DD2341
Song recognition

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Problem Statement

To build system capable of classifying an input melody snippet into relevant national anthem group.

“National anthem melody recognition system”

Dataset Preparation

Creating database of melodies

Melodies of national anthem

- 10 Countries:

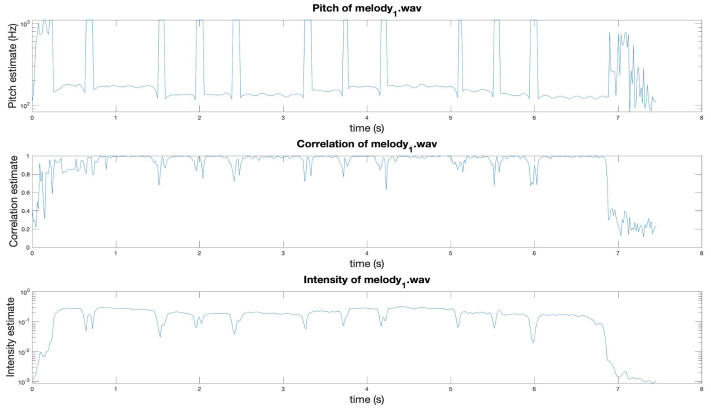
France	Sweden
Portugal	Germany
Great Britain	USA
Russia	Greece
Belgium	China

- 10 records for each melody

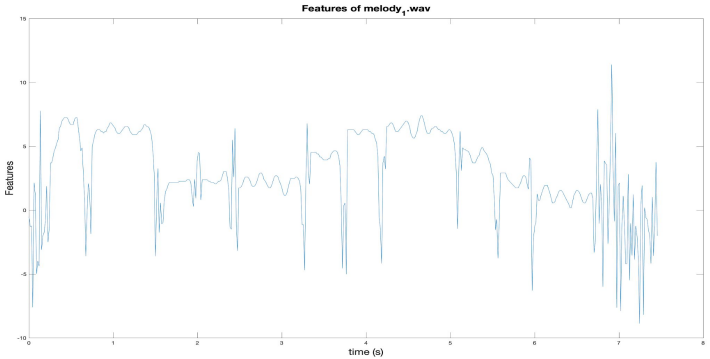
Dataset Preparation

Feature extraction scheme

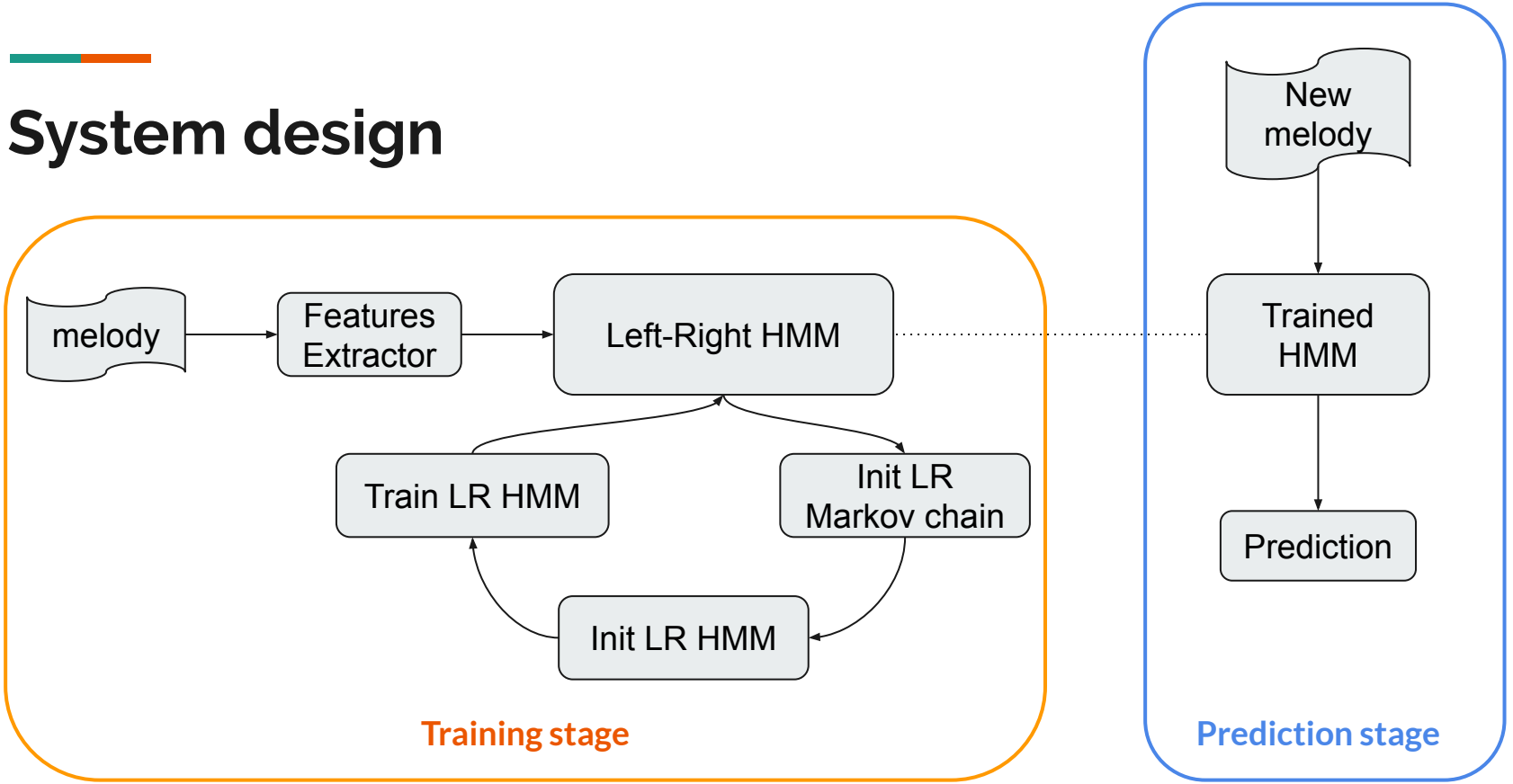
Extract features: **Pitch**, **Correlation** and **Intensity**



