

# Supervised Training

Given:

1.  $N$  – the number of states, e.g., 2, ( $s_1$  and  $s_2$ )
2.  $V$  – the vocabulary, e.g.,  $V=\{a,b\}$
3.  $O$  – observations, e.g.,  $O=aaaaabbbbb$
4. State transitions, e.g.,  $S=1121122222$

Task: Estimate the following parameters

1.  $\pi_1, \pi_2$

$$\pi_1=1/1=1; \pi_2=0/1=0$$

2.  $a_{11}, a_{12}, a_{22}, a_{21}$

$$a_{11}=2/4=0.5; a_{12}=2/4=0.5$$

3.  $b_1(a), b_1(b), b_2(a), b_2(b)$

$$a_{21}=1/5=0.2; a_{22}=4/5=0.8$$

$$b_1(a)=4/4=1.0; \quad b_1(b)=0/4=0;$$

$$b_2(a)=1/6=0.167; \quad b_2(b)=5/6=0.833$$

