AUSTRIAN ACADEMY OF SCIENCES
ACOUSTICS RESEARCH INSTITUTE

Clara Hollomey, Roberto Barumerli, Piotr Majdak

Workshop tasks

Vienna, 2022-02-02, AMT workshop

Idea

By means of a simple localization model, we would like you to:

1) Learn how to use AMT's functionalities supporting your ideas.
2) Integrate your experiments within the AMT.
3) Publish your model within the AMT.

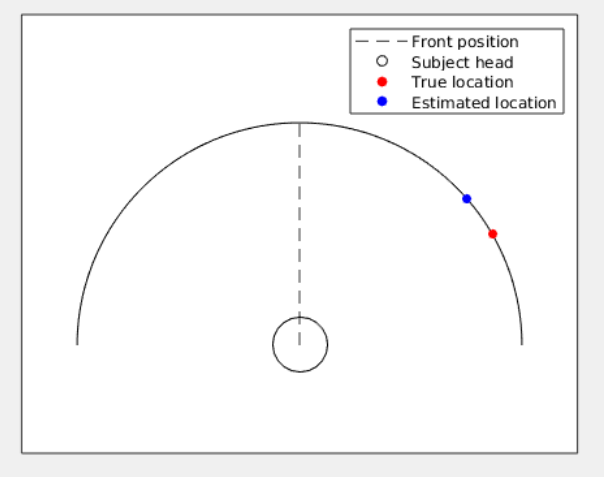
Tips

- Use the documentation
  - Each function is explained and examples are usually available
  - The documentation is available online and within each file
- Check code from other models and their demos
  - baumgartner2014, barumerli2021, dietz2011
  - demo_<modelname>
- Last but not least: ask for help :)

http://amtoolbox.org/amt-1.1.0/doc/base/index.php

Task 1

- AIM: start to have an idea around AMT functions and their parameters
- Task: create a sound localization model for the estimation of the angle of the sound source.
  - Use third-party functions to load HRTF
    - hrtf = SOFAload(fullfile(SOFAdbPath,'barumerli2021/dtf_nh12.sofa'));
  - Use core functions to load binaural sample
    - [soundtemp, fs] = sig_competingtalkers('one_of_three');
  - Use common functions to estimate angle (i.e. auditory model)
    - itdestimator, itd2angle_lookuptable and itd2angle
    - Use these parameters for itdestimator
      - 'MaxIACCe','lp','upper_cutfreq', 3000, 'fs', fs
- Done when:
  - Angle estimated is about -30deg



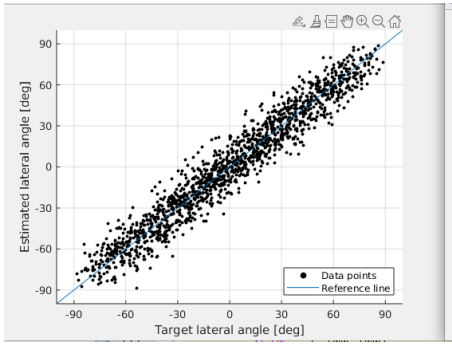
Task 2

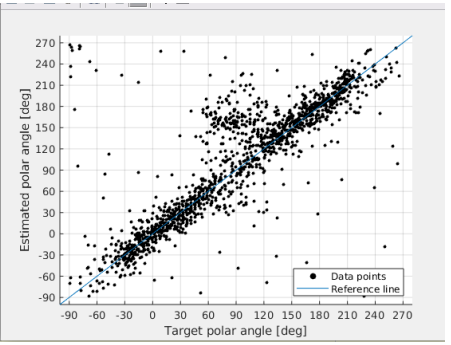
- AIM: understand how to use the AMT to wrap your experiments with an actual model
- Task: implement a localization experiment inside the AMT
  - One file exp_workshop<surname>2022 with one experiment named 'fig1'
  - Use amt_cache to cache your results
  - Use ltfatarghelper to parse your input parameters
    - definput.flags.type = {'missingflag', 'fig1'}
    - if flags.do_fig1
  - Cache this results
    - Load subject data from data_majdak2010 with id NH12
    - For on subject
      - Load HRTF dataset from ARI database (as in Task 1)
      - Use barumerli2021 to estimate the direction of arrival for each position.

```
>> exp_workshoppartecipant2022('fig1')
Real data
rmsL 8.35
rmsP 27.29
querr 2.92

Simulated data
rmsL 10.50
rmsP 26.67
querr 4.28
>>
```

  - Use common/localizationerror.m to estimate the RMS lateral error, and RMS polar error and the quadrant error.
  - Plot two scatter plots:
    one for the lateral and one for the polar dimensions
  - Commit experiment on your branch
- Done when:
  - Experiment returns plots and metrics when calling
    exp_workshop<surname>2022('fig1')
  - Documentation is added





http://amtoolbox.org/amt-1.1.0/doc/core/amt_cache.php

Task 3

- Develop your model in the AMT
- AIM: understand more deeply how the AMT is organized and how it can help you developing your model
- Task
  - Switch to branch workshop
  - Files
    - ./defaults/arg_template.m
    - ./demos/demo_template.m
    - ./experiments/exp_template.m
    - ./models/template.m
    - ./modelstages/template_stage.m
    - ./plot/plot_template.m
  - Each file needs to be documented
  - Add an experiment as ‘fig2’ to the file created in the previous task
    - Provide an experiment which tests the following ITD measures:
      - 'Threshold','Cen_e2','MaxIACCr', 'MaxIACCe', 'CenIACCr','CenIACCe', 'CenIACC2e'
  - Write a demo to call your experiments and show how the model should be used