Usage instructions

The following instructions go over usage instructions for the auger-analysis program. They also explain individual parts of the source code and give instructions for adding new options to the program.

1.1 The graphical interface

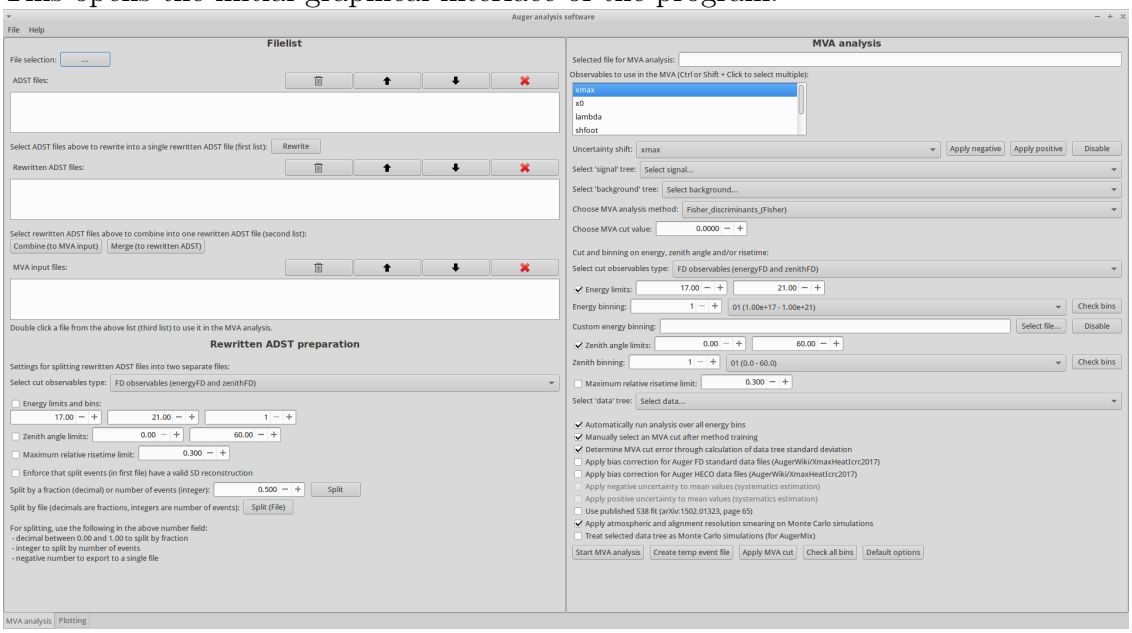
The GUI of the program for ADST version `XrYpZ` is executed with:

```
./start.sh vXrYpZ
```

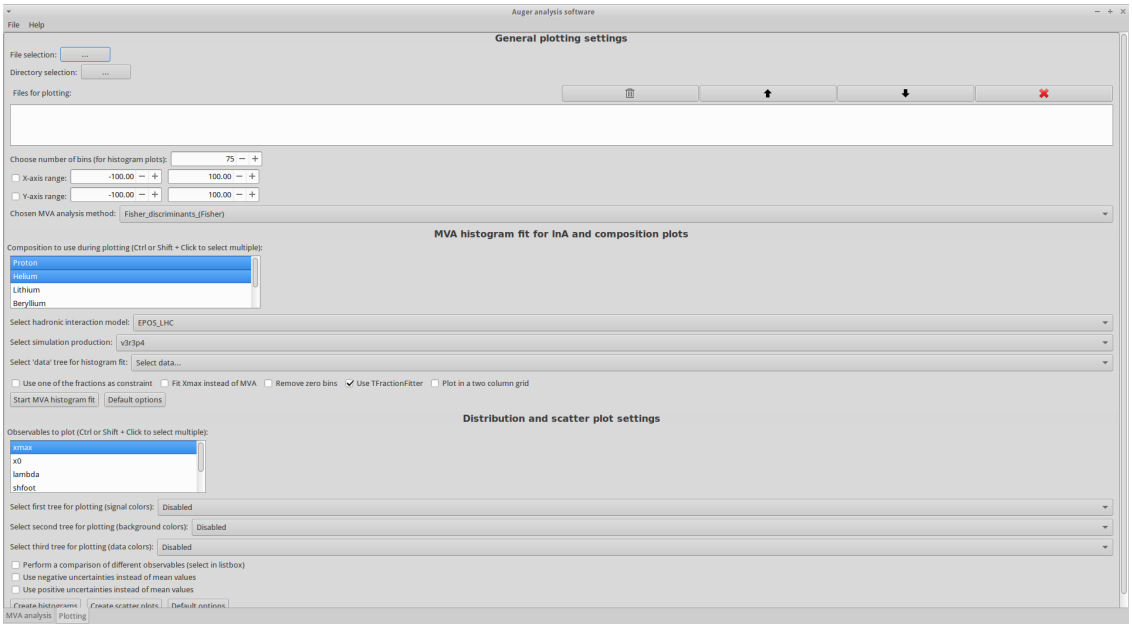
Note that standard output to the terminal might slow down the program considerably. It is thus advised to save the standard output into a file with:

```
./start.sh vXrYpZ > results/printout.txt
```

This opens the initial graphical interface of the program:



Moving to the `Plotting` tab in the bottom left, we get to the plotting part of the program:


Auger analysis software
File
Help
General plotting settings
File selection:
...
Directory selection:
...
Files for plotting:
Choose number of bins (for histogram plots):
75
X-axis range:
-100.00
100.00
Y-axis range:
-100.00
100.00
Chosen MVA analysis method:
Fisher_discriminants_(Fisher)
MVA histogram fit for lnA and composition plots
Composition to use during plotting (Ctrl or Shift + Click to select multiple):
Proton
Helium
Lithium
Beryllium
Select hadronic interaction model:
EPOS_LHC
Select simulation production:
v3r3p4
Select 'data' tree for histogram fit:
Select data...
Use one of the fractions as constraint
Fit Xmax instead of MVA
Remove zero bins
Use TFractionFitter
Plot in a two column grid
Start MVA histogram fit
Default options
Distribution and scatter plot settings
Observables to plot (Ctrl or Shift + Click to select multiple):
xmax
x0
lambda
shfoot
Select first tree for plotting (signal colors):
Disabled
Select second tree for plotting (background colors):
Disabled
Select third tree for plotting (data colors):
Disabled
Perform a comparison of different observables (select in listbox)
Use negative uncertainties instead of mean values
Use positive uncertainties instead of mean values
Create histograms
Create scatter plots
Default options
MVA analysis
Plotting

Bibliography

[1] ROOT data analysis framework, https://root.cern.ch.

[2] wxWidgets cross-platform GUI library, https://www.wxwidgets.org.

[3] S. Argiro, *et al.*, *The Offline Software Framework of the Pierre Auger Observatory*, arXiv:0707.1652 (1998).

[4] Toolkit for Multivariate Analysis (TMVA), http://tmva.sourceforge.net.