

# 大模型时代推荐系统的可能性

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### 大模型+推荐系统的挑战:语言知识和人类行为的差异性 7

**Tencent** 

威廉·莎士比亚是英国文学史上最

语言序列: 杰出的戏剧家,也是西方文艺史上

杰出的作家之一…





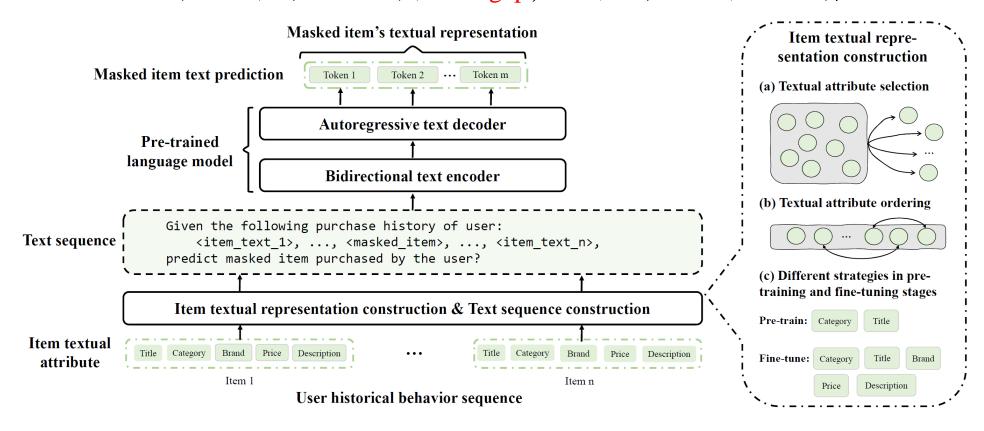


	语言模型	推荐系统
个性化	较通用的语言模型,储存的是文本承载的世界知识	用户行为兴趣千人千面,需要理解人类个性化的行为逻辑
Token&序 列建模	字词 (万级别, 语义明晰)	物品(亿级别,包含多种属性,语义模糊)
下游任务	多种多样,极具挑战(分类、 问答、生成、序列标注等等)	更加简单集中(推荐核心任务——不同场景下的下一个物品推荐)
稀疏性	训练数据相对较充分	由于个性化,用户-物品交互信息极其稀疏,长尾效应明显

### 可能性一: 彻底像建模语言一样建模推荐系统

#### **Tencent**

- · UPSR:将用户历史行为序列表示为文本序列,直接使用LLM进行序列建模
  - 优点: LLM建模对于跨领域/冷启动场景效果尤为突出
  - 缺点:文本信息和行为信息存在较大gap,目前效果不具备明显优势

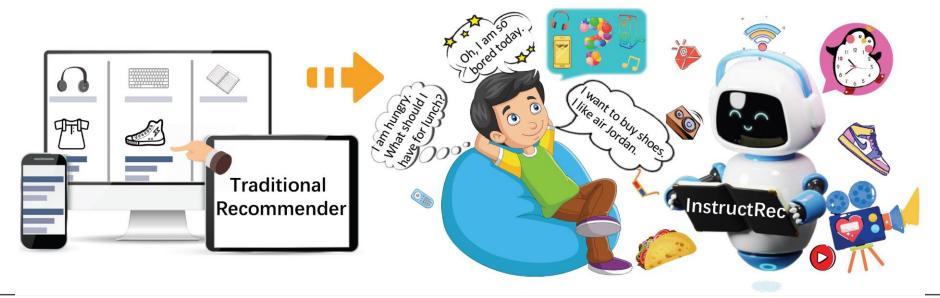


Qu, Zekai, et al. Thoroughly Modeling Multi-domain Pre-trained Recommendation as Language. arXiv'23.

