

Project Sonata: AI-Driven Recommendation & Consumer Segmentation Platform of Unilever NA

A Recommendation Engine to Enable Multiple Related Downstream Tasks for Unilever NA

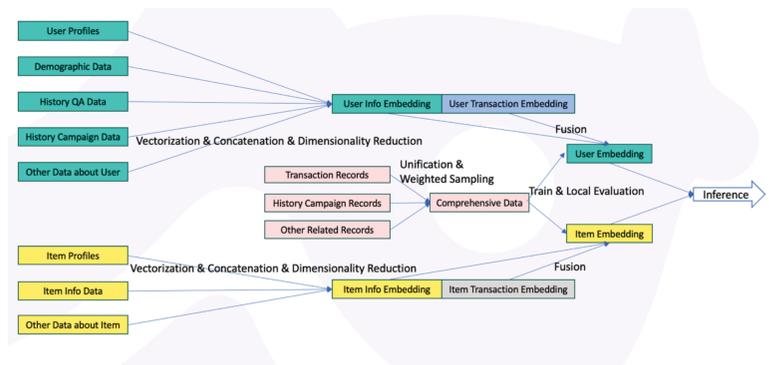
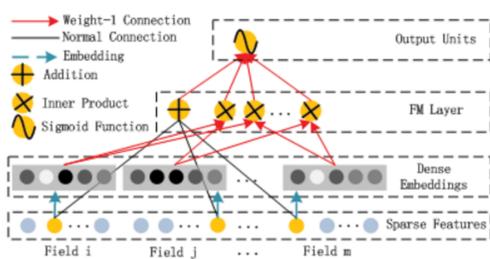
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PROJECT SUMMARY

Project Sonata, an integral component of Trade Optimization Improvement at Unilever North America, aims to revolutionize precision marketing through a bespoke recommendation engine that aligns with Unilever's distinct product range and customer demographics. Utilizing a multi-faceted research methodology, the study encompassed preliminary model selection, customized structure development, and rigorous empirical evaluation. A variety of recommendation models such as LightGCN, Wide & Deep, DIN, and DeepFM—were adapted, customized, and modified in their structures to better align with Unilever's features and application scenarios. These models were subsequently evaluated using historical data and the online A/B Test. Among these, a customized model based on the DeepFM, which synergistically combines deep and wide Learning, stood out as exceptionally effective. It demonstrated superior performance across a spectrum of key metrics such as AUC and F1 scores, both in offline evaluations and online A/B testing, as well as in inference speed. Significantly, this model outperformed our existing baseline recommendation methods, marking a substantial advancement in the effectiveness and efficiency of our precision marketing strategies.

REFERENCES

- Cheng, Heng-Tze, et al. "Wide & deep learning for recommender systems." Proceedings of the 1st workshop on deep learning for recommender systems. 2016.
- Guo, Huifeng, et al. "DeepFM: a factorization-machine based neural network for CTR prediction." arXiv preprint arXiv:1703.04247 (2017).
- He, Xiangnan, et al. "Lightgcn: Simplifying and powering graph convolution network for recommendation." Proceedings of the 43rd International ACM SIGIR conference on research and development in Information Retrieval. 2020.
- Zhou, Guorui, et al. "Deep interest network for click-through rate prediction." Proceedings of the 24th ACM SIGKDD international conference on knowledge discovery & data mining. 2018.

