11/6/8

UTEP/NMSU joint workshop
11^{05} Manali
12^{05} lunch
2^{00} Jaime

Trust Simulation

- independent events
- possible dependent events (Probabilistic & Interval)

$A \xrightarrow{p_1} \xrightarrow{p_2} B$

$$p \in [\max(p_1 + p_2 - 1, 0), \min(p_1, p_2)]$$

0.98 0.99

$$p \in [0.97, 0.98]$$

We want the lower bound

$$\begin{array}{r} 0.98 \\ +0.99 \\ \hline 1.97 \\ -1 \\ \hline 0.97 \end{array}$$

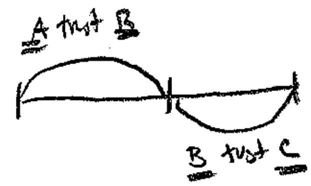
Problem: graph (A, E) — vertices, edges

(a,b)

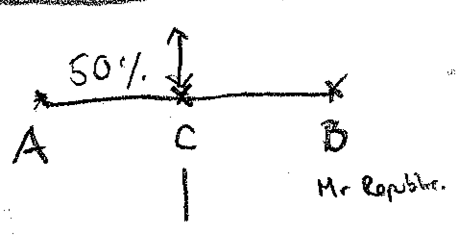
$p_0(a,b)$ – probability that a directly trusts b

$A \xrightarrow{0.5} C \xrightarrow{0.5} B$

A trusts B $\equiv$ (A trust C) & (C trust B)

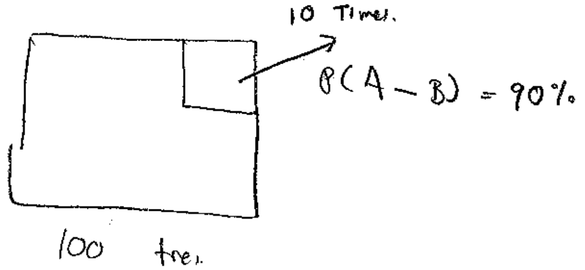


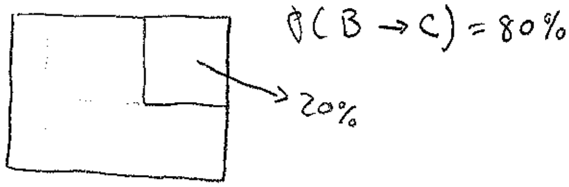
⚠ MonteCarlo: We need to know how correlated the values are



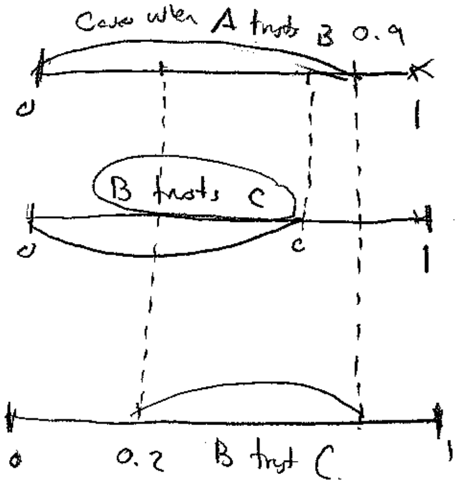
A trust B	C trusts B
Info in favor of Dem	Info in favor of Rep

ex.

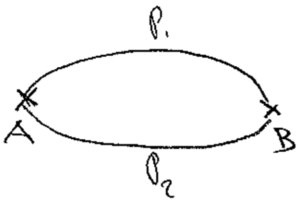




ex



ex.



