V 0.3.1 - 29/08/2019

These are few simple instructions to run the GRAWITA photometric pipeline for VST data.

1. Connect to ssh gwmilano@gravitown.oa-roma.inaf.it. Password is available upon request.
2. "*cd data02*"
3. Create a directory to store your analysis results, any name is fine. E.g. "*mkdir pippo1*", and "*cd pippo1*"
4. Now copy a set of cshell scripts that manage the pipeline execution: "*cp ../VSTcshs/*VST* .*"
5. And make them executable: "*chmod u+x *.csh*"
6. Now you have two possibilities. Either you are analyzing data available for one epoch only or you have multiple epochs of the same field
7. In the former case, single epoch, edit the script "*00.VST.Generale_1epoch.csh*". If you have been very ugly in your previous life and you now need to atone you can try "*vi 00.VST.Generale_1epoch.csh*", else any other editor is fine.
    7.1. Then, look for the line with: *set fpre = "/data01/VSTin/S190510g/20190510".* Substitute the actual path to your fits files and save.
    7.2. In order to analyse a given frame it is enough to execute the command: "*./00.VST.Generale_1epoch.csh   fitsfilename.fits*", where of course "*firsfilename.fits*" is the frame you want to analyse. And iterate for each file you want to study.
    7.3. The pipeline creates a directory with the same name of the FITS file you are analysing and several files (tables and logs). You are only interested in two products: "*Ep_all_6.tab*" and "*Ep_all_9.tab*". These two tables report, respectively, all the sources detected by the pipeline and those not detected in the GAIA (DR2) catalogue and not coincident with known minor planets.
    7.4. These tables are also available in "*skycat*" (e.g. starlink GAIA), "*votable*" (e.g. Aladin) and "*FITS*" format.
    7.5. Finally, at the path "*/gdrive/Data/phot-pipe/VST*" you can find a gzipped tar file including the essential pipeline results in order to allow one to download them elsewhere easily.
8. If we have multiple epchs the procedure is similar, but not exactly the same. And again you can have an alternative. Either you have only VST data, or the Padova group prepared a set of PanSTARRS frames to be used in the analysis.
    8.1. If there are PanSTARSS data you have to edit the "*00.VST.Generale.csh*" script file and update the *set extref = "/data03/padova/S190728q/PS1"* entry to point where these frames are. Else, define the variable to any non-existent path, as e.g. *set extref = /dev/null*.
    8.2. Now edit again the script file "*00.VST.Generale.csh*" and update the "*set fpre = "/data01/VSTin/S190510g/"* entry with the main directory containing the FITS files of the observations. This directory will be, typically, the one above the directories named with the dates of the multiple monitoring.
    8.3. In order to execute the pipeline you should digit the command: "*./00.VST.Generale.csh fieldnumber(s)*". "*fieldnumber(s)*" is (or are) the codes

identifying the various VST fields, i.e. the number following "*p*", as "*p0*", "p15", etc. In the last example the command would have been "*./00.VST.Generale.csh 0 15*".

8.4. The pipeline create a directory named as the field code under analysis, and generates several tables, logs and stamps. Of our interest are "*Ep_all_8.tab*" and "*Ep_all_15.tab*", the total number of objects identified by the pipeline and those survived after the various selections based on variability, coincidence with a known minor body of the Solar System, proximity to a known galaxy, etc.

8.5. And again the tables are available in more formats, and a gzipped tar file with anything needed for a visual check of the candidates is generated and copied to "*/gdrive/Data/phot-pipe/VST*". You can also create subdirectories to this directory for an easier management of the results.

9. One the pipeline in any mode is executed the products have to be checked by a visual inspection. This is an unavoidable procedure, even if it can be made easier and more effective by adopting proper machine learning techniques.

10. For products obtained with the "1epoch" mode things are actually simple. One can display the field and overplot the selected objects. This can be done rather easily with different tools (more in a future about this point).

11. The outputs of the pipeline in the "Nepochs" mode are more interesting but also more difficult to evaluate. Tools to check candidates at various epochs have been developed. For instance, from gravitown or if you have the pipeline installed in your system, and with the products of the pipeline execution, the command "*SRPGWCandSelect -v -i Ep_all_15.tab -r Restab.tab -m eventMJD*" allows us to rather effectively select the most interesting objects, get rid of obvious defects or of simple star-like variable objects. "*Restab.tab*" is any table name we like and "*eventMJD*" is the modified Julian Date of the event. It is an optional parameter but if it is set makes the plotted light-curves more meaningful. Tat output of the selection can then be converted to one of the previously quoted formats.