Technology Review – Google Multitask Ranking System

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Introduction

Youtube is one of or perhaps the most popular online video sharing platform in the world. Everyday there are millions of videos uploaded and recommended to viewers across the system. The system faces many real-world challenges due to its deep personalized user profile analysis. Each user has a profile on Youtube with dynamic viewing interest. Over the years, Google is trying to optimize the best way to accurately find targeted videos to each user. After reading through a research paper generated by the Google machine learning architects, the machine learning model specializes in video clustering, matching, and ranking them for users depending on their interest. The research paper explained the challenges they face when dealing with such enormous amount of data and the solutions they proposed to optimize matching and processing result. This technology review will provide a brief overview on the core concept of the Google Multitask Ranking system and compare this system with other popular video platform such as TikTok to explore similarities and differences.

Overview of Google Multitask Ranking System

To develop a comprehensive algorithm to effectively recommend matching videos to users that fit their interest is extremely challenging. The system not only relays on the large user logs but it also needs to find the balance between explicit and implicit feedback from the users. The reason is the explicit feedback such as user direct rating of the video is extremely useful when profiling the user interest; however, the online platform such as Youtube features billions of videos. When it comes to the scalability, the explicit feedback from the users will be difficult to handle. Most of the industrial system nowadays leverage implicit feedback where the system gathers user behavior from video clicks, watch time, navigation path etc. to map out possible interest point (Zhao, Z, et.al., 2019). The Google Multitask Ranking System features a Mixture of Experts (MMoE) layer to solve the problem of multi-objective learning for the recommendation system- Engagement Objective and Satisfaction Objective. Engagement objective is measured through the user clicks and engagement on the recommended video. The Satisfaction Objective

is the count of likes in the video and other sharing functions such as comments, sharing, etc. Those two are the main challenges for the modern platform systems where recommendations can sometimes experience certain degree of implicit bias; the user might click on certain videos and discovered they did not like the video after watching it, or the users might comment on videos that don't fit their interests etc. MMoE is essentially the combination of multi-layer perceptron followed up ReLU activations. Then the output of data from MMoE will be delivered to a Gating Network, this way the researchers were able to minimize the degree of implicit bias producing from the large user groups (Zhao, Z, et.al., 2019). Later the researchers perform several experiments on the larger video platform Youtube to verify the model improvements and the results demonstrated that the new Google Multitask Ranking system performs better in terms of system efficiency and bias elimination (Zhao, Z, et.al., 2019).

Comparing Youtube with other popular video sharing platform such TikTok, they both share similar product desire which is to attract users by consistently predicting and recommending videos for them to watch. However, TikTok videos recommendation system focuses on the aspects of user watch time on each content. Views, likes, and completion are the key factors for the system to calculate when performing collaborative filtering (Leslie, Jem, n.d.). TikTok videos tend to be short ones comparing to Youtube, so the watch time and completion rate factors weight more when estimating user interests (Zhang, M., Liu, Y., 2021). On the other hand, Youtube videos are relatively longer, and the system performs the recommendation calculation primarily using collaborative filtering instead of item filtering. Users will get the video recommended if that video is well liked by users who share similar profiles.

Conclusion

Overall, the Google Multitask Ranking System is a comprehensive development that has been proven to have greater performance and better accuracy in terms of recommending the fit videos to different user groups. However, further research and development is needed in this field as the size and space of the internet world is expanding at fast speed.

Reference

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