

# On the Heterogeneous Information Needs in the Job Domain: A Unified Platform for Student Career

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#### **On Finding the Right Job**

- Multi-stake holder system
- Competitive job market
- Matchmaking problem
- Data sparsity
- Cold-start problem



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## **Student Job Recommendations**

## About Talto

- Austria
- Student career
- Mobile and desktop

## About Student Needs

- Heterogeneity
  - Job postings
  - Company profiles
  - Career-related articles
- Study progression
- Periodicity (academic year)
- Anonymous browsing







## Solution @Talto

- Hybrid
  - $\bigcirc$  CF, CBF
  - $\bigcirc$  Doc2Vec
  - $\bigcirc$  Autoencoders
- Microarchitecture
  - Build upon Apache Solr
- Cognitive-inspired
  - Base-level Learning Equation
  - Weighted Embeddings



## **CTR - Homepage**

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**# Days:** 25

**# Distinct Users:** 9,620

**# Recommendation Requests:** 26,334

Approach	CTR	~	Runtime (ms)	$\searrow$
BLL	0.0671*	15.69%	114**	13.64%
CF	0.0580		132	

#### **CTR – Details Page**

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**# Days:** 15**# Distinct Users:** 4,715**# Recommendation Requests:** 18,464

Approach	CTR	7	Runtime (ms)	$\searrow$
LAST	0.0249**	75.35%	67**	28.72%
BLL	0.0142		94	

#### **CTR – Details Page**

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# Days: 15
# Distinct Users: 3,375
# Recommendation Requests: 11,992

Approach	CTR	7	Runtime (ms)	$\searrow$
$BLL_{d=0.6}$	0.0174*	25 0/1%	97	2.06%
$BLL_{d=0.4}$	0.0128	55.9470	95	

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#### **Session-based Recommendations**

Infer session embeddings using Autoencoders and use them in a KNN manner



	Accuracy	Beyond Accuracy	Coverage
VAE			1.1
VALInt	++	++	++
$VAE_{Comb}$	+	++	++
sKNN	+	0	+
V-sKNN	++	+	++
S-sKNN	++	+	+
GRU4Rec	++	+	+
pRNN			
Bayes			0
iKNN	0	-	+
BPR-MF	-		++
POP			

Lacic, E., Reiter-Haas, M., Kowald, D., Dareddy, M. R., Cho, J., & Lex, E. (2020). Using autoencoders for sessionbased job recommendations. User Modeling and User-Adapted Interaction, 30(4), 617-658.

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## **Cross-Entity Recommendations: ICE4Rec**

- 3 scenarios:
  - Item2Item
  - $\bigcirc$  User2Item
  - Query2Item
- Based on ICE
  - Training considers:
    - NetworkContent





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Wang, C. J., Wang, T. H., Yang, H. W., Chang, B. S., & Tsai, M. F. (2017, August). Ice: Item concept embedding via textual information. In *Proceedings of the 40th International ACM SIGIR Conference on Research and Development in Information Retrieval* (pp. 85-94).

#### **Additional Applicability**

#### New use cases

- Explainability
- Keyword generated page
- Search agent



von bilddaten mit entsprechender Massinzierung stellt eine wertvolle Ressource dar, die für viele Jahre ein Motor für radiologische Forschung auf höchstem Niveau und zukunftsorientierter Lehre sein kann

Die Dissertation wird an der Technischen Universität Graz von Univ.-Prof. Dr. Stefanie Lindstaedt und Dipl.-Ing. Dr. techn. Roman Kern betreut und findet in Kooperation mit der Medizinischen Universität Graz statt.

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#### Qualifikationen:

- Universitätsabschluss (MSc, DI) in Informatik, Softwareentwicklung, Telematik, Physik, Mathematik oder ähnlichen Studienbereichen
- Erste Erfahrungen in Programmierung, maschinellem Lernen, vertieftem Lernen,

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#### Thanks

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