Particle filtering

Wednesday, November 2, 2016 9:40 AM

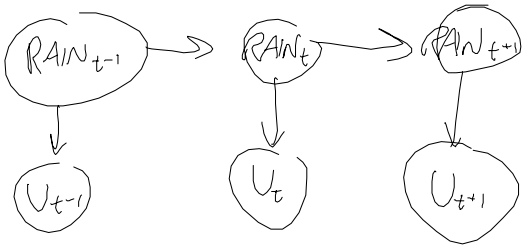
Approx technique

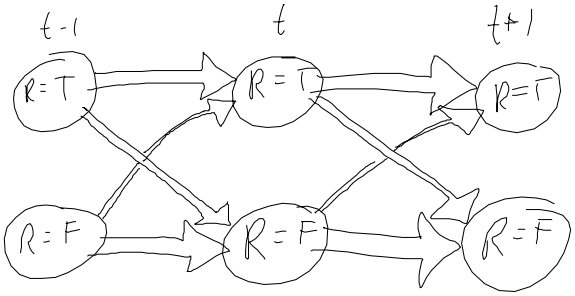
Exact can be expensive $\propto P(e_{t+1} | X_{t+1}) \sum_{x_t} P(X_t | x_{t-1}) P(x_{t-1} | e_{1:t-1})$ ← requires $O(k^n)$ computation

Particle Filtering — fast approx technique

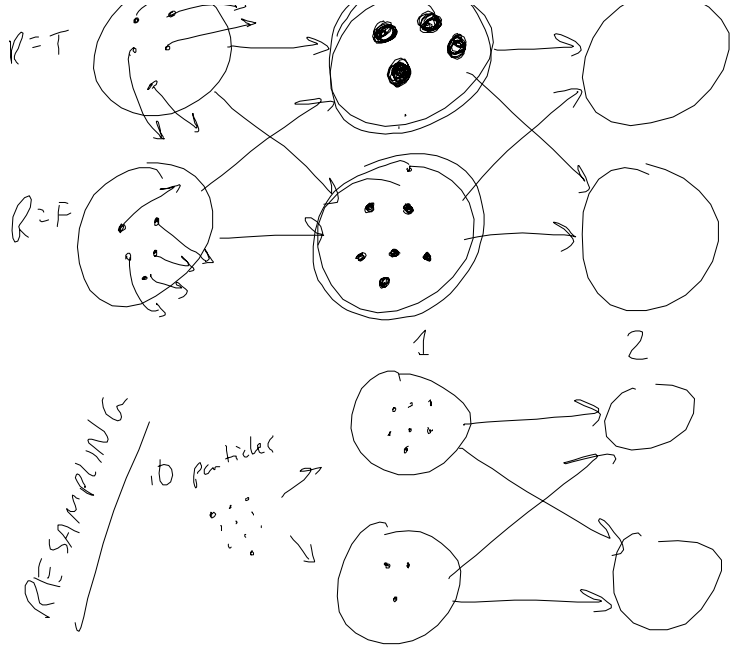
Discretize probability

Particles flowing through pipes

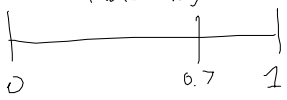




T= 0 1 2



for each particle
Random # generate



UMBRELLA, = TRUE

$P(U=T | R=T) = 0.9$

$P(U=T | R=F) = 0.2$

$P(X_t | e_t) = \frac{\#\text{particles in } X_t * \text{weight}}{\text{Total weight of all particles}}$

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