

## Why Viterbi?

Viterbi alg is used to compute single most likely sequence of hidden states in an HMM given observed data.

O = Observations  
S = hidden states

Viterbi efficiently finds:  $\arg \max P(S | O)$

Why not a standard hmmlearn python model? because hmmlearn assume gaussian numbers, distributions, etc auto-smoothing emission data, which caused issues in runtime.

In my data I have emission probabilities from musical data, and a transition matrix.

This allowed full control and interpretability.

I have  $O(t)$ : {energy, brightness, fatigue, spectrum}  
 $S(t)$ : {boring, engaging, over-stim}

Viterbi gives a clean .

$\arg \max (t) P(S(t) | O(t))$