$P(\bar{D}) = .995$

- P(E|D) = 0.95, P(D)=0.005

$P(E|\bar{D}) = 0.01$

Note Title 8/27/2013

Q: $P(D|E)$?

$$P(D|E) = \frac{P(DE)}{P(E)} = \frac{P(E|D)\cdot P(D)}{P(E)}$$

$$= \frac{P(E|D)\cdot P(D)}{P(E|D)\cdot P(D) + P(E|\bar{D})\cdot P(\bar{D})}$$

$$= \frac{0.95 \times 0.005}{0.95 \times 0.005 + 0.01 \times 0.995} = 0.323$$

- $P(E|S)=\prod P(w_i|S)$, $P(E|H)=\prod P(w_i|H)$ ← assume independence among keywords

$p(\text{dollar}|S) = 0.2$, $p(\text{dollar}|H) = 0.05$

$p(\text{cheap}|S) = 0.5$, $p(\text{cheap}|H) = 0.01$

$p(S) = 0.1$, $p(H) = 0.9$

$E: \{\text{cheap}, \text{dollar}\}$ Q: $p(S|E)$?

$p(H|E)$?

$$p(S|E) = \frac{\overbrace{p(E|S)}^{p(\text{dollar}|S) \times p(\text{cheap}|S)} \cdot p(S)}{p(E|S) \cdot p(S) + p(E|H) \cdot p(H)} = 0.957$$

$$p(H|E) = \frac{p(E|H) \cdot p(H)}{p(E)} = 0.043$$

high threshold

e.g. 80%

$n = 35$ r.v. X = # of active users at current time

$p = 0.1$ $X \sim B(n, p)$

$P(\text{congestion}) = P(\text{more then 10 active users})$

$= P(X > 10) = 1 - P(X \leq 10)$

$= p(X=0) + p(X=1) + \cdots + p(X=10)$

$= 0.0004$ $p(x=k) = \binom{n}{k} p^k (1-p)^{n-k}$