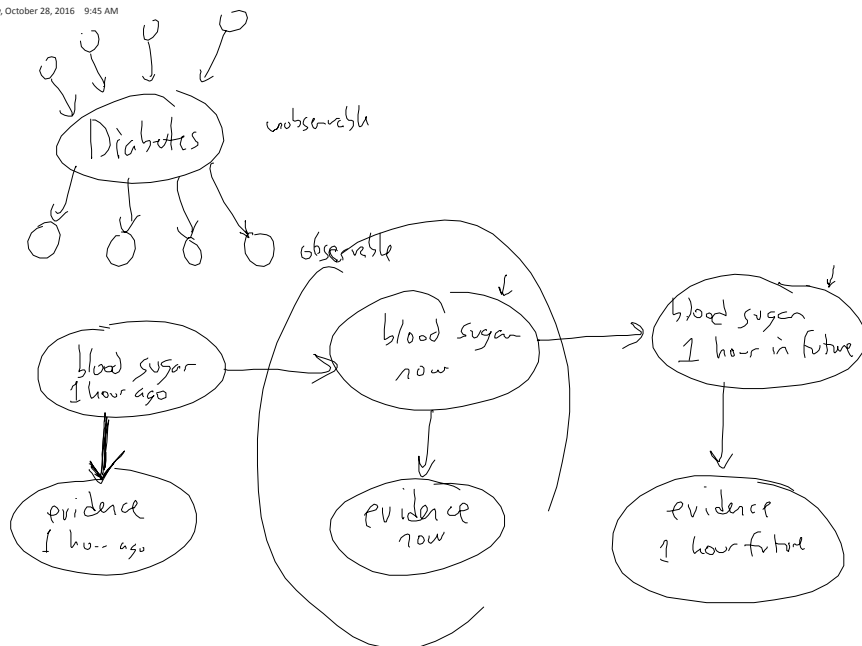


Reasoning with Time

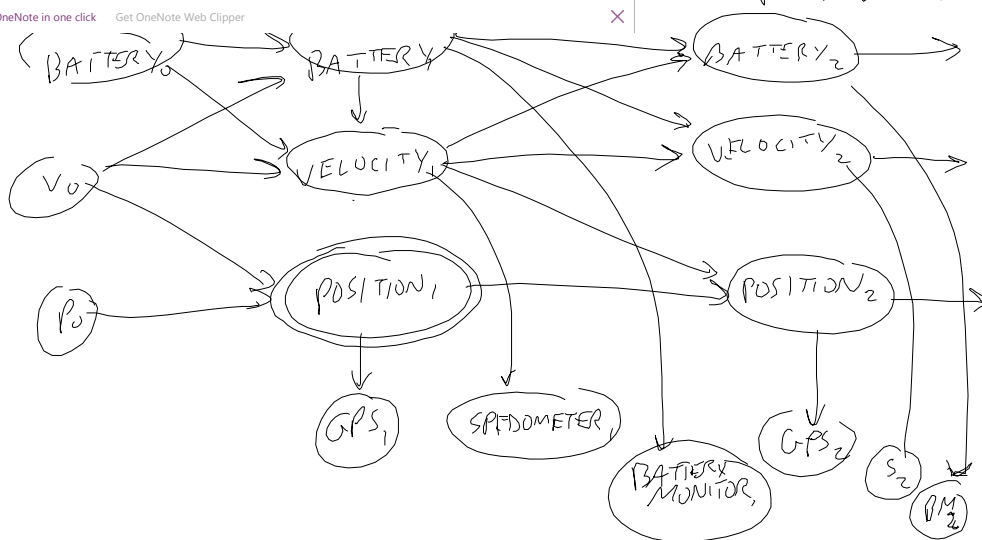
Friday, October 28, 2016 9:45 AM



X_t random variable with value at time t } * discretizing time
 E_t evidence variables

$X_{a:b} = X_a, X_{a+1}, X_{a+2}, \dots, X_{b-1}, X_b$ (a timeseries)

BLOODSUGAR... a sequence of actual blood sugar levels from time 0 to t



Markov Assumption: X_t depends on some bounded subset of the past $X_{0:t-1}$

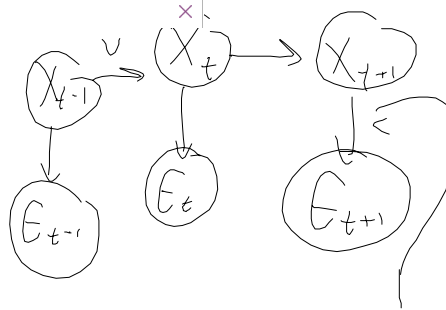
First order Markov Assumption: $P(X_t | X_{0:t-1}) = P(X_t | X_{t-1})$





Markov sensor Assumption: $P(E_t | X_{0:t}, E_{0:t-1}) = P(E_t | X_t)$

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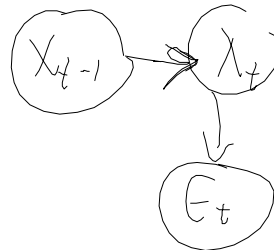
transition model

X_{t-1}	$P(X_t = \text{TRUE} X_{t-1})$	$P(X_t = \text{FALSE} X_{t-1})$
T		
F		

sensor model

X_t	$P(E_t X_t)$	$P(E_t = \text{FALSE} X_t)$
T		
F		

only need



Prior:

time = 0

$P(X_0) \leftarrow$ prior probability distribution

Posterior

RAIN_t

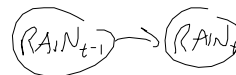
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$P(\text{RAIN}_0) = \langle 0.7, 0.3 \rangle$

$P(\text{RAIN}_0) = \langle 0.5, 0.5 \rangle$ uniform prior

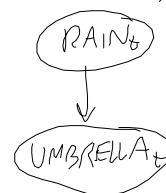
RAIN_t

transition



R_{t-1}	$P(R_t = \text{TRUE} R_{t-1})$	$P(R_t = \text{FALSE} R_{t-1})$
T	0.7	0.3
F	0.3	0.7

sensor model



R_t	$P(U_t = \text{TRUE} R_t)$	$P(U_t = \text{FALSE} R_t)$
T	0.9	0.1
F	0.2	0.8

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