How to Integrate a Model into the AMT

Hot Topic 8

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Content

- Question: How do I integrate my experiments or models into the AMT?
- We will cover:
  - AMT’s folder structure
  - Model’s anatomy
  - Coding conventions and guidelines within the AMT
Folder structure

- **common**: useful functions for hearing related computations.
- **data**: experimental data from several studies.
- **defaults**: definition of parameters and flags an their default values.
- **demos**: scripts show-casing the basic functionalities of a model.
- **experiments**: code to compute model’s results that made it into a paper.
- **models**: here we have the models!
- **modelstages**: models may contain multiple processing steps. This folder is dedicated to break down the structure in separate scripts.
- **plots**: code to generate complex visualizations.
- **signals**: scripts to generate generic or specific signals.
- **thirdparty**: external toolboxes like SOFA API or LTFAT.
The anatomy of a model

Experiment

Model
The anatomy of a model

- Load data
- Stimulus generation
- Plot
- Processing #1
- Processing #2
- Response
Without the AMT

Command Window

New to MATLAB? See resources for Getting Started.

>> exp_workshop2023turin
Perceived ITD: 0.35 ms
True lateral direction: -40.00 deg
Estimated lateral direction: -42.44 deg

>>
With the AMT

load data, caching, default parameters, generate stimuli, print/visualize results

plot_workshop2023.m

processing stimulus, features extraction, decision stage

workshop2023.m

plot_workshop2023

workshop2023_stage.m
With the AMT

Command Window

New to MATLAB? See resources for Getting Started.

>> exp_workshop2023turin('simple_test')
Perceived ITD: 0.35 ms
True lateral direction: -40.00 deg
Estimated lateral direction: -62.44 deg

./experiments/exp_workshop2023.m
./models/workshop2023.m
./defaults/arg_workshop2023.m
./demos/demo_workshop2023.m
./modelstages/workshop2023_stage.m
./plot/plot_workshop2023.m
How to contribute

- We ask for:
  - Model: `<surname><year>` (and modelstages...).
  - Experiment: each model needs an experiment file (exp_<surname><year>).
  - Documentation: at the beginning of each script following the conventions.
  - Demo: showcase of the model functionalities (demo_<surname><year>).

- If required:
  - Local functions prefixed with ‘local_’.
  - Long calculations cached with amt_cache.
  - Binary data loaded with amt_load.
  - Text printed with amt_disp.
  - HRTFs stored as SOFA file.
Model’s header

function [out1, ..., outn] = <surname><year>(in1,..., inn, varargin)

%<surname><year> short description
%

% Usage: out1 = <surname><year>(in1,..., inn);
% [out1, out2] = <surname><year>(in1,..., inn, varargin);
%

% Input parameters:
% in1 : description of input 1
Model’s header

```matlab
function [out1, ..., outN] = <surname><year>(in1,..., inN, varargin)

%<surname><year> short description

% Usage: out1 = <surname><year>(in1,..., inN);
% [out1, out2] = <surname><year>(in1,..., inN, varargin);

% Input parameters:
%   in1 : description of input 1
```

Everything matters
The hands-on

- Integrate a sound localization experiment into the AMT
  - Generic script with an experiment provided
  - Integrate the script following the AMT conventions

- At the end of the task:
  - You will understand how to use AMT functionalities to implement your experiments and/or models.
  - You will know how to integrate your code into the AMT.