TagPick: A System for Bridging Micro-Video Hashtags and E-commerce Categories

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Abstract

In order to leverage hashtags on micro-media platform for effective e-commerce marketing campaign, there is a demand from e-commerce industry to develop a mapping algorithm bridging its categories and micro-video hashtags. We therefore proposed a novel solution called **TagPick** that incorporates clues from all user behavior metadata (hashtags, interactions, multimedia information) as well as relational data (graph-based network) into a unified system to reveal the correlation between e-commerce categories and hashtags in industrial scenarios.

Keywords: Hashtags; Micro-Video; E-commerce; Deep Learning; Graph Representation

Introduction

We develop a novel hashtag mapping system, namely **TagPick**, which considers the implicitly linked data between social networks and e-commerce platform, and pick out the appropriate hashtags that match the category [1]. Moreover, the backend of **TagPick** is built upon on a graph-based learning framework that exploits both user behavior and hashtag semantics for modeling the correlation between micro-video hashtags and e-commerce categories. We conduct extensive model training experiments on eBay and Tiktok datasets and the proposed framework is successfully embedded in eBay's cross-platform advertising system.

System OVerview

The TagPick system consists of two major components as shown in Figure 1:

- Web-based User Interface
  - User input interface to capture the entered keywords or trigger conditions
  - Multi-modal dashboard to illustrate basic data statistics and mapping results
- Backend Search Engine and Hashtag Bridging Model
  - Database to store calculation information
  - Graph-based deep learning model and Search Engine

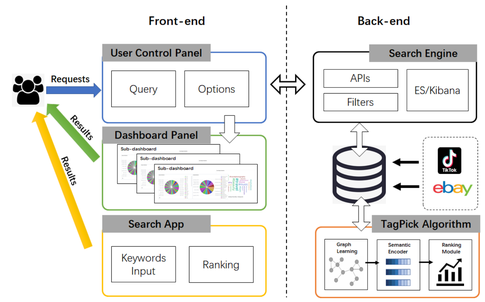

Figure 1: TagPick System Overview

Technical Details

Graph Representation Learning Given multiple relations and entities in social networks, the goal of this module is to learn the user behavior containing the individual preference and the relevant category [2].

$$\mathbf{u}_i^h = \phi\left(\frac{1}{|\mathcal{H}_i|}\sum_{h_j \in \mathcal{H}_i} \mathbf{W}_h^u \mathbf{h}_j\right) \quad (1)$$

Semantic Encoder The e-commerce category and social hashtag contain lexical clues at different levels such as word-level and sentence-level, which provide different degrees of explainability of why these documents are inherently related.

Ranking on Multi-layered Network As discussed above, the user preference is obtained by combining the user preference on hashtags and post contents.

$$\mathbf{u}_i = \phi\left(\mathbf{W}_{nn} Concat\left(\mathbf{u}_i^v, \mathbf{u}_i^h\right) + \mathbf{b}_{nn}\right) \quad (2)$$

Demonstration

- **Local Control** The frontend system consists control panels and dynamic dashboards.
  - A Multilevel Relational Menu
  - A Multi-level Category Retrieval Interface

  Consider our platform is to be linked to eBay advertising system, we provide a plug-in dashboard panel and support the export of retrieved result data as different file format.
  - Different Category Keywords
  - Related Hashtags
- **Global Search** Consider a user who wants to query the ranking list of hashtags associated with eBay categories, a user search interface (USI) is developed.
  - Hashtag Contents
  - Similarity Scores
  - Ranking Strategy

Figure 2: A Demonstration of TagPick: 1) User control panel and Dynamic dashboards (left); 2) Global static dashboard and global search user interface (right).

References

[1] Yinwei et al. Wei. Personalized hashtag recommendation for micro-videos. *MM*, 2019.

[2] Perozzi et al. Deepwalk: Online learning of social representations. *SIGKDD*, 2014.

CONCLUSION

We present TagPick, a fully-functional and easy-to-use platform for bridging e-commerce advertising and social network in industrial scenarios. TagPick leverages the distributed search engine as its data infrastructure, and adopts GCN-based methods as its core algorithm to perform our user behavior model training and calculate the similarity score over multi-layer encoders.

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