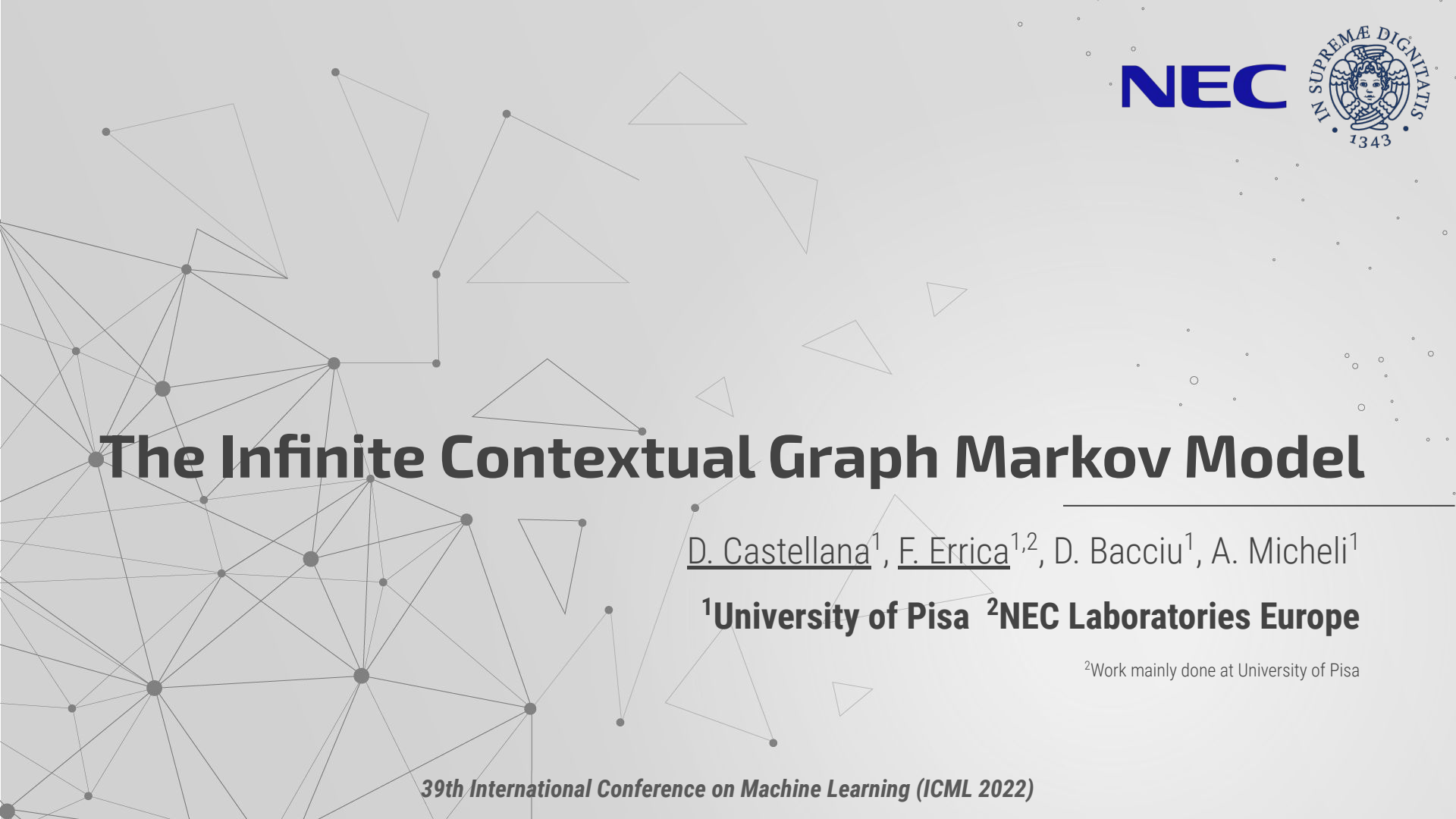

The Infinite Contextual Graph Markov Model

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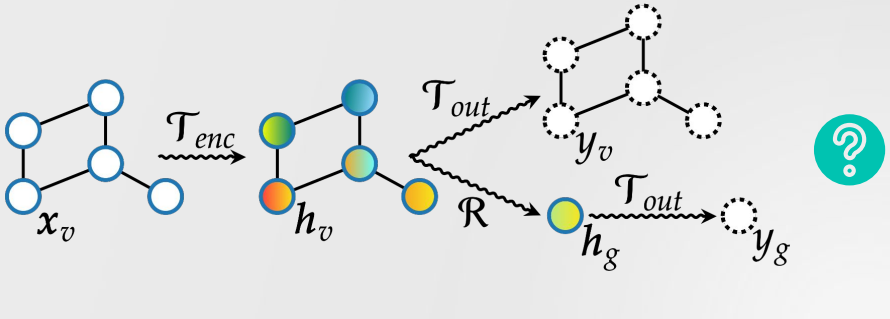
[1]University of Pisa [2]NEC Laboratories Europe

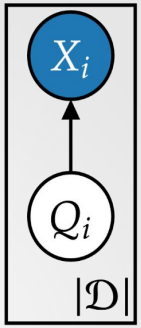
[2]Work mainly done at University of Pisa

39th International Conference on Machine Learning (ICML 2022)

