Dynamic Explainable Recommendation based on Neural Attentive Models

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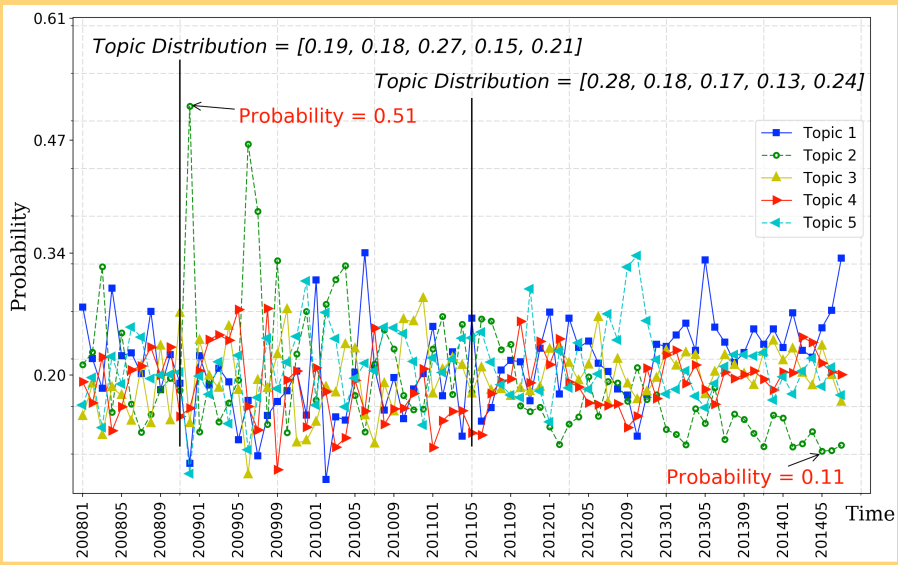
Abstract

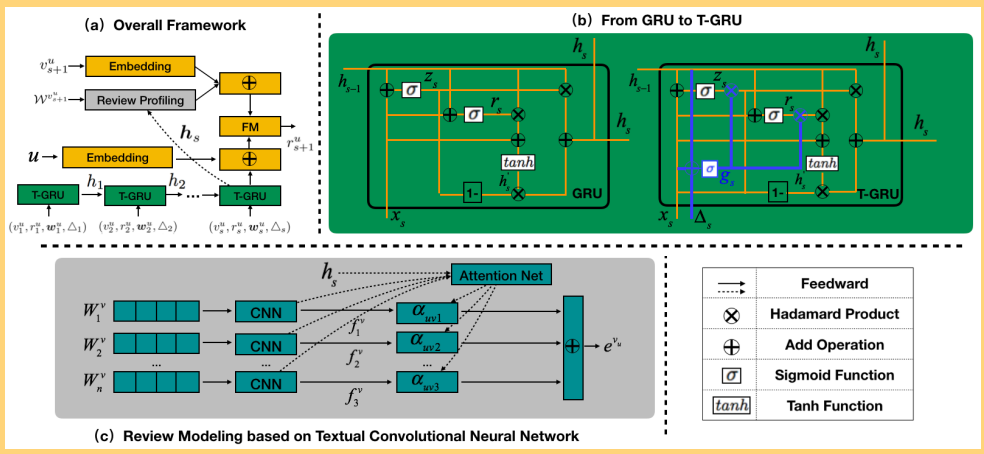
- Providing explanations in a recommender system is getting more and more attention in both industry and research communities. Most existing explainable recommender models regard user preferences as invariant to generate static explanations.
- However, in real scenarios, a user's preference is always dynamic, and she may be interested in different product features at different states. The mismatching between the ex- planation and user preference may degrade costumers' satis- faction, confidence and trust for the recommender system.
- In this paper, we build a novel Dynamic Explainable Recommender (called DER) for more accurate user modeling and explanations.

Data Analysis based on Amazon Datasets



The dynamic nature of the user review topic distribution across different months. The number of topics in LDA is set as 5.

Dynamic Explainable Recommender (DER)



(a) Explainable Rating Prediction (b) User Modeling (c) Item Modeling

Experiments

Table 2: The results of comparing our model with the baselines in terms of RMSE.

Dataset	Music	Automotive	Toy	Yelp
PMF	1.0706	1.0100	1.1220	1.3411
GRU4Rec	1.0111	0.9723	1.0363	1.3011
Time-LSTM	0.9901	0.9615	0.9963	1.2821
Time-LSTM++	0.9878	0.9435	0.9805	1.2711
NARRE	0.9784	0.9199	0.9690	1.2507
DER	**0.9678**	**0.8981**	**0.9535**	**1.2314**

Results for rating prediction

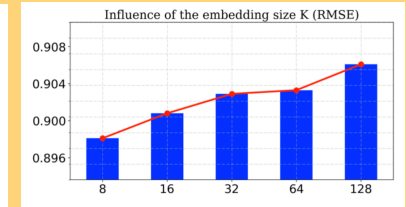


Figure 3: Influence of the embedding size K for our model's final performance

Dimension size influence

All the reviews of the target item

Review No.1: *I wanted a decent black hitch cover to use as a base to mount a skull head to something sturdier than what it originally came on, This is a nice well made plain hitch cover so whether you want something plain in itself or something plain to work from, this is a great hitch cover, I highly recommend this product*

Review No.2: It is being used with a Curt hitch, This seems to be a great deal compared with others and I like the fact that it is steel and not plastic, It is of high quality construction and the padding behind the head prevents the cover from making any noise when touching the receiver.

Attention score: 0.475296

Review No.3: Nice look on my 2013 all black F150 fx2, Fits loose so I wrapped some electrical tape around it so it fit snug, Looks great though

Attention score: 0.0901059

Review No.4: A perfect fit to finish off a 2" receiver hitch,...

Review No.5: I ordered this before measuring (a big mistake) the distance from the plate to the hole and this wont fit many applications correctly, BOTTOM line, measure your receiver application and then ask them if this unit will fit correctly before buying

Attention score: 0.0842444

Review No.6: Fits the Class III Receiver by Curt, I like the durability of this cover much better than plastic ones, It does have a small amount of play but not enough to make noise

...

User Name: A1H79QIIXALK3N
Latest review: ... Not worth the money for fog lights. I purchased quality LED ...

User Name: A2SUCKG38D9RSD
Latest review: ... goes great with my RV fits like a glove. it will fit about any size tire ...

The example of an item's highlighted reviews for two different users. The most important review learned by NARRE is labeled by italic, and the sentences selected by our model are presented in underlined and bold fonts for different users, respectively.

Conclusion

- we will investigate the potential advantages of stochastic process (e.g., point process for user dynamic preference modeling in the context of explainable recommendation, where we may focus on two questions: one is how to seamlessly equip stochastic process with side information (e.g., user reviews), and the other is how to relate stochastic process with attention mechanism for explaining the recommendations.
- As there is an emerging trend to leverage user visual preference for enhancing recommendation performance, in the future, we will also study how to integrate product images into our model for more comprehensive recommendation explanations.