Exploiting Large Language Model with Reinforcement Learning for Generative Job Recommendations

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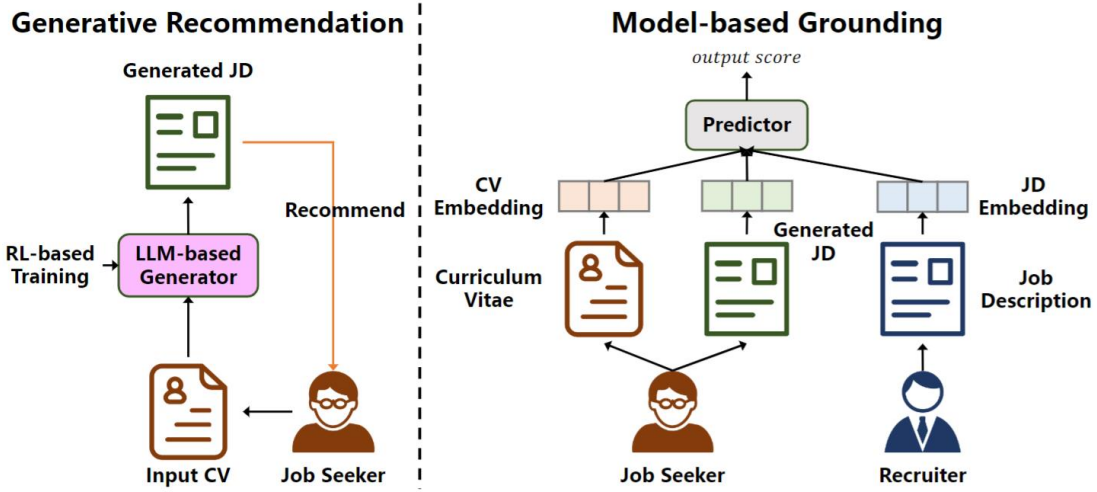
Problems & Ideas

- Problems of LLM-based Generative RSs:
  - SFT-based training methods are insufficient for LLMs to adequately grasp the knowledge embedded in complex interactive behaviors.
  - similarity-based grounding methods also face challenges for long text matching.
- Ideas: Train a model which can evaluate the matching degree, use a PPO-based RL method to fine-tune the LLM-based recommender. Moreover, we propose a model-based grounding method.



Main Contributions

- Contributions:
  - To the best of our knowledge, this is the first piece of work which proposes an LLM-based generative job recommendation paradigm;
  - We propose a novel three-step training methodology with reinforcement learning to train an LLM-based generative job recommendation model;
  - We propose a model-based grounding method for mapping the results generated by the LLM.
  - We conducted extensive experiments on two real-world datasets and the experimental results show GIRL achieves the best performance compared with several competitive baseline methods.

	JobRec		JobRec-Cold	
Model	AUC(↑)	LogLoss(↓)	AUC(↑)	LogLoss(↓)
NCF	0.5415	0.4434	0.5410	0.4549
PJFNN	0.5508	0.4425	0.5434	0.4534
APJFNN	0.5911	0.4303	0.5720	0.4426
BERT	0.6349	0.4043	0.6198	0.4270
FT-LLM	0.6313	0.4035	0.5998	0.4477
BIGRec	0.5499	0.4427	0.5404	0.4513
BIGRec-MLP	0.6297	0.4044	0.6166	0.4446
GIRL	**0.6476**	**0.3908**	**0.6347**	**0.4229**

Model Pair	Win	Tie	Loss	Adv.
GIRL v.s. LLaMA-7b	0.63	0.07	0.30	0.33
GIRL v.s. BLOOMZ-7b	0.74	0.08	0.18	0.56
GIRL v.s. BELLE-7b	0.45	0.17	0.36	0.09
GIRL v.s. GIRL-SFT	0.45	0.25	0.26	0.19
GIRL-SFT v.s. LLaMA-7b	0.55	0.03	0.42	0.13
GIRL-SFT v.s. BLOOMZ-7b	0.73	0.07	0.19	0.54
GIRL-SFT v.s. BELLE-7b	0.49	0.06	0.41	0.08
BELLE-7b v.s. LLaMA-7b	0.61	0.04	0.34	0.27
BELLE-7b v.s. BLOOMZ-7b	0.65	0.07	0.17	0.48