Motivations

1



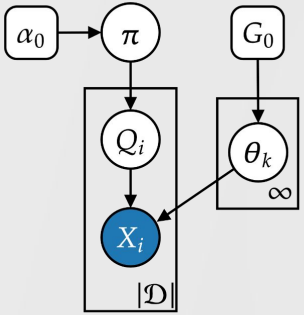


2

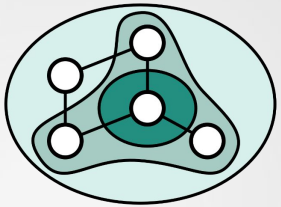
How can we **automatically choose the hyper-parameters** of the model?

Main features

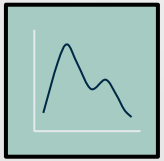
Probabilistic



Deep Architecture



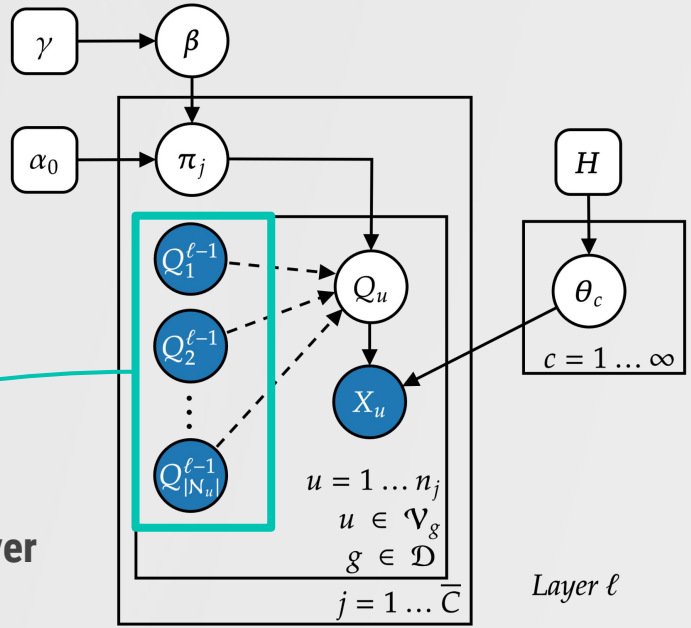
Unsupervised



The Infinite CGMM (iCGMM)

