Assignment 3
Machine Listening
Computer Engineering Department
Boğaziçi University
Due: 8 May, 2015

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Time series models

1. Starting from the simple matlab code provided on the website (lecture 7), do an implementation in the log domain to increase numerical stability. Increase the length of the sequence and show by plotting the smoothed posterior that it works independent of sequence length. Hint: In the lecture slides by Taylan hoca from the Bayesian Statistics Class, Lecture 6, you can find a lot of additional information).

2. Change the observation model to the one provided in Lecture 8 (simple copy/paste from the slides), and plot the smoothed posterior.

3. Now make a step towards a more realistic observation model, following Figure 1. The Figure shows how likely it is to observe an onset at the bar positions in a Curcuna usul. Use these probabilities in your improved observation model (hint: the resolution of the metrical cycle is double compared to the resolution in the lecture, which means that the number of states will be double). Make plots of the smoothed posterior and comment on the difference compared to the simpler observation model.

Submission/Guidelines

As before, you do not need to bring in a hard copy, but send a digital copy to me, the latest on 8 May. Please do not copy paste codes you find on the web, but create your own solutions.

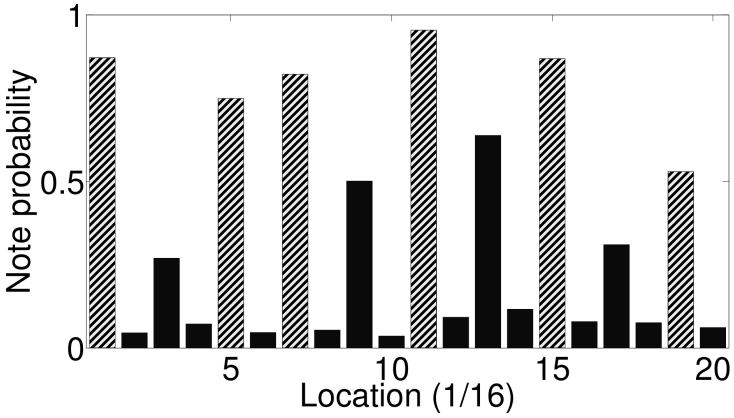

Figure 1: Probability to observe an onset at each of the 20 bins of the Curcuna usul at a 1/16 note resolution.