Directions for a novel Bayesian meaning change model

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1 Use genre information

- Simple approach: Lea's model applied to partitions of the data based on genres (IN PROGRESS)
- Add genre-dependent covariates to Gaussian model for each meaning, i.e.,

$$\phi^t \mid \phi^{-t}, k^\phi \sim N\left(\frac{\phi_{t-1}+\phi_{t+1}}{2} + \sum_j \beta_j \mathbf{1}_j, k^\phi\right),$$

  where β_j represents the impact of genre j on the meaning probability ϕ^t (note: this is a draft, the generative model is unclear yet).
- Use ideas from author-topic model, where authors correspond to genres in our case (see `https://mimno.infosci.cornell.edu/info6150/readings/398.pdf`)

2 Introduce change points

- Simple approach for fixed change points at known locations: Lea's model applied to consecutive segments of the total time period. These decouples the dependencies between consecutive meaning probabilities ϕ and ϕ^{t+1}.

3 Allow for infinite meanings

- Replace Gaussian time-evolution with dependent Dirichlet (see literature)
- Extend to Hierarchical Dirichlet process

4 More realistic time-evolution

- Instead of Gaussian: evolution of normalized probabilities, values forced within 0 and 1, drift and more advanced correlation structure

5 Add dependence across meanings

- Use ideas from correlated topic models (see `http://people.ee.duke.edu/~lcarin/Blei2005CTM.pdf`)