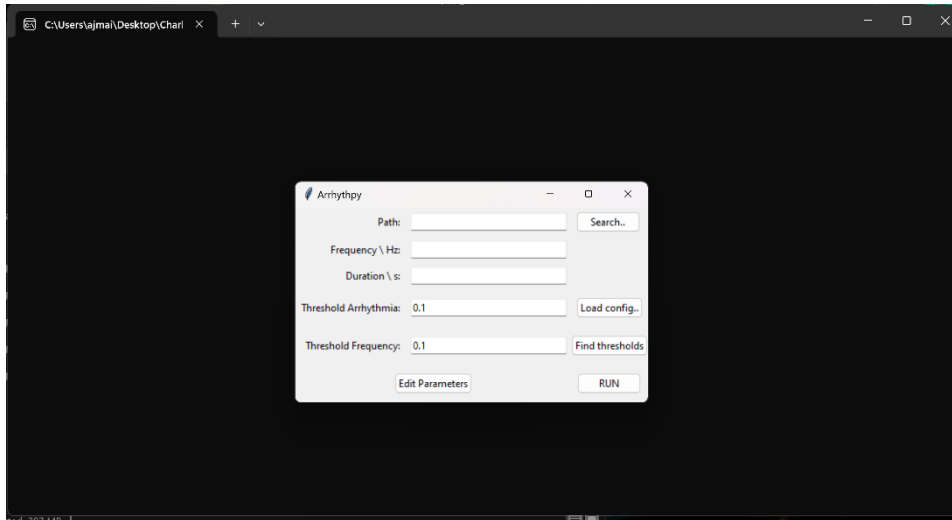


Manual for Arrhythpy

After downloading the executable at 'Releases' on github, extract the folder and run the executable (Arrhythpy.exe). This will open the User interface as well as a terminal. It can take a while for it to open.



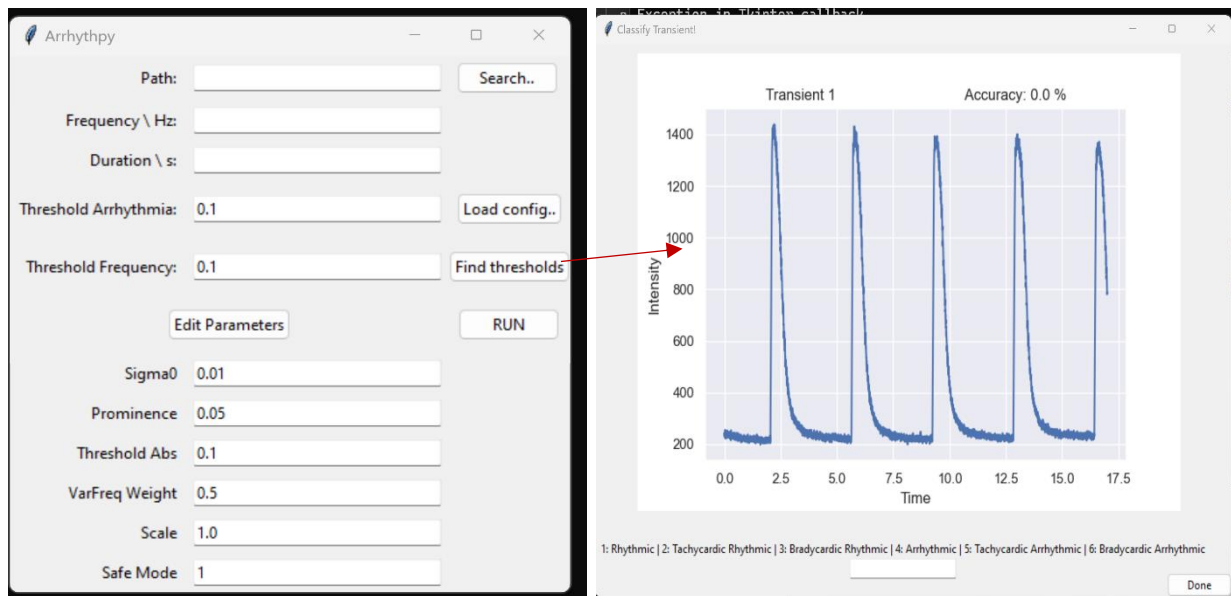
Do not enter units into the fields, but only the number! You need to provide these parameters to get started:

- Path: Provide the path to your data either by copying or by browsing using the 'Search..' button. It has to be a folder that contains your linescans i.e. either lsm or tif files. Or a csv containing the transient directly. If you need support for other data files, contact me at karim.ajmail@mtl.maxplanckschools.de
- Frequency: The pacing frequency of the transient given in Hertz (1/s). It has to be only a float number. i.e. 0.5
- Duration: The duration of the transient in seconds. This is needed to convert the results into a meaning full unit
- Threshold Arrhythmia & Threshold Frequency: The thresholds used for classification of the two aspects of arrhythmia captured (see paper for details)

For a more detailed control over the parameters of Arrhythpy click Edit Parameters. This is usually not necessary, but sometimes it might be good to adapt the parameters to the new dataset. The extended parameters are:

- Sigma0: at the start of the analysis performed by Arrhythpy, the transient is smoothed using a gaussian filter. This parameter determines the amount of smoothing applied. If you notice that some beats are too fast to be captured by the wavelet transform you can try to decrease this parameter
- Prominence: After autocorrelation, the peaks of the autocorrelation are determined and filtered according to a given prominence of the peaks. If you notice that some very small peaks are detected, that you believe is due to noise, increase this parameter.
- Threshold Abs: After wavelet transformation the most prominent peaks are detected to determine the dominant frequency in the transient. To this end, this threshold determines the sensitivity towards peaks in the wavelet transformation.

- Scale: The frequency variation and mean peak correlation is combined into a single measure. This parameter determines the weight of each parameter, which should contribute equally. If your frequency variation is much larger than the mean peak correlation decrease this parameter accordingly.
- Safe Mode: Can either be 0 or 1 to turn 'Safe Mode' off or on. If there is an error, this is the first thing to change to 0. When set to 0, those transients that cause an error, are skipped and not analysed. When set to 1 an error is raised.



If the thresholds are important, you have the option to automatically determine the threshold by running 'Find thresholds'. You are then prompted to label transients by typing the appropriate number and pressing enter. After each labelling optimal thresholds are calculated. Keep labelling until the accuracy is high and does not change significantly anymore. You can then click 'Done' at any time to return to the main window. You should see, that the threshold have been updated to the optimal thresholds.

Click 'RUN' to analyse your data. In the terminal window (black window) you can see the progress and messages and or errors if applicable. After running, the results are saved in an excel file and saved in the directory of the data you provided (i.e, 'Path').

By running, the parameters of Arrhythpy are also saved as a config file. If you want to rerun or run the same analysis on a different dataset, you can import this config file by clicking 'Load config..'.

Most importantly, don't hesitate to contact me with any issues!