#### 可能性二: 作为人类-推荐系统的灵活友好的接口

#### **Tencent**

• InstructRec: 基于指令微调,满足用户多种偏好/意图/任务形式下的推荐需求



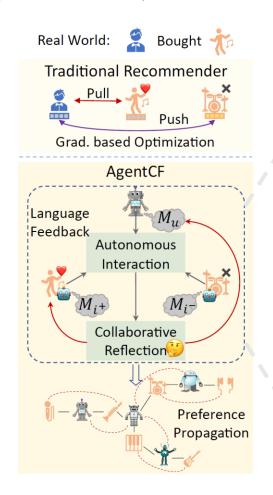
Instantiation	Model Instructions
$\langle P_1, I_0, T_0 \rangle$	The user has purchased these items: <a href="https://example.com/historical interactions">historical interactions</a> . Based on this information, is it likely that the user will interact with <a href="https://example.com/historical-interactions">-target item</a> next?
$\langle P_2, I_0, T_3 \rangle$	You are a search engine and you meet a user's query: <explicit preference=""> . Please respond to this user by selecting items from the candidates: <candidate items="">.</candidate></explicit>
$\langle P_0, I_1, T_2 \rangle$	As a recommender system, your task is to recommend an item that is related to the user's <vague intention=""> . Please provide your recommendation.</vague>
$\langle P_0, I_2, T_2 \rangle$	Suppose you are a search engine, now the user search that <specific intention="">, can you generate the item to respond to user's query?</specific>
$\langle P_1, P_2, T_2 \rangle$	Here is the historical interactions of a user: <a historical-interactions"="" href="https://www.needing.com/herealth-needing-needing-needing-needing-needed-&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;&lt;math&gt;\langle P_1, I_1, T_2 \rangle&lt;/math&gt;&lt;/td&gt;&lt;td&gt;The user has interacted with the following &lt;a href=" https:="" www.nier.com="">historical interactions</a> . Now the user search for <a href="https://www.nier.com/historical-interactions">was a generate products</a> that match his intent.
$\langle P_1, I_2, T_2 \rangle$	The user has recently purchased the following

Zhang J, et al. Recommendation as Instruction Following: A Large Language Model Empowered Recommendation Approach. arXiv'23.

### 可能性三:万物皆有灵——推荐系统智能体网络



· AgentCF: 用户和物品皆为智能体,通过自然语言传递信息,各自反思并进化



#### **Previous Memory**

- User Agent Memory: I adore energetic guitar-driven rock, and dance pop music...
- Pos Item Agent Memory: The CD 'Highway to Hell' is classic rock and AOR, radiating raw energy and infectious melodies that captivate fans of classic rock...
- Neg Item Agent Memory: 'The Very Best of Prince' is a Pop and Dance Pop CD, offering a collection of prince's greatest hits for an enjoyable experience...

#### **Autonomous Interaction**

- System Prompt: The first CD is [Memory], the second CD is [Memory]. Please select your preferred CD from these two candidates and provide an explanation.
- User Agent Response: I prefer 'The Very Best of Prince'... This CD resonates with my preference for Pop and Dance Pop CDs...

#### **Reflection & Memory Update**

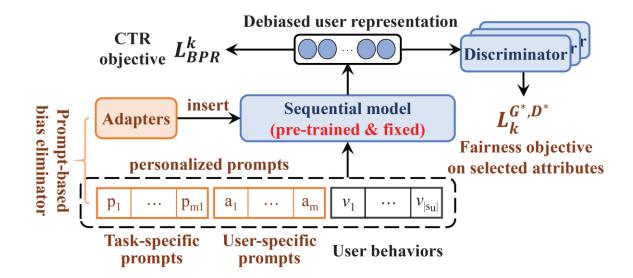
- System Prompt: You find that you don't like the CD that you chose, indicating your preferences have changed. Please update your preferences.
- User Agent Response: I adore energetic guitar-driven rock, classic rock, and AOR. I value classic rock for its raw energy and infectious melodies. I do not like Pop...
- System Prompt: The user finds that he makes a unsuitable choice, possibly due to the misleading information in CDs' features. Please update the description.
- Pos Item Agent Response: 'Highway to Hell' is classic rock and AOR CD, exuding a raw energy and infectious melodies, ideal for energetic guitar-driven enthusiasts...

Zhang, J, et al. AgentCF: Collaborative Learning with Autonomous Language Agents for Recommender Systems. arXiv'23.

### Warning: 警惕推荐大模型的隐私/公平性/安全性问题

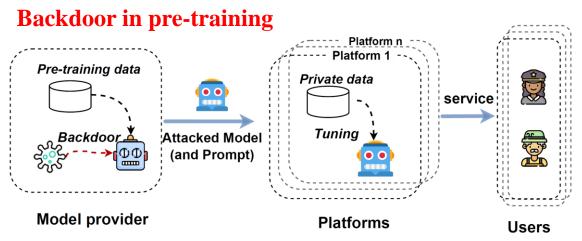


• 基于推荐预训练模型的用户可选择的公平性



Wu Y, et al. Selective fairness in recommendation via prompts. SIGIR'22

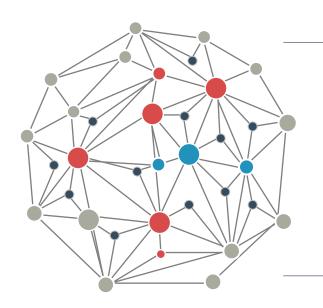
基于推荐预训练模型的安全性问题—— 一大模型下新的攻防范式



Wu Y, et al. Attacking pre-trained recommendation. SIGIR'23







## 感谢聆听!

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