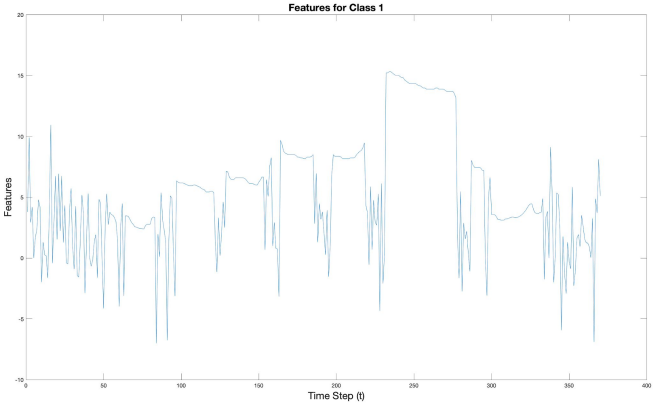
Post processing: Remove non-harmonics, Add noise and Semitones transformation



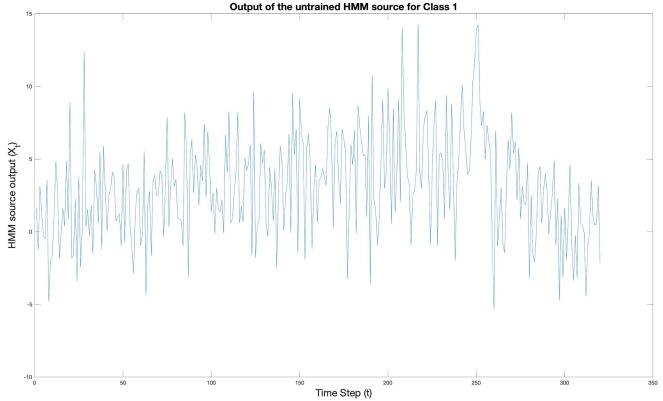
System design



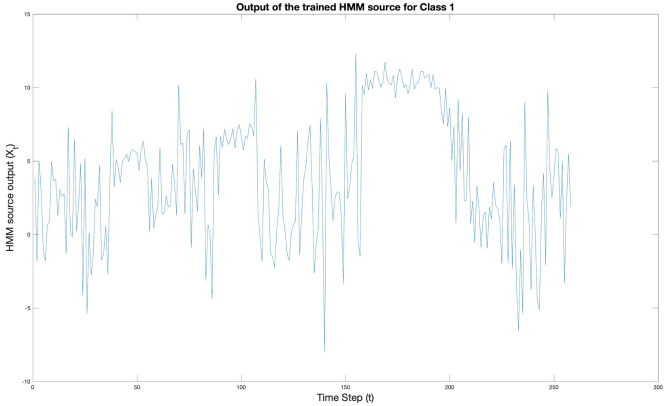
Training process



Features for class 1



Untrained HMM



Trained HMM

Performance Evaluation

Performance ~ 60% - 80%

Confusion Matrix

True Class \ Prediction										
	1	0	0	0	0	0	0	0	0	0
	0	1	0	0	0	0	0	0	0	0
	0	0	2	0	0	0	0	0	0	0
	0	0	0	1	0	0	0	0	0	0
	0	0	0	1	2	0	0	0	0	0
	0	0	0	0	0	2	0	0	0	1
	0	0	0	0	0	0	2	0	0	0
	0	0	0	0	0	0	0	1	0	0
	1	1	0	0	0	0	0	1	2	0
	0	0	0	0	0	0	0	0	0	1

Overall accuracy : 75%

Live Demo

Conclusion

- Data work, Training & performance evaluation gave ~ 60% - 80% accuracy.

- Strengths and weakness of our model
  - '+' Robust to transposition, pitch halving/doubling
  - '-' Robustness to high variations in a melody

- Learning outcomes
  - OOPS in Matlab
  - Solving a pattern recognition problem
  - Feature extraction, HMM init, training and evaluation.