Learning and Inferring Motion Patterns using Parametric Segmental SLDS
- Guides for using Executables and Data -

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1 Contents

The downloadable "deliverables.tar.gz" file has following subdirectories zipped in it.

- Subdirectory './data/' contains
  - Raw experimental data : 6 bee track sequence directories named "sequence1 - sequence6".
  - Repository for inference results : 'labels'
  - Repository for learning results : 'params'
- Subdirectory './executable' contains
  - main.exe : the executable file
  - psslds.mdl : parameters file (don't modify the values please)

2 Installation

Please unzip 'deliverables.tar.gz' file. There's no further compilation required. The executable './executable/main.exe' is binary file and runs on Linux Redhat 9.0.

3 Instruction

You can test the performance of three methods step by step following the instructions below. The three methods are :

1. SLDS Viterbi
2. SLDS Variational
3. PS-SLDS Viterbi

First, in the subdirectory /executable/, type the following command to run the main program :
./main.exe psslds.mdl

Then, a GUI will pop up. The subsequent menus at the top of the GUI are described in the following subsections.

3.1 Data

You can view the preprocessed data by clicking :

- Data -> View Original Data : shows datasets for SLDS learning and inference.
- Data -> View PS-SLDS Training Data : shows datasets for PS-SLDS learning and inference. Additional rotation preprocessing has been done on these datasets to align the dances.

3.2 Learning

In the 'Learning menu' there are three sub-menus : SLDS, S-SLDS, PS-SLDS. Please click these three menus from top to the bottom. Then the system learns the parameters of SLDS, S-SLDS, PS-SLDS models.

Note that it's important to execute them in order. This is required because SLDS parameters are used as part of the S-SLDS parameters. Similary, S-SLDS parameters are used as part of the PS-SLDS model parameters.

3.3 Inference

The three inference methods, i.e., SLDS Viterbi/Variational, PS-SLDS Viterbi, are tested in top menu 'SLDS' and 'PS-SLDS' respectively.

It is again important to run these inference methods in order, for the same reason. I.e., SLDS Viterbi inference results are used as a part of the initialization points for SLDS Variational approximation methods. Some of the intermediate results of SLDS inference methods are used for PS-SLDS inference as well.

3.3.1 SLDS Viterbi

Click SLDS -> Approximate Viterbi all.

Then all six SLDS inference results will pop up in colors for qualitative analysis.

3.3.2 SLDS Variational

Click SLDS -> Variational all.

Then, all six SLDS inference results will pop up in colors for qualitative analysis. You can see that the color strips evolve as the variational approximation iterations proceed.

3.3.3 PS-SLDS Viterbi

First, you need to find the initialization priors for PS-SLDS inference.

To do this, please click PS-SLDS -> S-SLDS all. This process may take several munites depending on the performance of your machine.

Once the initialization is done and ready, please click PS-SLDS -> PS-SLDS Viterbi all. Then, PS-SLDS inference starts and goes over all six data sequence one by one. The final results will pop up when the EM iterations are done.

Again, this process may take several munites depending on the performance of your machine. E.g, it takes about one and half hour in total for PS-SLDS inference results to be converged for all six data sequences.

4 Results

You can view all the results (SLDS VIterbi, SLDS VA, PS-SLDS Viterbi and Ground truth labels) in colors by clicking :

- Results -> Everything.

The inference results which was presented in the submission will show up for all six data sequences.

5 Q & A

If you have further questions, please contact to sangmin@cc.gatech.edu or via journal office in case you are an anonymous reviewer.