CENG3522 Applied Machine Learning Project

# Project Name

**Brain Tumor Detection System**

# Team Members

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# Goal /Motivation

With the advancement of medical technologies today, the early detection and treatment of many health issues have become possible. However, the early diagnosis of conditions such as brain tumors, which can pose potential life-threatening risks, still remains a significant challenge. To overcome these challenges and provide more effective healthcare services, we are focusing on innovative solutions based on artificial intelligence and machine learning.

Our goal is to develop a detection machine capable of identifying brain tumors early and accurately, providing a valuable contribution to the diagnostic process of medical experts. This machine could play a critical role in saving patients lives and improving the medical intervention process.

# Description of the Learning Problem

The learning problem in this project involves classifying MRI images into two categories: those indicating the presence of a brain tumor and those showing no evidence of a tumor. This falls under the domain of supervised learning, where the algorithm learns from labeled data to make predictions on unseen data.

# Datasets

We have 2 datasets and 1500 MRI images.

<https://www.kaggle.com/datasets/preetviradiya/brian-tumor-dataset?resource=download>

<https://www.kaggle.com/datasets/trainingdatapro/brain-mri-dataset>

ekran görüntüsü, metin, röntgen filmi içeren bir resim

Açıklama otomatik olarak oluşturuldu

## Services

Yolo v8

Google Collabd

Roboflow

## Methods

We needed an object detection system, and we chose the YOLOv8 model for this purpose. To prepare our dataset for use with YOLOv8, we labeled all our data by separating it into classes using Roboflow.

## Results

We tried 2 datasets for tumor images. In first dataset:

In healthy tomography, we got 11 empty errors and 8 brain tumor errors out of 100. It’s %81 accuracy.

In brain tumor tomography, out of 132 tumors, we got 8 empty errors and 4 were wrong. It’s %91 accuracy.

Second dataset:

In healthy tomography, we got 22 empty errors and 13 brain tumor errors out of 80. It’s %57 accuracy.

In brain tumor tomography, out of 170 tumors, we got 17 empty errors and 6 were wrong. It’s %87 accuracy.

## Github Link

<https://github.com/EAtalay8/BrainTumorDetection>

## Roboflow Link

<https://app.roboflow.com/alper-fbc0d/tumor-detection2-rscmi/2>