Brain tumor classification

Phase 1: PEAS and ODESA

PEAS:

* P (Performance Measure)
* Healthy patient, minimize costs
* E (Environment)
  + Patient, hospital, staff
* A (Actuator)
  + Display questions, tests, diagnoses
* S (Sensor)
  + entry of image

ODESA:

* O : partial observable
* D : stochastic
* E : Episode
* S : dynamic
* A : Single agent

Phase 2: Problem Formulation

Initial State:

* + Random weight of all neuron
* Successor function:
  + Change weight in neural network
* Goal test:
  + Successes to classified image in test set
* Path cost:
* minimize difference between predicate and label

Phase 3: Project Design

brain tumor dataset consisting of 3064 T-1 weighted CE-MRI images publicly available via figshare Cheng (Brain Tumor Dataset, 2017 [[1](https://link.springer.com/chapter/10.1007/978-981-10-9035-6_33?fbclid=IwAR1KTQ-tzCNNr5FHByIr4NR1S--FT3TVk4r1AzNcBUQuhScq0fspZdWGaIA#CR1)]). Using our simple architecture we could achieve a training accuracy of 98.51% and validation accuracy of 96.3% at best.

This dataset consists of 708 images with glioma, 1426 images with meningioma, and 930 images with pituitary tumors. In our training phase, we equalize the amount of images that are used.

Split data into 1500 image in training set and 450 image in validation set and 150 image in training.

We used image preprocessing and thin using transfer learning fine tuning vgg16 and some new layer with dropout and using adam optimizer with start learninig rate 0.003 and thin decay to 0.001 after 0.001 after 25 epoch.

Phase 4: AI algorithm

CNN (convolutional-neural-networks)

First layer is vgg16 and thin new CNN layer with dropout