

CORPUS

Jecel/**NNP** ate/**VB** an/**AT** apple/**NNP** ./.

Frecy/**NNP** likes/**VB** an/**AT** orange/**NNP** ./.

An/**AT** apple/**NNP** is/**VB** red/**JJ** ./.

NNP	Proper noun, singular
VB	Verb
AT	Article
JJ	Adjective
.	period

Approximations for HMM

$$\begin{aligned} & \arg \max_{c_1 \dots c_T} P(c_1 \dots c_T | F_1 \dots F_T) \\ &= \arg \max_{c_1 \dots c_T} \frac{P(c_1 \dots c_T) P(F_1 \dots F_T | c_1 \dots c_T)}{P(F_1 \dots F_T)} \\ &= \arg \max_{c_1 \dots c_T} P(c_1 \dots c_T) P(F_1 \dots F_T | c_1 \dots c_T) \\ &\cong \arg \max_{c_1 \dots c_T} \left[\prod_{i=1}^T P(c_i | c_{i-1}) \times \prod_{i=1}^T P(F_i | c_i) \right] \\ &= \arg \max_{c_1 \dots c_T} \prod_{i=1}^T P(c_i | c_{i-1}) P(F_i | c_i) \end{aligned}$$

HMM state diagram

