UNIVERSIDAD DE GRANADA

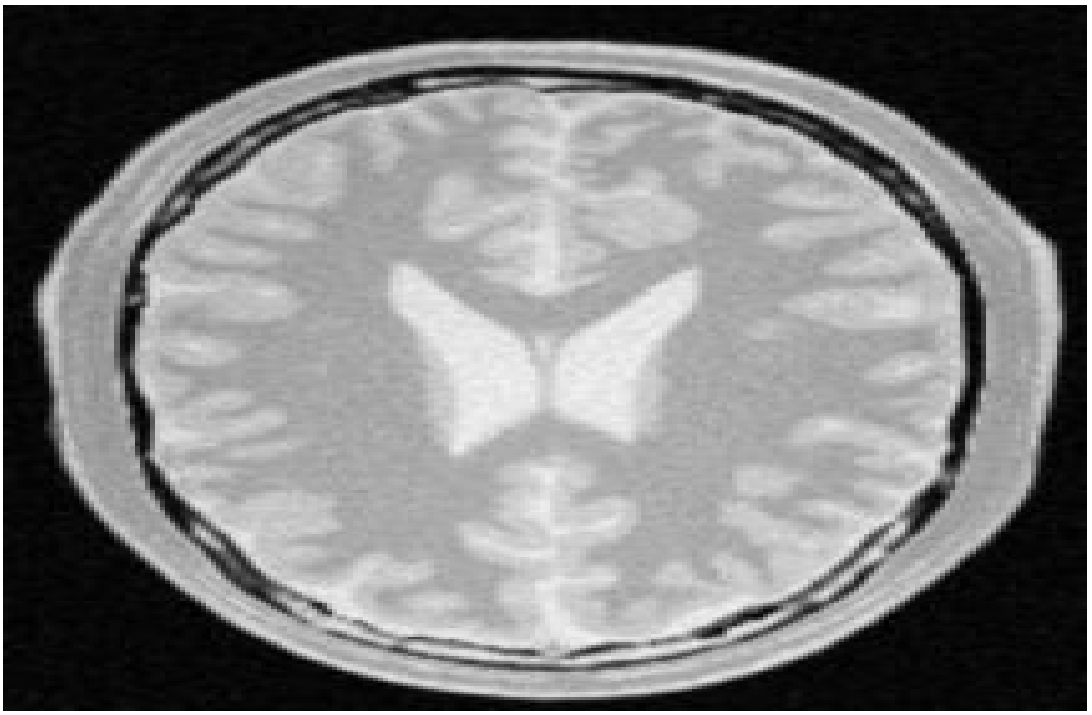
TVG

Practica 4

Alumno	Abdullah Almusawi
Profesor	ALEJANDRO JOSE
Fecha	April 2020
Versión	1.0

Brain

`BrainProtonDensitySlice256x256.png`:



Both the choroid plexus and the white matter have been segmented.

Choroid plexuses

Being a pretty good image, you hardly notice the difference between applying or not filtering it, however, a media filter has been applied to smooth it out.

Connected Threshold

- Seed: 81, 108
- Threshold: 210, 255

first picture without filter and the second with filter

Neighbourhood Connected

- Seed: 81, 108
- Threshold: 210, 255

without filter with filter

In this case, not adding the pre-filtering means that the segmentation is not complete and only segments a part of the plexus.

Confidence Connected

- Seed: 91, 118
- Radius: 3
- Multiplier: 3
- Iters: 2

White substance

When segmenting this part, the pre-filtering of the image should be noted more since it is not as different a part as the previous one.

