SILESIAN UNIVERSITY OF TECHNOLOGY
FACULTY OF AUTOMATIC CONTROL, ELECTRONICS AND COMPUTER SCIENCE

BIOLOGICALLY INSPIRED ARTIFICIAL INTELLIGENCE
PROJECT TOPIC: BRAIN TUMOR DETECTION FROM MRI IMAGES

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1. Objective

   The goal of this project is to develop a deep learning model capable of accurately detecting brain tumors from MRI images. The model will utilize a U-Net architecture to perform semantic segmentation, identifying tumor regions within the MRI scans. The final application will utilize the deep learning model to assist radiologists by providing precise and reliable tumor localization, thus improving diagnostic accuracy.

2. Compatibility:

   Operating system: the application will be compatible with Windows.
   Programming languages: Python.
   Deep learning frameworks: TensorFlow/Keras

3. Input Image Format:

   Image type: MRI (Magnetic Resonance Imaging)
   Image dimensions: 256x256 pixels.
   Color mode: RGB for input images, grayscale for mask images
   File format: .tif images will be used for training the ML model. Other image formats (.jpg, .jpeg, .png) will be supported in the final application.
   Dataset source: the dataset used for this project is sourced from Kaggle, [Brain MRI segmentation](#).

4. Computational Resources

   The model will be trained using Kaggle Kernel, a cloud service, which provides powerful computational resources including GPUs and TPUs. The final application can be run on an average computer.

5. Output Format

   The output will be a binary mask highlighting the detected tumor regions in the input MRI image. The application will display both the original MRI image and the generated tumor mask for visual inspection.