Adaptive Personalisation in Social media

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**Abstract**

*In today’s world, social media constitutes a significant part of everyone’s life. It has occupied such a role that we even feel it kills our productivity and time. Each social media application consists of an enormous number of posts that are both informative and entertaining belonging to a plethora of categories. Social media applications can be made more user-friendly by the personalization and customization of the feed. The home feed often consists of a variety of unrelated posts which might make the user experience bad and scrolling longer. The problem solved here is to provide a customized and personalized feed for the user based on the cue (such as feedback from the user in the form of Interested or Not Interested button clicks). Currently, the feed is primarily based on the interests and user accounts followed manually by the user. Most of the social media applications are proprietary and the algorithms for adaptive personalization are not published publicly. The main objective of the proposed system is to develop a model for deciding on how to include or discard a new post from the user’s feed based on the user interests collected earlier. Personalizing and adapting might make the user's home page and usage of social media much more relatable and tailored according to the needs and wants of the user.*

**Introduction**

Social media has seen incredible growth since the boom of the internet. The research and development on social media have also seen its side of growth. Artificial intelligence and machine learning techniques have made life easier and more sophisticated. The devices we have at hand learn to be as useful to us as possible. They have all kinds of recommendations and ads tailored for us. This has become the major source of income for big tech companies like Google and Microsoft. While social networking and microblogging sites have increased in great numbers, the scrolling of the feed of these sites has taken up more than two-thirds of the total usage of laptops, phones, and PC computers. These feeds, though entertaining, make us feel that we are killing our time with some non-productive activities. Personalized feeds are a solution to making the user feel hooked to social media sites in a good sense. The news and posts today are not just determined by the users we follow or the topics we subscribe to, but they are also curated specifically for us by big algorithms which run behind the scenes. The data we generate is training big models profiling each user whenever he/she discards a post saying “not interested” or whenever he/she follows new topics from the post link. These small mechanisms to collect feedback from users for their personalized feed are omnipresent on the internet today. From news feed to video home page on youtube, sites like Instagram, Twitter, Facebook all have their own algorithms to make the user feel as “at home” as possible on the home page of their application.

The mechanisms by which their personalization is provided are similar to the strategies followed by big marketing companies, recommendations given by big e-commerce companies, and so on. The data which follows a bi-directional pattern plays a key role here. The size of the data accumulated over time from an average user is huge beyond imagination. The trained model which uses these data and algorithms which evolve over time can make the process of adaptive personalization so smooth that the user feels that the feed has been handpicked for him specifically.

The work considers some approaches like Reinforcement Learning, Neural networks based on NLP, User Social Profiling, and improvised algorithms based on recommendation engines. The lack of a complete existing system gives full freedom to experiment and explore the personalization algorithm for social media kind of applications. Personalized feeds make the user’s usage of social media worthwhile as he/she doesn’t have to waste time scrolling through unrelated posts which may mean nothing to him/her.

**Related work**

This chapter discusses the knowledge gained from the materials which include the theoretical contributions to personalize the feed.

Adaptive personalization using social networks published by Tuck Siong Chung, Michel Wedel & Roland T. Rust [2016] used Bayesian Models to personalize the feed. In this paper, keywords are used for personalization which improves the performance of the system. But the algorithms used in this paper are less good at finding the news items that are preferred by the user.

The effects of trait-based personalization in social media advertising written by Stephan Winter, Ewa Maslowska, Anne L.Vos (2021) used the Five-factor model for customization. Trait-based personalization leads to better evaluation of content which in turn give better customization result.

Personalized Recommendation Combining User Interest and Social Circle published by Xueming Qian, He Feng, Guoshuai Zhao, Tao Mei (2013) used Matrix factorization, CircleCon Model, and ContextMF model to customize the feed. In this paper, Social network factors were fused together to improve the accuracy and applicability of the recommender system. But The personalized recommendation model takes only user historical rating records and interpersonal relationships of social networks.

Item-based Collaborative Filtering Recommendation Algorithm Combining Item Category with Interestingness Measure written by Suyun Wei, Ning Ye, Shuo Zhang, Xia Huang, Jian Zhu (2012) implemented Collaborative filtering algorithm based on item category and interest measure (CICF). CICF provided better quality than the traditional algorithm. The lower the MAE value, the more accurate the recommendation engine predicts. Combining different attributes of users and items in the algorithm is a challenging area.

Towards a Personalized Learning Experience Using Reinforcement Learning published by Doaa Shawky and Ashraf Badawi (2019) used Reinforcement Learning for personalization. The proposed approach can assist the students to find out what she or he really needs, by investigating the features of learning material or a sequence that has not been explored before. A large no of possible states/state-action pairs has to be considered to avoid complexity & convergence problems if the model is implemented without the benefit of a repetitive training period.

Collective Knowledge Ontology User Profiling for Twitter - Automatic User Profiling written by Paula Peña, Rafael del Hoyo, Jorge Vea-Murguía, Carlos González, Sergio Mayo (2013) used Ontology Web Language or Resource Description Framework/XML format to personalize and customize the feed. To improve and enrich the user profiling, time dimension to capture changes of user-profiles, categorization, and opinion analysis are included. Social networks and big data require storing, analyzing, and processing large amounts of data in distributed databases that provide high scalability and availability

The existing works are siloed and mostly not available as a complete system. Social media personalization is mostly proprietary. The proposed system aims to overcome the drawbacks of the existing systems and aims to develop an ensembled model to

**Requirements**

**Hardware requirements:**

The hardware requirements are as follows:

* 4GB *RAM*
* Minimum 3GB for large data storage
* Minimum i3 core processor to run ML algorithms
* Cloud storage and processing along with deployment can be used.

**Software requirements:**

The software requirements are as follows:

* Code Notebooks in Google Colaboratory
* MLlibraries like TensorFlow and Keras
* Web development tech stack
* Libraries to implementMatrix and Eigen-based algorithms, reinforcement learning, etc.