$\Delta P_1 \quad \Delta P_2$

independent $\quad P_1 + P_2 - P_1 \cdot P_2$

$\Delta P = \Delta P_1 \cdot \Delta P_2$

$-$Prob $(1-\Delta P_1) - (1-\Delta P_2) + (1-\Delta P_1)(1-\Delta P_2)$

Possibly Dependent : $P = \max(P_1, P_2)$

$1 - P = 1 - \max(1-\Delta P_1, 1-\Delta P_2) =$

$= 1 - (1 - \min(\Delta P_1, \Delta P_2)) = \min(\Delta P_1, \Delta P_2)$

$P(A \vee B) = 1 - P(\neg(A \vee B))$

$= 1 - \underbrace{P(\neg A \wedge \neg B)}_{*}$

$\boxed{\begin{array}{l} P(\neg A) = 1 - pA \\ P(\neg B) = 1 - pB \end{array}}$

$*$ $[\max(P(\neg A) + P(\neg B) - 1, 0), \min(P(\neg A), P(\neg B))]$

$[\max(1 - pA + 1 - pB - 1, 0), \min(1 - pA, 1 - pB)]$

$[\max(1 - pA - pB, 0), 1 - \max(pA, pB)]$

$*$ $[\max(pA, pB), \min(pA + pB, 1)]$

HW. Thursday.

We want: $\underline{p}$ (lower bound), $\underline{P}(f, s)$ — first, second $\quad \underline{d}(f,s) = 1 - \underline{p}(f,s)$

$= \min \{ p(f,s)$: all possible distr which are consistent with $p_0(a,b)$

$d_0(a,b) \overset{\text{def}}{=} 1 - p_0(a,b)$.

$\underline{d}(f,s)$ = length of the shortest path from $\underline{f}$ to S

lower bound.

$f \xrightarrow{d_1} \times \xrightarrow{d_2} s \quad \hookrightarrow \max(p_1 + p_2 - 1, 0)$

$d_1 = 1 - p_1 \quad d_2 = 1 - p_2$

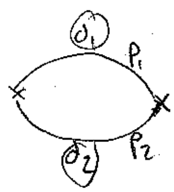
$p = p_1 + p_2 - 1$

$1 - p = 1 - ((1 - \Delta p_1) + (1 - \Delta p_2) - 1) =$

Shortest path: $d_1 + d_2$

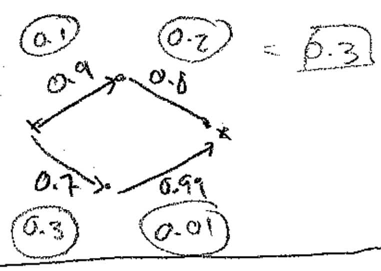
$= \cancel{1} \cancel{-1} + \Delta p_1 \cancel{-1} + \Delta p_2 \cancel{+1}$

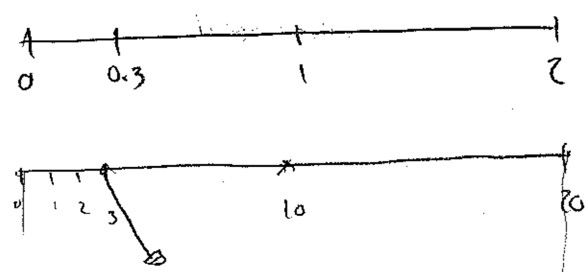
$\boxed{= \Delta p_1 + \Delta p_2}$

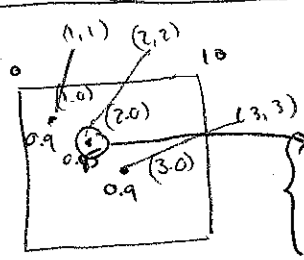


$\min(d_1, d_2)$

! Check for HW 10.







$(0.9)\cdot(0.9) = 0.85 * 1.5 = 1.28$

$(0.9)(0.05)(0.9) = 0.04 * 2.0 = 0.10$

$(0.1)(0.95)(0.9) = 0.09 * 2.5 = 0.25$

$\overline{0.02} \quad \overline{1.53}$

$\sigma^2 = 0.85 \cdot 0.13^2 + 0.05 \cdot 0.4^2 +$

$= 0.85 \cdot 0.17 + 0.05 \cdot 0.16 + 0.1 \cdot 0.81 =$

$= 0.14 + 0.08 + 0.08 = 0.28 \longrightarrow \sqrt{0.28}$