chen_2020_a_topic_sensitive_trust_evaluation_approach_for_users_in_online_communities

Year

2020

Author(s)

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Title

A topic-sensitive trust evaluation approach for users in online communities

Venue

Knowledge-Based Systems

Topic labeling

Fully automated

Focus

Secondary

Type of contribution

Established approach

Underlying technique

Result of supervised topic modeling (LLDA)

Topic labeling parameters

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Label generation

LLDA supports the incorporation of the prior labels or tags into its learning process

Table 4
Representative words in the three selected topics recognized by the user-topic model.

Topic	Top 10 representative words
Elec	Input, Resistor, Signal, Supply, Frequency, Device, Load, Pin, Capacitor, Battery
Phy	Force, Mass, Vector, Space, Equation, Theory, Quantum, State, Particle, Velocity
Stats	Distribution, Test, Mean, Sample, Regression, Value, Variable, Sum, Number, Probability

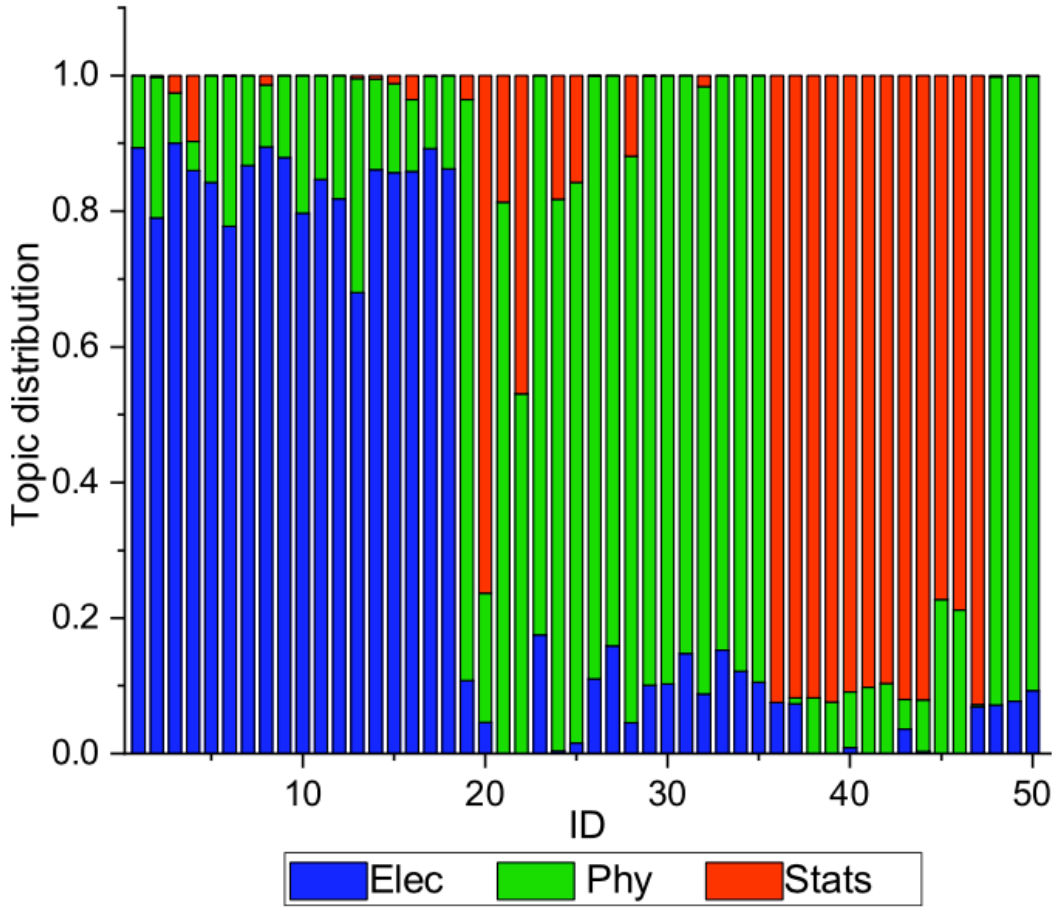

Fig. 6. Topic distributions of 50 randomly selected users.

Motivation

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Topic modeling

LLDA (Ramage et al., 2009)

Topic modeling parameters

iterations of Gibbs sampling: 1000

Nr. of topics

3 (One per selected Stack Exchange category)

Label

One of three categories from the Stack Exchange dataset: Electronical Engineering (Elec), Physics (Phy), Cross validated (Stats)

Label selection

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Label quality evaluation

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Assessors

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Domain

Paper: Trust evaluation
Dataset: Online Q&A

Problem statement

Most of the existing methods consider trust in a person as a value which does not vary across different scenarios without any attention to the distinction of domains or

communities where trust is derived.
In this paper, we develop a general approach to accomplish topic-sensitive trust evaluation by considering the context of trust.
We first propose a general framework which presents the well organised architecture of topic-sensitive trust evaluation in online communities.
Then, a user-topic model is proposed to automatically extract topic data from user-generated content based on the Labeled Latent Dirichlet Allocation (LLDA) model.
To compare the topic differences between users, we design a topic coverage function for revealing their trust relationships in diverse topics. Moreover, we employ two traditional methods and extend them to accomplish trust prediction for people with multiple domain knowledge.

Corpus

Origin: Stack Exchange
Nr. of documents: 2010
Details:

- Q&A website that allows users to ask and answer questions in 174 different topics, 3 of which are selected
- Stack Exchange provides categories of topics in its directory, which is an outstanding resource of training labels for LLDA

Table 1
Subset of Stack Exchange dataset used in experiments.

Category	#Users	#Questions	#Answers	Abbreviation
Electronical engineering	670	37,768	47,403	Elec
Physics	670	36,376	43,983	Phy
Cross validated	670	28,631	33,852	Stats

* *# represents the number of items.*

Document

Q&A strictly corresponds to one user

Pre-processing

- removing those users whose number of posted questions and answers is no more than 20 in each category.

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@article{chen_2020_a_topic_sensitive_trust_evaluation_approach_for_users_in_online_communities,
  abstract = {In order to facilitate human decision making, trust evaluation has received widespread attention in many fields, especially for online services. Most of the existing methods consider trust in a person as a value which does not vary across different scenarios without any attention to the distinction of domains or communities where trust is derived. However, the notion of context is a significant and indispensable factor for trust evaluation in practice. Due to the lack of the consideration of context, traditional methods cannot resolve the issue that arises when a highly trustworthy person in one domain is likely to dominate the results of trust assessment in others where the person is in fact less authoritative. To solve this problem, in this paper, we develop a general approach to accomplish topic-sensitive trust evaluation by considering the context of trust. We first propose a general framework which presents the well-organized architecture of topic-sensitive trust evaluation in online communities. Then, a user-topic model is proposed to automatically extract topic data from user-generated content based on the Labeled Latent Dirichlet Allocation (LLDA) model. To compare the topic differences between users, we design a topic coverage function for revealing their trust relationships in diverse topics. Moreover, we employ two traditional methods and extend them to accomplish trust prediction for people with multiple domain knowledge. Experiments based on a real-world dataset show that extended topic-sensitive approaches are more adaptive and accurate than those topic-free trust evaluation approaches, especially when the trust application scenario features multiple topics.},
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#Thesis/Papers/Initial