# A fully Bayesian view of Latent Dirichlet Allocation

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## Abstract

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## 1 Introduction

## 2 Related work

## 3 A conjugate prior for the Dirichlet distribution

## 4 Fully variational Bayes for Latent Dirichlet Allocation

## 5 Experiments

In order to evaluate our model we ran experiments over two corpus to compare the typical LDA and his fully bayesian formulation. We uesd a 20 news groups dataset and a nips 2012 set of articles. Each of them were divided into a training and test set corpus. We fit both a classical LDA model and the full variational LDA using the training set. The test set was used to assert to convergence of the training phase by computing the perplexity of the model. To compute it we use the approximation in (Asuncion, 2009). We topic-word distribution is fit on the learning set and the document-topic distribution is evaluated on the testing set, thus the perplexity of the model is computed as follow:

$$\log p(x^{test}) = \sum_{jw} N_{jw} \log \frac{1}{S} \sum_{s} \sum_{k} \theta^{s}_{kj} \phi^{s}_{wk}$$

Preliminary work. Under review by AISTATS 2016. Do not distribute.

## 6 Discussion

### Acknowledgements

Use unnumbered third level headings for the acknowledgements. All acknowledgements go at the end of the paper. Be sure to omit any identifying information in the initial double-blind submission!

### References

Asuncion, Arthur, et al. "On smoothing and inference for topic models." Proceedings of the Twenty-Fifth Conference on Uncertainty in Artificial Intelligence. AUAI Press, 2009.