IN5450/9450
Mandatory Exercise 2

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1 Packages

The following package should be installed:

- `numpy`
- `matplotlib`
- `scipy`
- `cmcrameri`
- `pathlib`
- `moviepy`
- `glob2`

2 High-Resolution Beamforming on farfield monochromatic signals

2.1 Folders

```
├── data
├── images
├── questions
├── slides
├── utils
└── main.py
```

The folder data contains the data used for the experiments. Inside it, you fill find two sub-folder containing the `MATLAB` or `python` files. `Images` and `questions` contain the obtained figures and the scripts for each question. The `utils` folder contains all the necessary functions: power spectrum estimation functions, spatial correlation matrix estimation function. . .

2.2 Parameters

2.2.1 I want to use `python` data

You can easily modify the parameters in the file `utils/configuration.py`. In this script, you will find two dictionnaries (one for each part) where you can change all the simulation parameters (sources positions, SNR. . .). Once done, open `main.py`, set the variable `data` to `python` (we indicate that we want to use data from `python`) and set the boolean `generate_data` to `True` to specify that you wan to generate new data.

You can select the question by commenting (with `#`) the calls `run_question()`

2.2.2 I want to use `MATLAB` data

First, generate the desired signals vector using `MATLAB` and place them in `data/matlab`. Then, open `main.py` and go to the lines 64 and 65. Change the argument `matlab_filename` of the function `from_matlab_to_numpy` with the names of your files. Finally, set the variable `data` to `matlab` (we indicate that we want to use data from `matlab`).

2.3 How to run the code?

To run the code, just launch `main.py` and be patient!

2.4 Where are the figures?

All the produced figures can be found in `images`. They are sorted by question.

3 Working on signals recorded from a commercially available microphone array

3.1 Parameters

All parameters can be modify in the `main.py` file.

3.2 How to run the code?

To run the code, just launch `main.py` and be extremely patient!

3.3 Where are the results?

All the produced figures can be found in `images`. They are named according to the number of frames. Moreover, you will find a video (`video_channel_20_lowpass.mp4`) in the root directory.