Making Text Analytics More Approachable: From Traditional to Generative AI for Business Applications

Paper # AL96

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Background


Text Mining
Clustering
Sentiment Analysis
NLP
Generative AI & LLMs
Topic Modeling
Content Summary

Focus Area

To conduct a comparative study on performance of unsupervised topic modeling techniques:

- Spanning from traditional to generative models
- Devise a new approach for combining topic modeling and text classification.

Techniques Used

- SAS Visual Text Analytics
- Text Analytics with Python

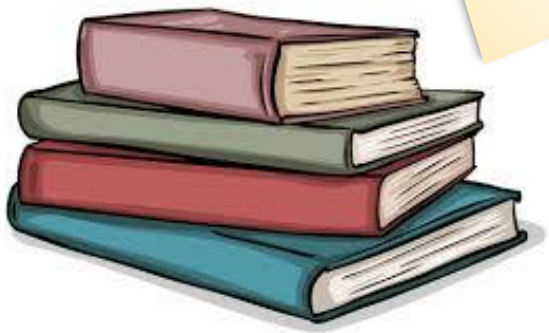
Image Credit: DALL-E

Topic Modeling

Key Idea: Documents are mixtures of latent topics, where a topic is a probability distribution over a word

- The main way of automatically capturing the meaning of documents.
- The topic of an image: a cat, a dog..

Politics, President, Law, Policy….
Space, Planet, Astronaut, Mission….
Sports, Team, Player, Coach, Stadium….



Dataset

- 2,225 articles published online
- Each article is labeled under one of 5 categories:
  - Business
  - Entertainment
  - Politics
  - Sport
  - Tech

Sample Data

text	label_text
wales want rugby league training…..	Sport
new harry potter tops book……	Entertainment

https://huggingface.co/datasets/SetFit/bbc-news

http://mlg.ucd.ie/datasets/bbc.html

Topic Modeling & Classification

Topic Modeling

Topic 1

- Politics, President, Law, Policy….

Topic 2

- Space, Planet, Astronaut, Mission…

Topic 3

- Sports, Team, Player, Coach…..

Top 10 Docs

Top 10 Docs

Top 10 Docs

LLM

Sports

Business

Politics

Tech

Entertain -ment

Evaluations

Topic Modeling

Technique	# Topics	Coherence score
Lda	14	0.34
Top2vec	10	0.47
SAS	11	0.49
Bertopic	53	0.62

Text Classification

Model Type	Accuracy
Transformer based	88.3%
Non-Transformer based	72.6%

Why did the numbers vary?

Traditional

- Based on probabilistic models or matrix factorization.
- Uses bag-of-words assumption (ignores word order).
- Focuses on identifying word co-occurrence patterns in documents.

Modern

- Leverages word embeddings (BERT, GPT) to capture context.
- Uses deep learning and transformers for topic inference.
- Focuses on generating Context-aware topics using semantic relationships.

Use Cases

Calculator is to Math, LLMs are to ?

Conclusions

Transformer-based algorithms improve topic modeling by producing organized clusters and revealing key relationships. Combining topic modeling with language models enhances automatic categorization.

Traditional algorithms often miss text semantics, but large language models (LLMs) provide significant improvements.

Future work will focus on optimizing parameters, conducting detailed studies on specific user groups, and developing scalable platforms.

Thank You!

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