

CS 486 — Lecture 15: Hidden Markov Models, Part 2

1 Smoothing

- Given the observations up to today, which state were we in yesterday?
- Smoothing requires recursion.
- How do we calculate $P(R_k|u_{1:t}), 1 \leq k < t$?
- Use forward recursion to get $f_{1:t}$. Then use backwards recursion to build from $b_{t+1:t}$.
- We see:

$$\begin{aligned} P(R_k|u_{1:t}) &= P(R_k|u_{1:k} \wedge u_{k+1:t}) \\ &= \alpha P(R_k|u_{1:k}) P(u_{k+1:t}|R_k \wedge u_{1:k}) \\ &= \alpha P(R_k|u_{1:k}) P(u_{k+1:t}|R_k) \end{aligned}$$