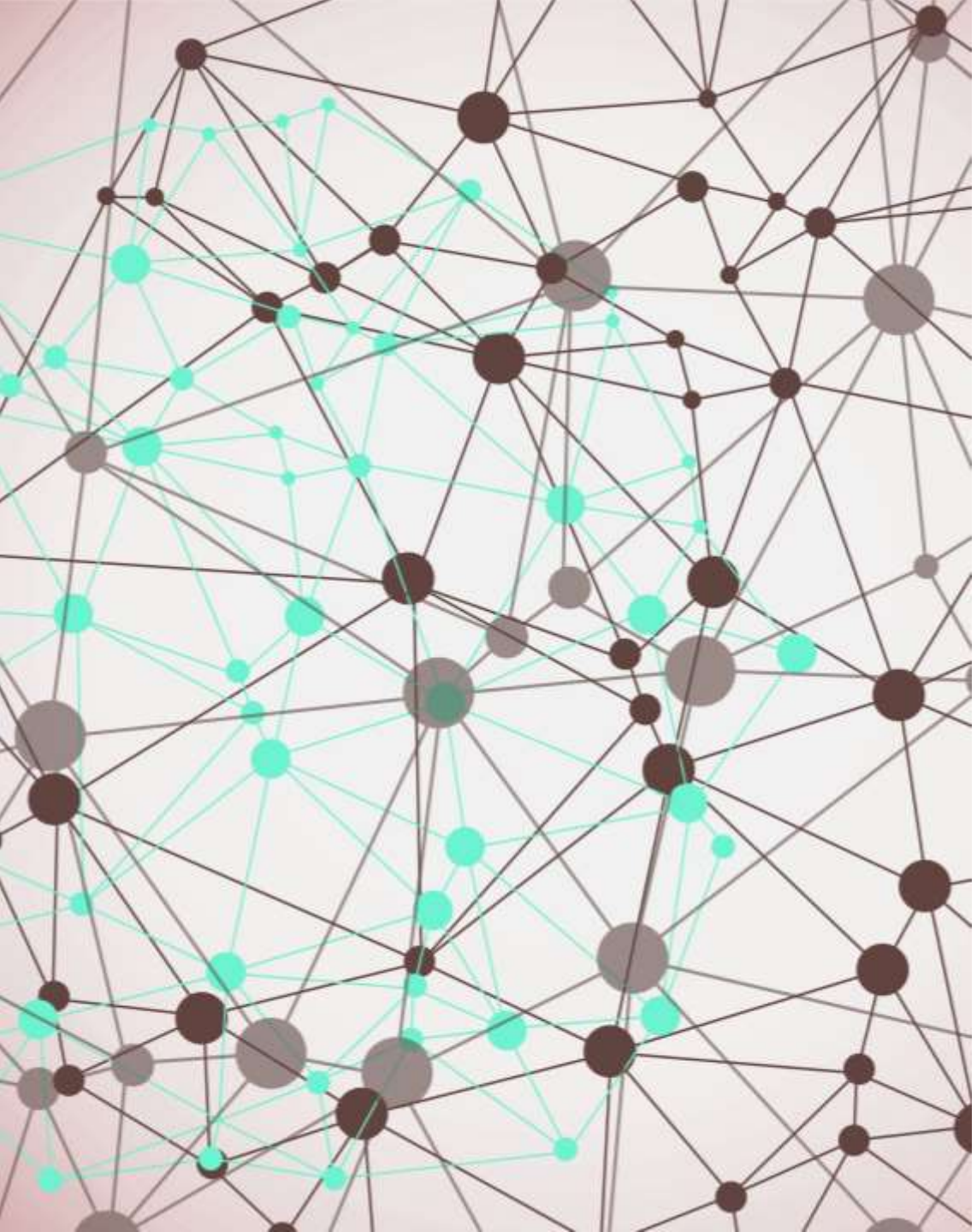
