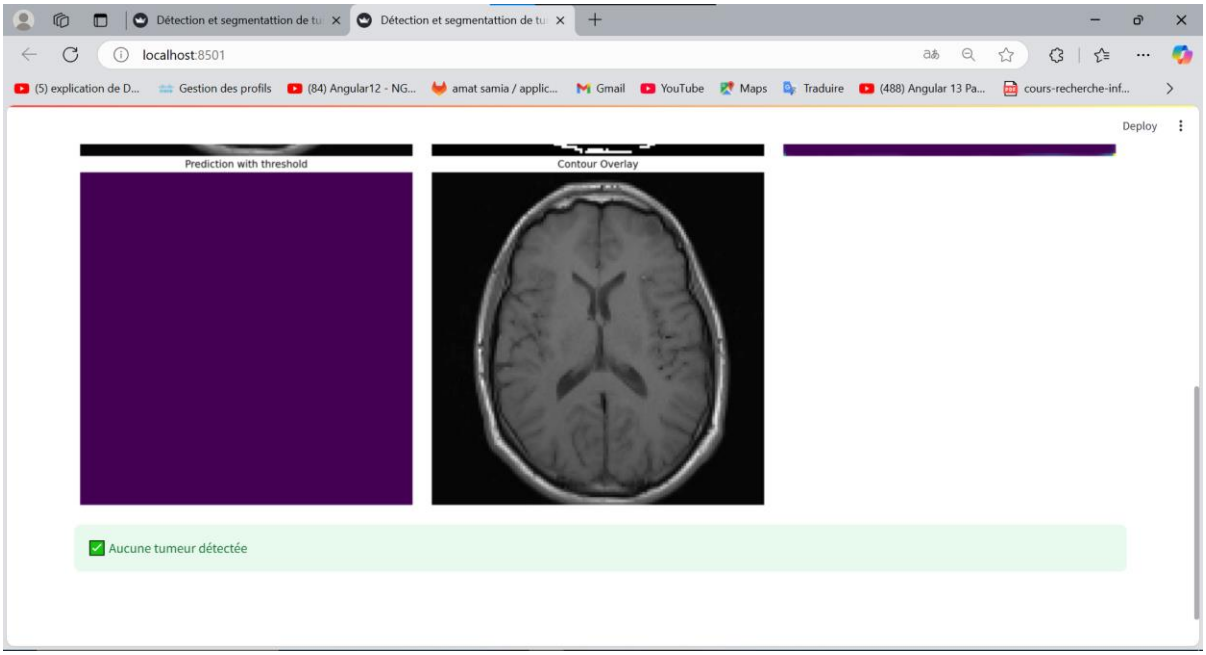
First test with an image that contains a tumor





Second test with an image that does not contain a tumor





3. Interpreting Results

- **Classification/Detection:** An image may belong to multiple classes with confidence scores.
- **Segmentation:** An overlay of the segmentation is displayed on the original image.

Conclusion

This guide allows you to take control of the applications for detection and segmentation of brain lesions in MRI images. For any modifications or improvements, refer to the source files and the documentation provided with the project.