

April 16, 2020

Last time: graph convolutional networks

$$\left(\overset{n}{\square} \overset{\hat{A}}{A}, \overset{n}{\square} \overset{\hat{d}}{F} \right) \xrightarrow{f} \overset{n}{\square} \overset{k}{X} \xrightarrow{g} \overset{n}{\square} \overset{1}{\hat{Y}} \xrightarrow{\ell} (\hat{Y}_H, Q_H)$$

$$\hat{Y} = \begin{bmatrix} \hat{Y}_H \\ \hat{Y}_u \end{bmatrix}$$

predictions on unlabeled nodes

Smoothed features:

ith column $x_i \approx \underset{z}{\operatorname{argmin}} f(z) + \lambda \|z - f\|_2^2$

$$\begin{matrix} \uparrow \\ z^T L z \quad z^T N z \quad z^T (I - P) z \end{matrix}$$

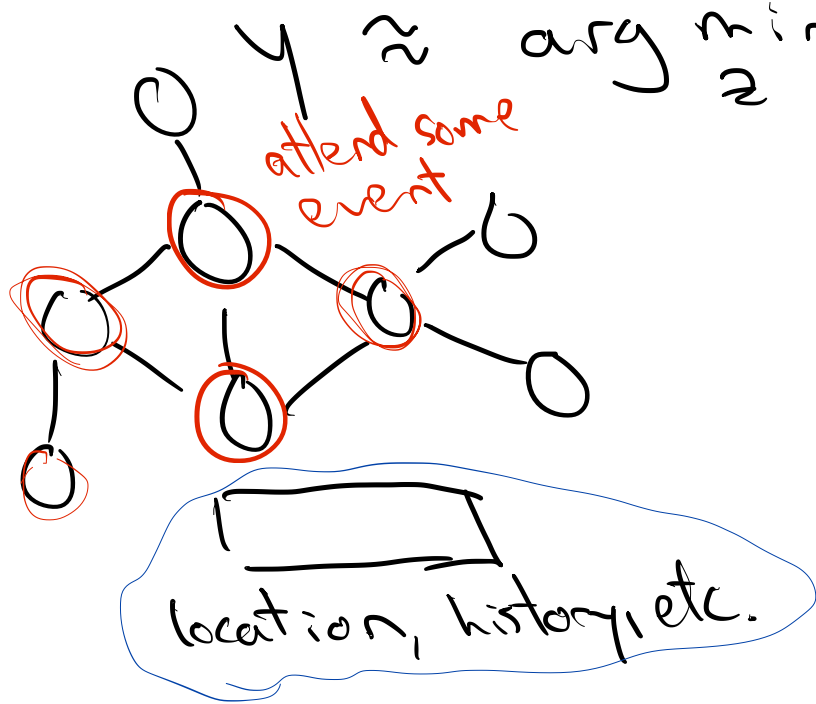
Each GD steps:

$$x_i^{(t+1)} \approx \underbrace{\left[\alpha P + (1 - \alpha) I \right]}_M x_i^{(t)}$$

$$X^{(t+1)} \approx M X^{(t)} \Rightarrow X^{(t+1)} = \sigma(M X^{(t)} W^{(t)} + b^{(t)})$$

$W^{(t)}, b^{(t)}$ couples embedding and prediction task

Smoothed labels



seems like we should be using the label

$$\left(\tilde{A}, \tilde{F}, \overset{\sim}{\begin{pmatrix} l_H \\ 0 \end{pmatrix}} \right) \text{ label as input feature!}$$

$$f(z) + \lambda \left\| \begin{pmatrix} y_H \\ y_u \end{pmatrix} - \begin{pmatrix} l_H \\ 0 \end{pmatrix} \right\|_2^2$$