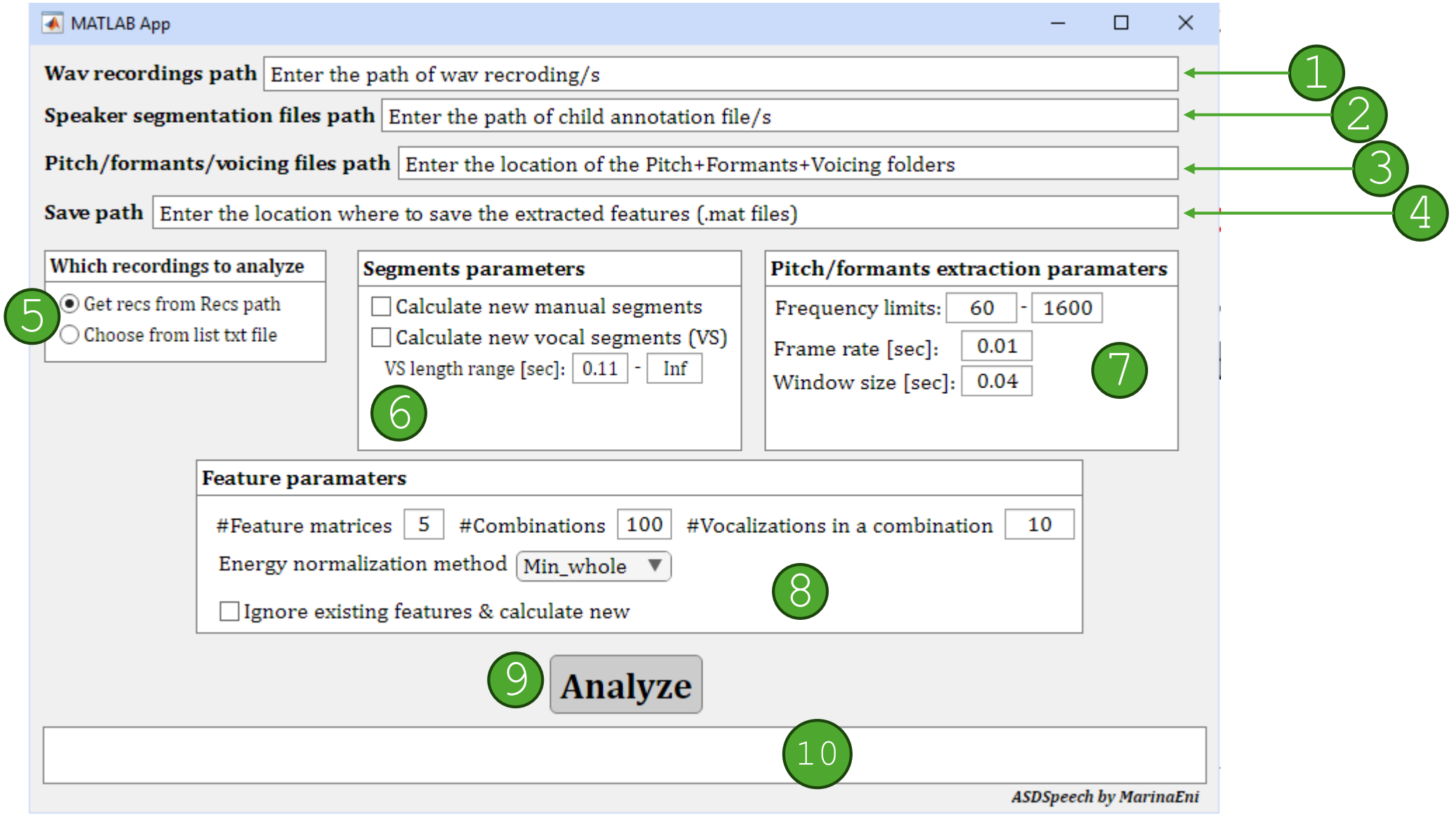


