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Overview

Motivation

A model for:

- Link prediction or community detection in social networks.
- Objects with coupling relations along time(serial coupling relations).
- Capturing some aspects(infinite, dynamic, mixed-membership and data-driven inference).

Motivation(cont.)

- Infinite: We do not have to define the number of communities before hand. It can prevent under or over fitting problem.
- Dynamic: The number of communities can change over time.
- Mixed-membership: one node can belongs to multiple communities.
- Data-driven inference: model bases on data only.

Litarature review

IRM

Infinite Relation Model(Kemp et al. 2006) cluster nodes into different groups based on their pairwise and directional binary interactions.

- Infinite.
- Not take into account changing with time.
- One node can only belong to one community.
- Data-driven.

dIRM

Dynamic Infinite Relation Model(Ishiguro et al. 2010)

- Infinite.
- Changing with time.
- One node can only belong to one community.
- Data-driven.

Litarature review(cont.)

MMSB

Mixed-Membership Block Model(Airoldi et al. 2008)

- Not Infinite.
- Not take into account changing with time.
- One node can belong to multiple communities.
- Data-driven.

LFRM

Latent Feature Relation Model(Miller et al. 2009)

- Infinite.
- Does not take into account changing with time.
- One node can belong to multiple communities.
- Data-driven.

Litarature review(cont.)

Sticky HDP-HMM

Sticky Hierachical Dirichlet Process - Hidden Markov Model(Fox et al. 2008)

- Infinite.
- Changing with time.
- One node can only belong to one community.
- Data-driven.

A model can capture all aspects:

- Infinite.
- Changing with time.
- One node can belong to multiple communities.
- Data-driven.

LFRMtimes

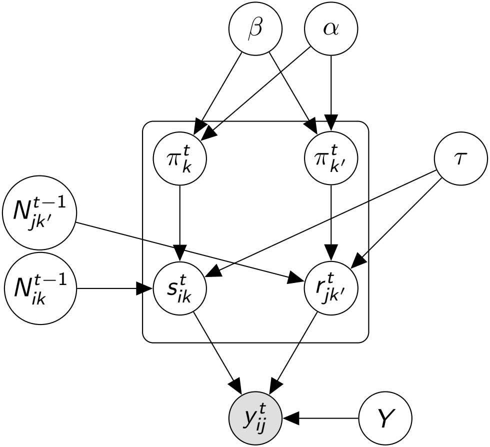

Figure: LFRMtimes. i,j = 1 : n, k,k' = 1 : K, t = 1 : T

LFRMtimes(cont.)

$\pi_k^t \sim BP(\alpha, \beta)$

$s_{ik}^t \sim BeP(\pi_k^t + \tau.N_{ik}^{t-1}\delta_k)$

$r_{jk}^t \sim BeP(\pi_k^t + \tau.N_{jk}^{t-1}\delta_k)$

$w_{kk'}^t \sim \mathcal{N}(0, \sigma_{w^t}^2)$ for all k, k' which features k and k' are non-zero.

$y_{ij}^t \sim \sigma(S_i W R_j^T) = \sigma(\sum_{k,k'} s_{ik}^t r_{jk'}^t w_{kk'}^t)$ for each observation.

$\sigma(x) = \frac{1}{1+exp(-x)}$

Blocks of Highlighted Text

Block 1

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Block 2

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Block 3

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Multiple Columns

Heading

1. Statement
2. Explanation
3. Example

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Table

Treatments	**Response 1**	**Response 2**
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table: Table caption

Theorem

Theorem (Mass–energy equivalence)

$E = mc^2$

Verbatim

Example (Theorem Slide Code)

```
\begin{frame}
\frametitle{Theorem}
\begin{theorem}[Mass--energy equivalence]
$E = mc^2$
\end{theorem}
\end{frame}
```

Figure

Uncomment the code on this slide to include your own image from the same directory as the template .TeX file.

Citation

An example of the `\cite` command to cite within the presentation:

This statement requires citation [Smith, 2012].

References

John Smith (2012)
Title of the publication
Journal Name 12(3), 45 – 678.

The End