ÇANKAYA UNIVERSITY

CENG408-Innovative System Design and Development II

Image Analysis for the Classification of Brain Tumor
Location on MR Images

USER MANUAL

Contents

INTRODUCTION

The purpose of this document is to describe Image Analysis for the Classification of Brain Tumor Location on MR Images Project to Çankaya University to users. Our project aims to develop a program which analyses the Magnetic Resonance Images of patient under consideration and recognizes the tumor by using image processing and detects the location of tumor. Users can get information about their brain MR images and whether the image has tumor or not. This document elaborates on detailed information about the project. The detailed technological requirements of the Image Analysis for the Classification of Brain Tumor Location on MR Images Project are provided in this document.

INSTALLATION

1. First of all, you have to download project code from GitHub page. We have two different codes one for developers that includes segmentation and classification algorithms, the other one for end-users which is a desktop application that uses segmentation algorithms and finds tumor location. GitHub link of our project: https://github.com/CankayaUniversity/ceng-407-408-2019-2020-Image-Analysis-for-the-Classification-of-Brain-Tumor-Location-on-MR-Images. Developers must download TumorDetection.py Python code. End-users must download TumorDetectionGUI.py

2. The second step is for developers only. We use MySQL database for this system. If you want to work and store your results on database you must download MySQL to your computer. If you do not want to work with a database, you should delete related database codes manually. The codes that related to database are specified in the comments.

3. If you want to work with a database you can get our database structure from here: https://github.com/CankayaUniversity/ceng-407-408-2019-2020-Image-Analysis-for-the-Classification-of-Brain-Tumor-Location-on-MR-Images/blob/master/Dump20200516.sql
You must save file as .sql extension and import it to MySQL. Here is information about how to import database files to MySQL workbench:
https://dev.mysql.com/doc/workbench/en/wb-admin-export-import- table.html.
Further information you must the with databases are shown in the comments on the codes.

4. You can run the code in a code editor based on your choice. We recommend you to install Anaconda to your computer and run it in the Jupyter Notebook editor or JupyterLab. You can download Anaconda from the link given on the side: https://www.anaconda.com/products/individual.

5. You also must install Python and pip to your computer. We use Python version 3.7 and pip3 for the project. We recommend downloading these versions to the project to get ahead of possible errors. You must run the codes given below either at the operating system terminal or at the terminal of the editor that you are using before you run the project code. JupyterLab can be installed using conda or pip. If you use conda you can install it with:

```
conda install -c conda-forge jupyterlab
```

If you use pip, you can install it with:

```
pip install jupyterlab
```

pip commands that you need to execute before you start the project:

```
pip install opencv-python

pip install numpy

Pip install scipy

pip install scikit-learn

pip install mysql-connector-python

pip install h5py

pip install os

pip install glob

pip install matplotlib

pip install io

pip install base64
```

USER MANUAL

The system works for both Windows and Linux operating systems. You must create a folder for the project manually. Inside the folder you must also create data folder that named "data" and put your dataset inside the folder. After that you are good to go. Get the code from our GitHub page, paste it to your editor you want work with. You also need to run pip install codes we gave above, on your editor or computer terminal. You must run the code considering the code must work inside your project directory so make sure you direct your editor inside project folder. Then run the code. The code takes a few minutes to give a result. When developer code finishes executing, it will print the accuracy of classification and the results of your dataset. On developer code it saves the results to MYSQL database.

When end-user code starts executing it will ask you to choose an image. Click Open Image button and choose brain MR image that its extension must be .jpg.
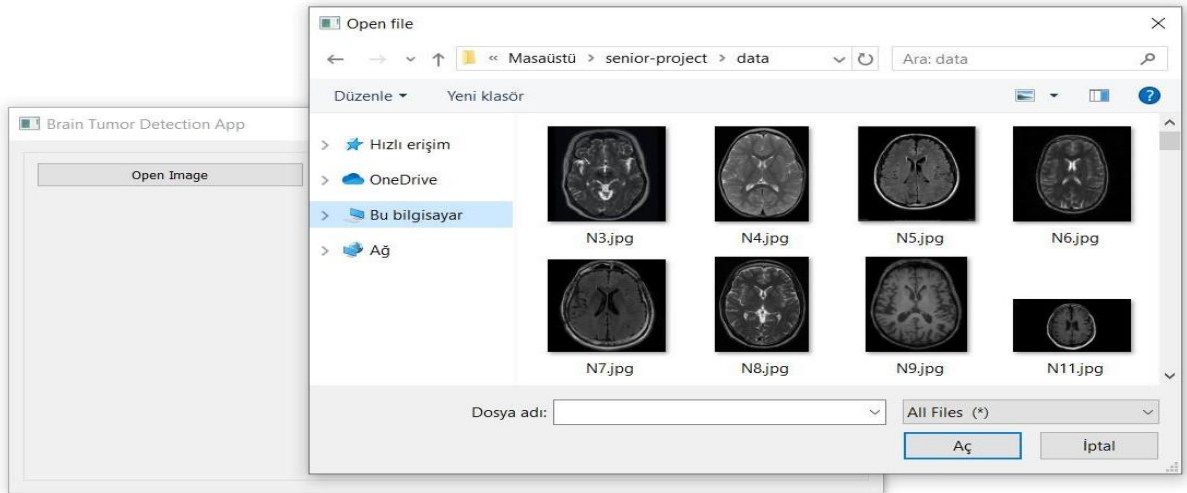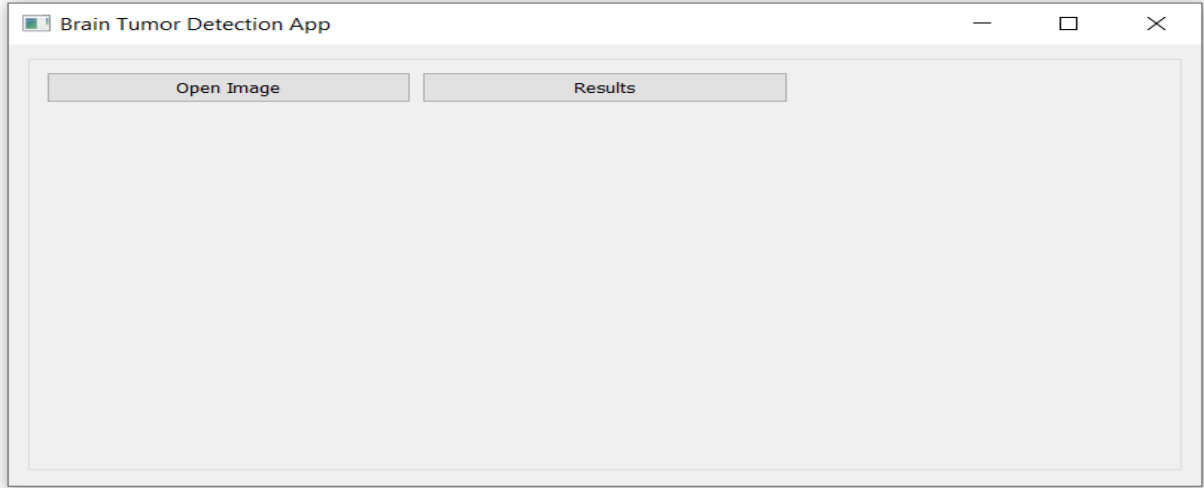
Click on Results, it will show you the result images and tell you whether there is a tumor and not. If there is a tumor, application displays its location whether it is on the right or left side.