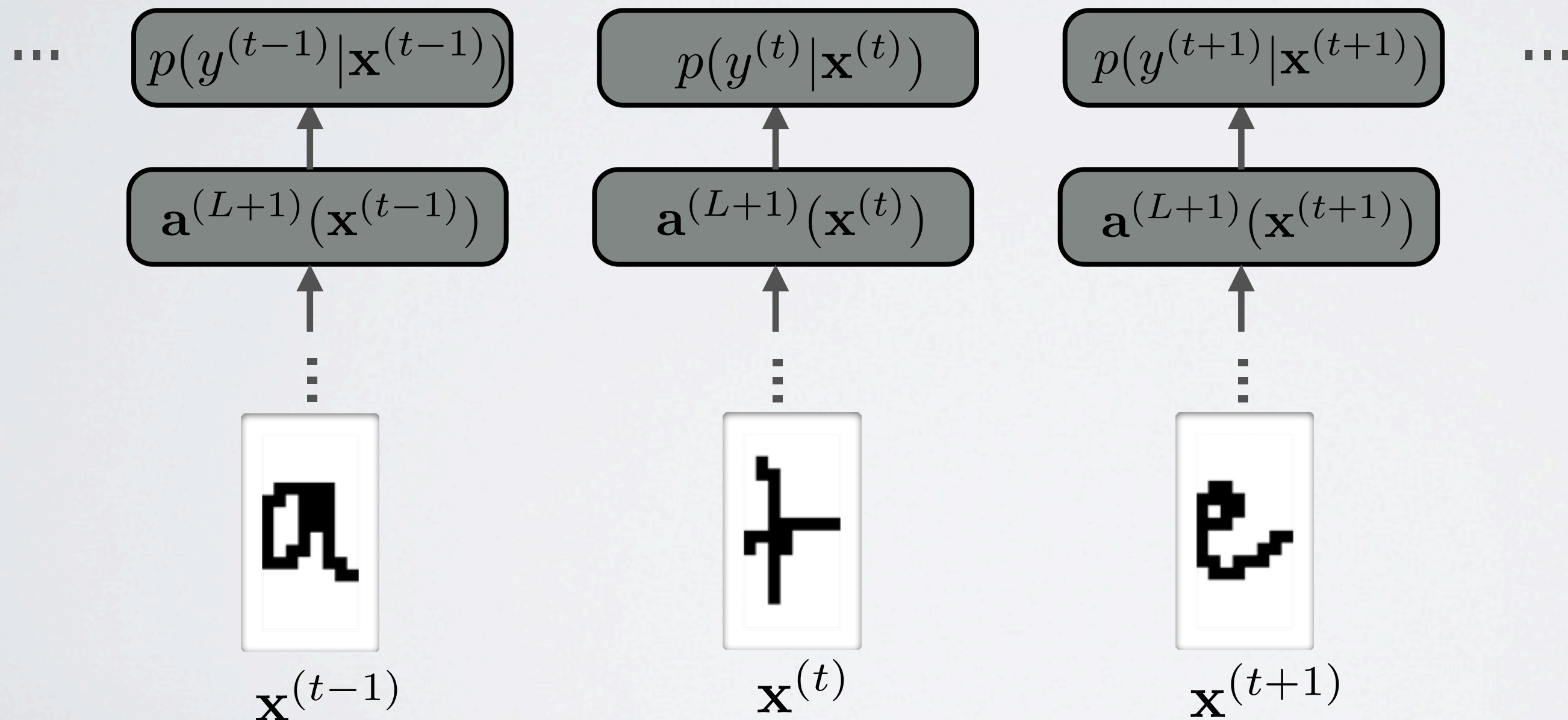# Neural networks

Conditional random fields - motivation

CONDITIONAL RANDOM FIELD

Topics: sequence classification
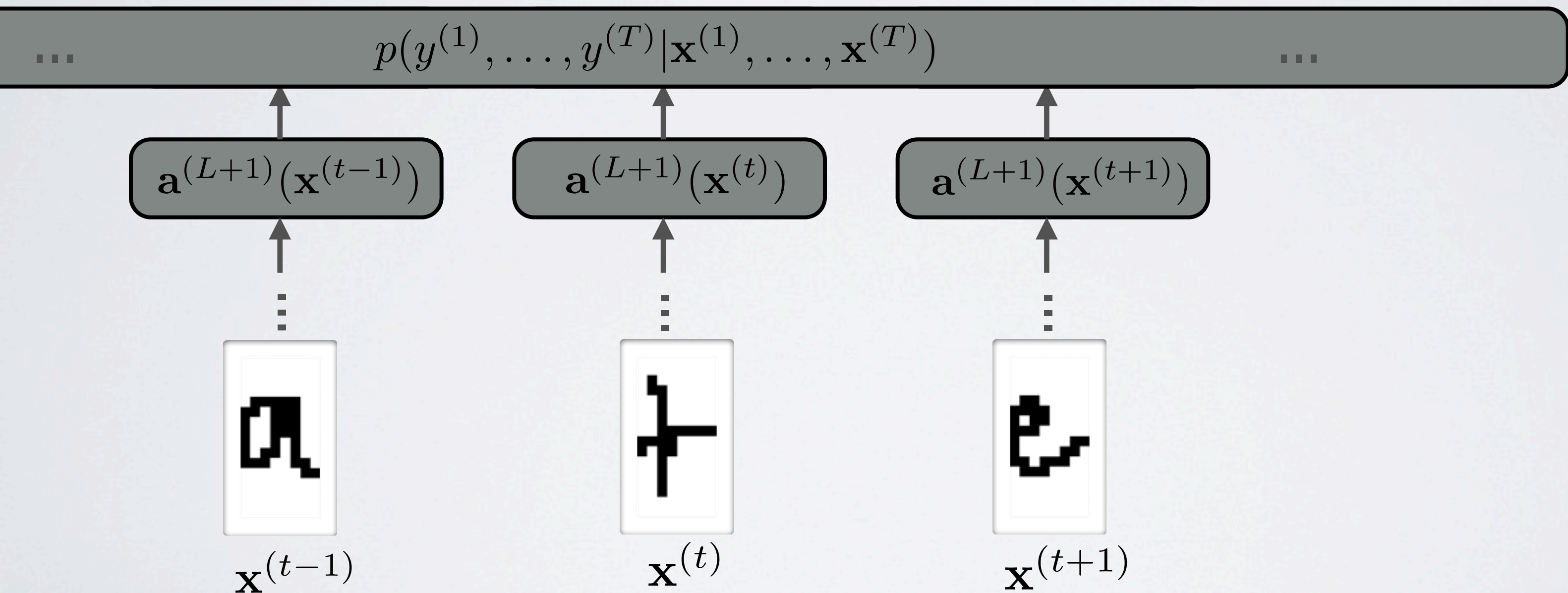
• What if examples organized in a sequence

CONDITIONAL RANDOM FIELD

Topics: sequence classification

• What if examples organized in a sequence

NOTATION

Topics: notation for inputs and targets

- Training set $\{(\mathbf{X}^{(t)}, \mathbf{y}^{(t)})\}$ is a set of input and target sequences pairs:

  ‣ inputs are $\mathbf{X}^{(t)} = [\mathbf{x}_1^{(t)}, \ldots, \mathbf{x}_{K_t}^{(t)}]$

  ‣ targets are $\mathbf{y}^{(t)} = [y_1^{(t)}, \ldots, y_{K_t}^{(t)}]$

  ‣ K_t is the length of the tth sequence

CONDITIONAL RANDOM FIELD

Topics: sequence classification

• For a given example $(\mathbf{X}, \mathbf{y})$:

$$\cdots \quad p(\mathbf{y}|\mathbf{X}) = p(y_1, \ldots, y_K | \mathbf{x}_1, \ldots, \mathbf{x}_K)$$

$$\mathbf{a}^{(L+1)}(\mathbf{x}_{k-1}) \qquad \mathbf{a}^{(L+1)}(\mathbf{x}_k) \qquad \mathbf{a}^{(L+1)}(\mathbf{x}_{k+1})$$

$$\mathbf{x}_{k-1} \qquad\qquad \mathbf{x}_k \qquad\qquad \mathbf{x}_{k+1}$$