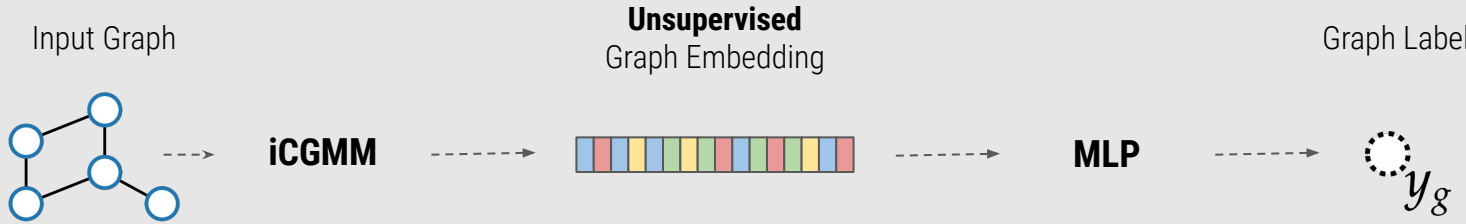
At **each layer**, iCGMM trains a **Hierarchical Dirichlet Process** to fit the node labels distributions $\mathbf{X_u}$

- Automatic choice of **# states for $\mathbf{Q_u}$**
- Estimate **all hyper-parameters** via hyper-priors
- **Gibbs sampling** inference



The **neighbors'** states at the **previous layer** determine the label **group**

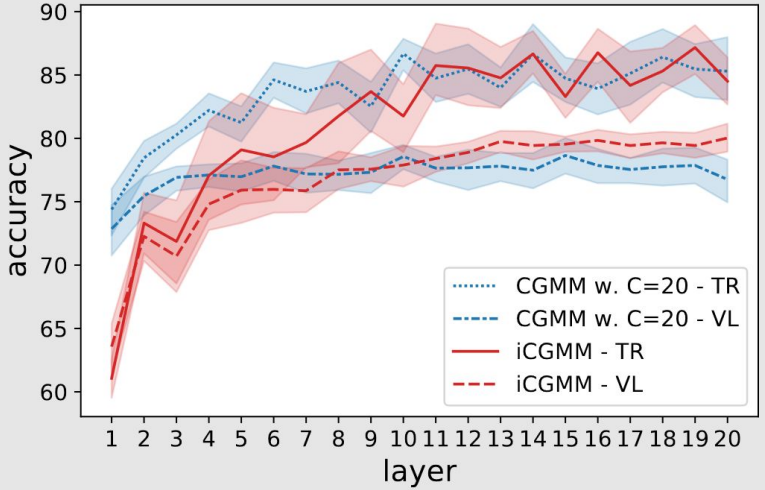
Graph classification results*



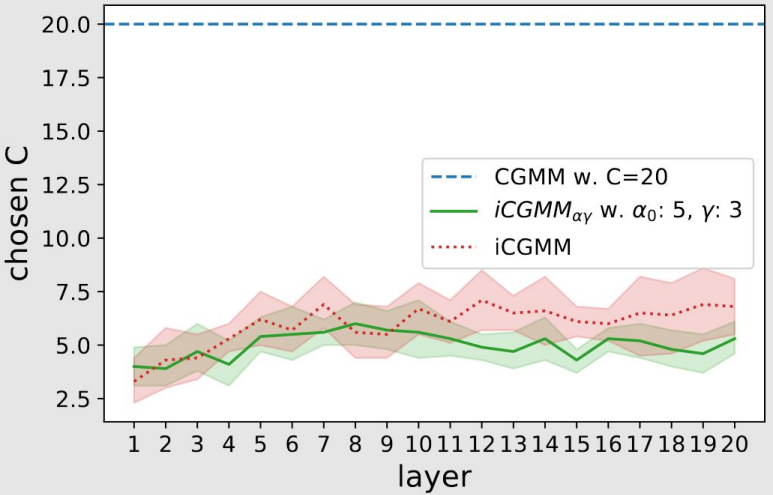
- **Comparable results** against supervised DGN⟶ **structural information** exploited
- **Comparable results** against CGMM ⟶ **# of latent states** successfully inferred
- **No need** for extensive model selection ⟶ time savings!

*Using the fair and reproducible experimental setting of [Errica et al., ICLR 2020]

Qualitative analyses



Effect of **depth** on TR/VL accuracy



states chosen at each layer

Questions?

Thanks for listening!

See you at the **poster** session!

You can **reach out** via:

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Code: github.com/diningphil/iCGMM