Joint User Profiling with Hierarchical Attention Networks

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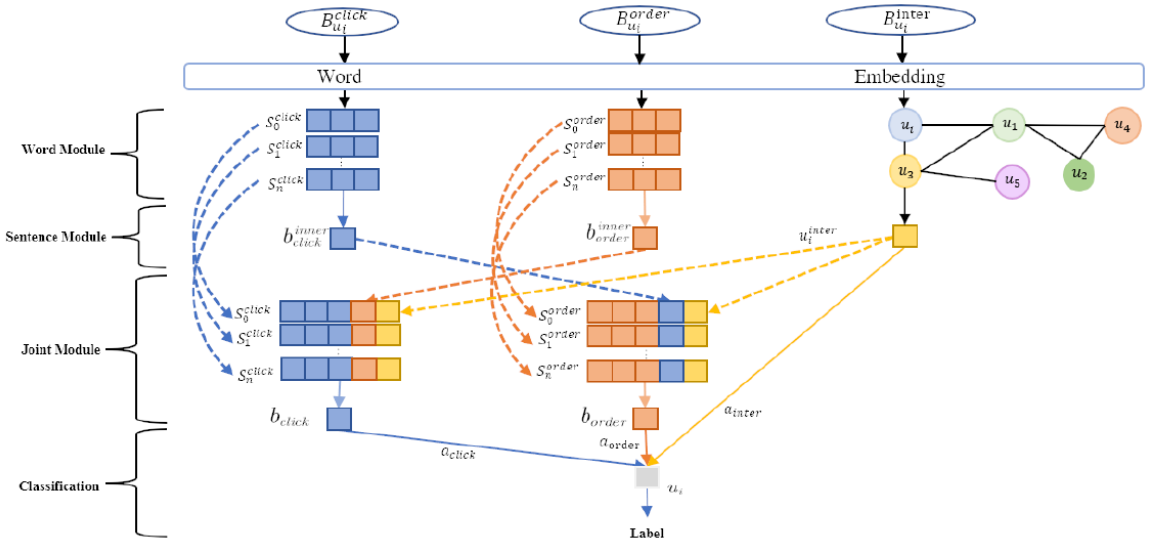
Frontiers of Computer Science, DOI: 10.1007/s11704-022-1437-6

Problems & Ideas

- Problems of conventional user profiling approaches:
  - Users often generate multiple types of information in real-world applications.
  - Not all information is useful for user profiling.
  - Most related studies consider user profiling as an individual task from only one perspective.
- Ideas: A joint user profiling model with hierarchical attention networks that extracts the final user representation jointly from inner-user and inter-user features respectively.



Overall framework of JUHA

Main Contributions

- Contributions:
  - Hierarchical attention networks were proposed for user profiling in JUHA. In our method, all types of user data are integrated intuitively and sufficiently, and the important information is distinguished from noisy data;
  - All types of data were joined to learn inner-user features, and both inner-users and inter-user features were joined into user profiling to learn the final user representation, which improves the performance of user profiling;
  - Extensive experiments were conducted on two real-world datasets to verify the effectiveness of the proposed method.

Methods	Age		Gender	
	Accuracy	*Macro-F1*	*Accuracy*	*Macro-F1*
GCN	0.491	0.183	0.644	0.510
GAT	0.490	0.178	0.663	0.579
HGCN	0.491	0.174	0.646	0.513
HGAT	0.492	0.187	0.691	0.619
HURA_C	0.523	0.348	0.802	0.787
HURA_O	0.515	0.320	0.747	0.732
COOP_C	0.546	0.355	0.790	0.780
COOP_O	0.502	0.316	0.737	0.720
JUHA	**0.580**	**0.393**	**0.826**	**0.809**

Methods	Age		Gender	
	Accuracy	*Macro-F1*	*Accuracy*	*Macro-F1*
GCN	0.558	0.266	0.743	0.561
GAT	0.560	0.260	0.761	0.591
HGCN	0.563	0.269	0.766	0.612
HGAT	0.566	0.275	0.771	0.630
HURA	0.631	0.293	0.827	0.728
COOP	0.616	0.300	**0.839**	**0.758**
JUHA	**0.639**	**0.322**	0.837	0.743

Experimental results for user profiling on two datasets compared with state-of-the-art methods. Left: on the JD e-commerce dataset; Right: on the Sina Weibo dataset.