ASDspeech feature extraction app

- by Marina Eni, Prof. Yaniv Zigel, and Prof. Ilan Dinstein

https://github.com/Dinstein-Lab/ASDSpeech

M. Eni, I. Dinstein, M. Ilan, I. Menashe, G. Meiri and Y. Zigel, "Estimating Autism Severity in Young Children From Speech Signals Using a Deep Neural Network," in IEEE Access, vol. 8, pp. 139489-139500, 2020, doi: 10.1109/ACCESS.2020.3012532.


MATLAB App
Wav recordings path
Enter the path of wav recroding/s
Speaker segmentation files path
Enter the path of child annotation file/s
Pitch/formants/voicing files path
Enter the location of the Pitch+Formants+Voicing folders
Save path
Enter the location where to save the extracted features (.mat files)
Which recordings to analyze
Get recs from Recs path
Choose from list txt file
Segments parameters
Calculate new manual segments
Calculate new vocal segments (VS)
VS length range [sec]: 0.11 - Inf
Pitch/formants extraction paramaters
Frequency limits: 60 - 1600
Frame rate [sec]: 0.01
Window size [sec]: 0.04
Feature paramaters
#Feature matrices 5
#Combinations 100
#Vocalizations in a combination 10
Energy normalization method Min_whole
Ignore existing features & calculate new
Analyze
ASDSpeech by MarinaEni
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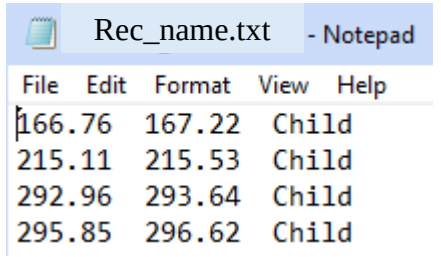
1. **Recordings path**: The path where the .wav recordings are located.
2. **Manual segmentation files path**: The path where the manual annotation .txt files of the target Child segments are located. If there is no annotated .txt file for a recording, the algorithm assumes the recording has only one speaker, the target Child, and there is only one segment: from the start of the recording to the end. The .txt files should be in format: <Start_time> \t <End_time> \t <Speaker>. For example:



3. **Pitch/formants/voicing files path**: The path where the pitch, formants, and voicing folders are located. Each type is assumed to be in its own folder. These files created by PRAAT using the `main_run_pitch_extraction_recs.py`. script located in https://github.com/Dinstein-Lab/ASDSpeech.
4. **Save path**: the path where the feature files will be saved.
5. **Which recordings to analyse:**
   a) **"Get recs from Recs path"**: Generate features for .wav recordings located in the specified folder "Recordings path".
   b) **"Choose from list txt file"**: Generate features for .wav recordings specified in the .txt file (list of recordings without the .wav extension) the user will choose after pressing he Analyze button.

6. “Segments parameters”:

a) **“Calculate new manual segments”:** Check this option if you want to calculate/generate and save new Child segments (from manual annotations), which will be saved in: <Save path>/Segments. If you select this option, the “Calculate new vocal segments (VS)” option will be automatically selected and applied. Applying this option will ignore existing saved segments files and overwrite them with the new files. If the manual annotation .txt file doesn’t exist for a recording, the Child segment will be the whole recording.

b) **“Calculate new vocal segments (VS)”:** Check this option if you want to calculate/generate and save Child vocalizations (segments without silence). Applying this option will ignore existing vocalizations files and overwrite them with the new files. The files will be saved in: <Save path>/Vocalizations

I. **VS length range**: The minimum and maximum length of vocalizations (seconds) to be included in the analysis. Vocalizations that not in this range will be excluded from further analysis.

7. “Pitch/formants extraction parameters”:

a) **Frequency limits**: the floor and ceiling values of the pitch you defined in: `main_run_pitch_extraction_recs.py`.

b) **Frame rate**: the time step value you defined in: `main_run_pitch_extraction_recs.py`.

c) **Window rate**: the window length value you defined in: `main_run_pitch_extraction_recs.py`.

8. “Feature parameters”:

a) **#Feature matrices:** Specifies the number of feature matrices (#Combinations x 49) to create for each recording.

b) #Combinations: Specifies the number of random combinations of vocalizations to create (number of rows in the feature matrix), where each row in the feature matrix is a random combination of sequential #vocalizations.

c) # Vocalizations in a combination: Specifies the number of random and sequential vocalizations in each combination for feature calculation.

d) Energy normalization method: Specifies the method of energy normalization for each child vocalization. Default: the lowest energy of the whole recording (not including zeros).

e) Ignore existing features & calculate new: Check this option in case where there are already saved features, and the user wants to regenerate them.

f) The features for each recording are saved independently in .mat files and additional .mat file is generated for all chosen recordings altogether.

g) The .mat files are saved in "Save path/Features" folder.

9. "**Analyze**": press this button to start the process of feature extraction.

a) If there are any missing pitch, formant, or voicing .txt files for the recordings, an error message will be printed listing these recordings, and the analysis will be aborted.

b) A log file that lists all the printing messages is created at the Save path (4) under the name "log_file_<ddMMyy>_<hhmmss>.txt".