Short Documentary

This document gives a short introduction on how to use and modify the feature extraction tool.

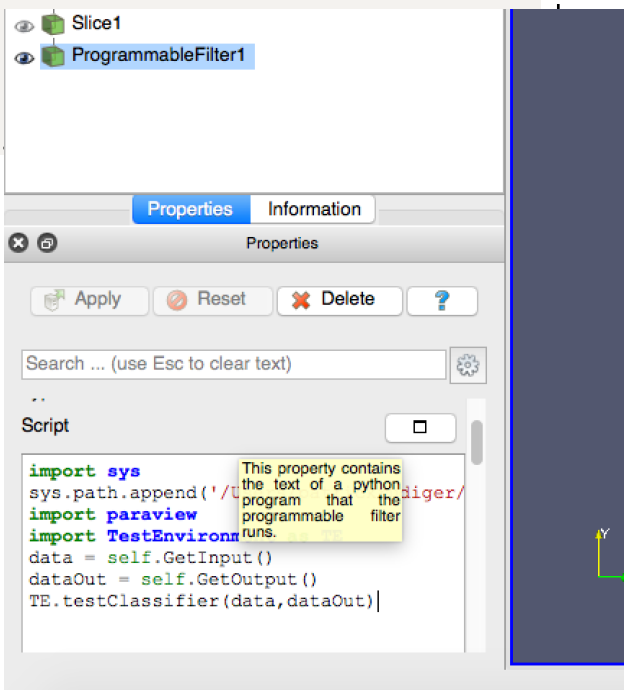
The actual version is available on github https://github.com/PatRuediger/GeodynamoExtrapolations/tree/master/InteractiveFeatureDefinition. Make sure you have Paraview v4.0 or greater and Python 2.7 installed.

USE IN PARAVIEW

1. Find out your local path, where you saved the code from github. We will refer to it as `localpath` from now on.
2. Open the dataset in Paraview.
3. (Optional) Choose one of the available tools from Paraview to generate a subset of interest. You can use any tool, that outputs a Paraview in the Pipeline Browser.
4. Choose the data object from the Pipeline Browser you want to apply the Feature Extractor.
5. Go to Filters -> Data Analysis -> Programmable Filter
6. In the Script section add the following:

```
import sys
sys.path.append('localpath')
import paraview
import TestEnvironment as TE
data = self.GetInput()
dataOut = self.GetOutput()
TE.testClassifier(data,dataOut)
```

Where `localpath` is the directory of your used python scripts. `TestEnvironment` is currently only a placeholder. Basically it collects all the necessary subscripts so that the filter above doesn't need special treatment.
Remember to add additional non „standard“ python packages to the `sys.path` as well.



Now hit Apply and the feature will be calculated only for the selected subset. It could take some while depending of the data size and the complexity of the feature.
You can now save the filter as a Paraview-State file and use it on other datasets.

CUSTOMIZED FEATURE EXTRACTORS

There is a broad spectrum of possibilities to customize features of interest.
The pipeline in general is held very simple, so that one needs to choose at which point to add the customization.

With the Paraview Interface ParaviewClassifer.py it is possible to access all data of the original data set. So that it possible to modify/ create a subset that perfectly matches the current needs. You can make use of all vtk modules from this point.
The Area Extractor is basically a specialized filter on the generated subset to match the needs for the feature definition. For simple features („referring to features that don't need special knowledge about the topology etc.“) this is just a forwarded reference of the generated subset. The idea is to have an encapsulated module to add/ extract topological information for more advanced features.
The Interface classes of the Area and Feature Extractor show the basic structure in order to have a proper working filter.
The Angular Direction Changing Rate is a good example to show how to use a simple topology (Nearest Neighbor) in a feature definition and how the overall feature definition should look like.
The output is then saved as new Paraview state, which can be further processed like any other.

INTERACTIVE FEATURE EXTRACTION USING PARAVIEW