VTK HW01

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1 Dataset

The dataset used in this project is from ADNI: *http://adni.loni.usc.edu/*. Basically each fMRI image contain 140 time frames. In the data preprocessing we discarded the first 10 frames. And for each of the rest 130 frames we separate the whole brain as 120 zones according to a canonical template. We calculate the mean of each zone. We can think it means the activity of the brain. Then we do feature selection for these 120 zones and select 20 zones as the final fetures. So at the end for each fMRI image we have a matrix of 20×130.
We plan to show the matrices via VTK. The basic idea is to use a cylinder for each zone, and use the value of the zone as the height of the cylinder. So in the 130 time sequence, we can see the data change.
After data prepcoressing, we have 180 subjects. And they can be separated as two classes: Alzheimer and Normal. The assumption is that the brain activity for these two groups are not the same. So the purpose of this project is to show two subjects at the same time and observe the brain activity.

2 Code

This project is done by python. For the VTK part, we use two for iterations. The first one for 130 time sequence; The second one for 20 cylinders. The cylinder source and mapper parts are easy. For the actor part, because we plan to show two subjects at the same time, we need two actors. For each actor, we arrange the cylinders on y coordinate. For the cylinder we only can set the center. If we want to make them have the same bottom, we need to set the position of the center as half of the height in the VTK actor part. For these two actors, we set the different bottom, so we have two row cylinders on y coordinate. Then we can set the camera on the z coordinate.

3 Improvement in the future

Now in this project the sylinders are only have one color. For each cylinder the height change in a range. We can set the color according to the height and change from green to red. So we can see when and where the brain active dramatically.
And also, the code is not perfect now. I don't know why the interactor doesn't work well now. This part also need modify.