

# **Tech Review: Recommending What Video to Watch Next: A Multitask Ranking System**

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## **Introduction**

In the work written by Zhao et. al.(2019), they presented the system they designed to recommend videos a user might enjoy, based on the user's previous watching history. They pointed out that this task is challenging because the system wants to recommend videos that not only will be watched by the user, but also will be rated highly and will be recommended to the friends of this user as well. This leads to inevitable trade-offs in the design procedure. What's more, even if a user watched a video, it is hard to tell whether a user likes it. Maybe he/she watched it just because he/she see it has a high popularity and he/she didn't enjoy it after all. The authors proposed a system that will take in consideration two aspects of user activities. The first aspect is engagement activities, which include clicking and watching of videos. The second aspect is how satisfied users are with the recommended videos. They built their model based on the Wide & Deep model, which is proposed by Cheng et. al. in 2016. This model will be able to focus on several objectives at the same time.

## **Method**

Besides the challenges mentioned above, the system serves as a real-life large-scale, so it has to be scalable and be able to learn from different features of both videos and the user. In other words, when considering which video should be recommended, it not only should take video's content, description, thumbnail, etc. into consideration, but also take users demographics, profile, etc. into consideration.

To address these problems, the system took the following strategies. To generate candidate videos, the system used two algorithms. The first algorithm considers the similarity of title between candidate videos and the query video, which is a video the user has watched.

Another algorithm the system uses considers how likely a candidate video will be watched if a user watch the query video. After candidate videos are generated, a ranking algorithm based on neural networks will be applied to make the user have the highest utility by placing video with highest utility at the top.

## **Results**

Compared to the baseline model, the system proposed in this work has significantly higher engagement rate and satisfaction rate. In the best outcomes with 8 experts used, this system has 0.45% higher engagement rate and 3.07% higher satisfaction rate.

## **Conclusion**

This work is proposed to address the challenges encountered in the process of building video recommendation systems. The challenges include implicit information given by users and inevitable trade-offs has to be made in balancing multiple objectives. This system worked outstandingly compared to the baseline model by taking brand new strategies.

## **References**

- Cheng, H. T., Koc, L., Harmsen, J., Shaked, T., Chandra, T., Aradhye, H., ... & Shah, H. (2016, September). Wide & deep learning for recommender systems. In *Proceedings of the 1st workshop on deep learning for recommender systems* (pp. 7-10).
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