Connected Threshold

- Seed: 60, 125
- Threshold: 150, 180

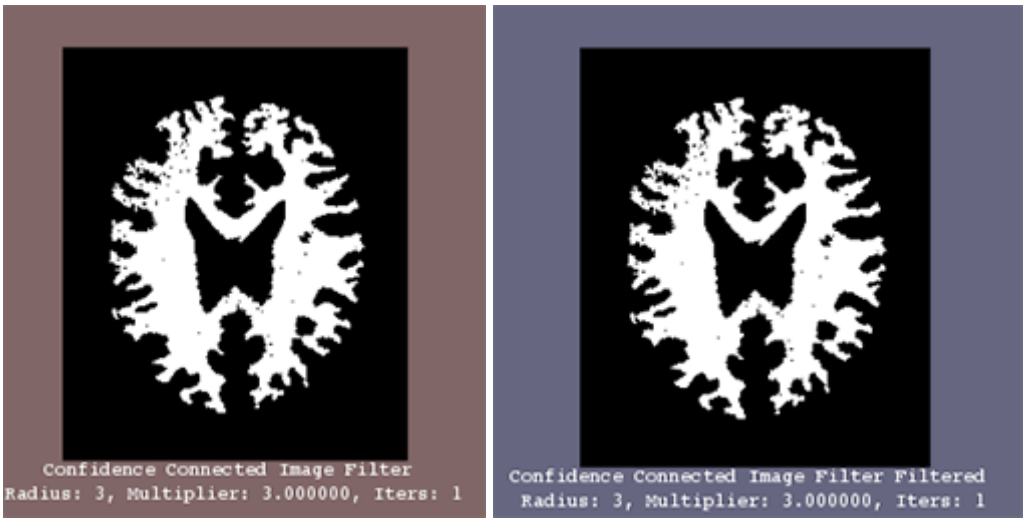
Neighbourhood Connected

- Seed: 60, 125
- Threshold: 150, 180

Confidence Connected

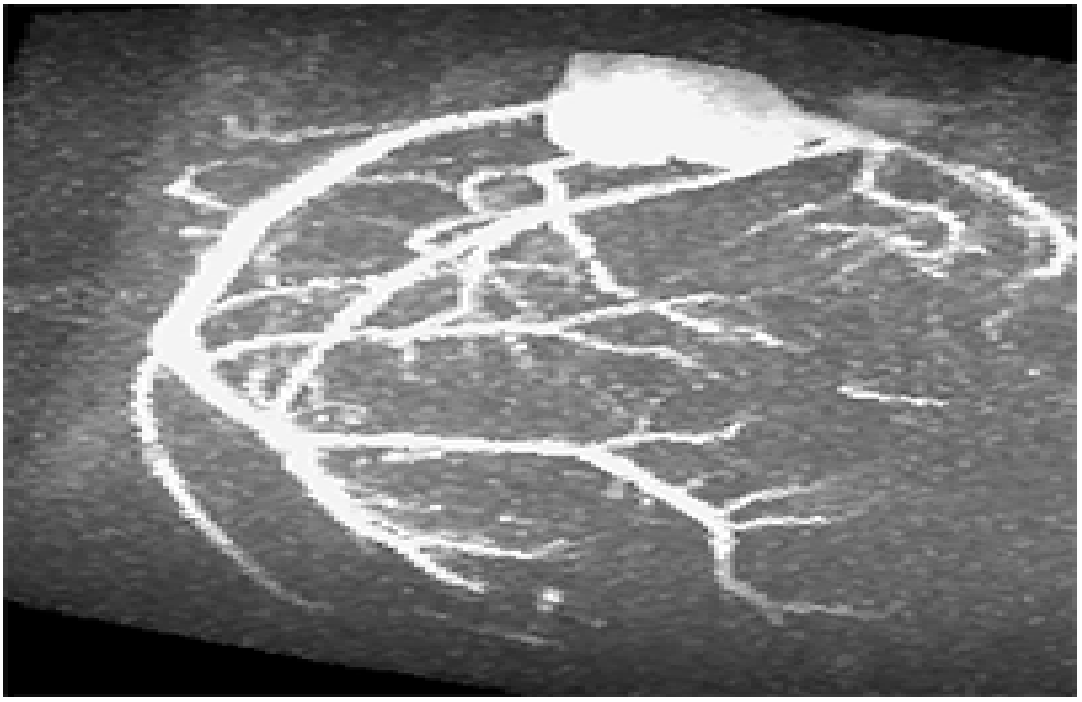
- Seed: 60, 125
- Radius: 3
- Multiplier: 3

- Iters: 1



Angiogram

`coronaryAngiogram.png`:



For this, the Confidence Connected filter has been used since it is the only one with which a fairly good segmentation was obtained. In addition, morphological operators have been applied with which this segmentation is seen to improve.

Confidence Connected

- Seed: 79, 321
- Radius: 3
- Multiplier: 3
- Iters: 25

Difference with morphological operators

On the right the image with morphological operators (dilation + erosion) and on the left without them where it is seen how it covers holes.

Conclusions

We have first seen the segmentation of two parts of the brain. One of them, the choroid plexus is very easy to segment because it is easy to determine in your neighborhood which voxel is adjacent and which is not with minimal tolerance. On the other hand, with white matter it is not so easy and requires pre-filtering of the image so that the segmentation is good enough.

Finally, an attempt has been made to segment an angiogram, which is quite complicated due to the large number of ramifications it has. It would have been better if several seeds could have been used. With this example we have tested the morphological operators that we see that help to close holes while maintaining the original shape.