

ALEXANDER KOTOV

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Research interests:

Textual data analytics, with particular focus on **natural language processing, information retrieval** and their applications to **health informatics**

Education:

University of Illinois at Urbana-Champaign	2006 – 2011
PhD, Computer Science	
University of Illinois at Urbana-Champaign	2004 – 2006
MS, Computer Science	

Professional experience:

Associate Professor , Wayne State University	August 2020 – present
Assistant Professor , Wayne State University	August 2013 – August 2020
Post-Doctoral Fellow , Emory University	September 2011 – July 2013
Research Intern , Microsoft Research	June 2010 – August 2010
Research Intern , Yahoo! Labs	June 2008 – September 2008

Profession awards and honors:

Citation award at the 40th Annual Meeting of the Society of Behavioral Medicine (SBM), 2019.

Best Short Paper Honorable Mention at the 40th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**), 2017.

Best Short Paper Award at the 11th Asia Information Retrieval Societies Conference (**AIRS**), 2015.

1st place (among 36 participating teams from academic institutions and companies around the world) in Task A (Automatic) of **Clinical Decision Support track** at the 24th Text Retrieval Conference (**TREC**) by the National Institute of Standards and Technology (**NIST**), 2015.

1st place (among 36 participating teams from academic institutions and companies around the world) in Task A (Manual) of **Clinical Decision Support track** at the 24th Text Retrieval Conference (**TREC**) by the National Institute of Standards and Technology (**NIST**), 2015.

Best Reviewer Award at the Joint Conference on Empirical Methods in Natural Language Processing and Computational Natural Language Learning (**EMNLP-CoNLL**), 2012.

Publications:

*indicates the authors, who provided an equal contribution to the manuscript

Book chapters:

- B.1. **Alexander Kotov**, “Knowledge Graph Entity Representation and Retrieval”, *tutorial chapter in Proceedings of the 10th Summer School in Information Retrieval and Young Scientist Conference (RuSSIR 2016)* by Pavel Braslavski et al. (editors), *Communications in Computer and Information Science*, 2016
- B.2. **Alexander Kotov**, “Social Media Analytics for Healthcare”, In “Healthcare Data Analytics” by Chandan K. Reddy and Charu C. Aggarwal (editors), CRC Press, 2015

Journal papers:

- J.1. Dmitriy Viderman, **Alexander Kotov**, Maxim Popov and Yerkin Abdildin, “Machine and deep learning methods for clinical outcome prediction based on physiological data of COVID-19 patients: a scoping review”, *International Journal of Medical Informatics*, volume 182: 105308, 2024.

- J.2. Leah Ketcheson, E. Whitney Moore, Chandler Wentz, Kaiyue Zhou, Xiangmin Zhang, Deborah Charbonneau, Son Dang Tien and **Alexander Kotov**, “Variables Contributing to the Age of Diagnosis of Autism Spectrum Disorder (ASD): Implications for Addressing Diagnostic Disparities”, *International Journal of Autism and Related Disabilities*, volume 149, 2021.
- J.3. Saeid Balaneshinkordan and **Alexander Kotov**, “Bayesian Approach to Incorporating Different Types of Biomedical Knowledge Bases into Information Retrieval Systems for Clinical Decision Support in Precision Medicine”, *Journal of Biomedical Informatics*, volume 98: 103238, 2019.
- J.4. April Idalski Carcone, Mehedi Hasan, Gwen Alexander, Ming Dong, Susan Eggly, Kathryn Brogan Hartlieb, Sylvie Naar, Karen MacDonell, **Alexander Kotov**, “Developing Machine Learning Models for Behavioral Coding”, *Journal of Pediatric Psychology*, volume 44(3), pages 289–299, 2019.
- J.5. Mehedi Hasan, April Idalski Carcone, Sylvie Naar, Susan Eggly, Gwen Alexander, Kathryn Brogan Hartlieb, **Alexander Kotov**, “Identifying Effective Motivational Interviewing Communication Sequences using Automated Pattern Analysis”, *Journal of Health Informatics Research*, volume 3(1), pages 86–106, 2019.
- J.6. Mehedi Hasan*, **Alexander Kotov***, April Idalski Carcone, Ming Dong, Sylvie Naar, Kathryn Brogan Hartlieb “A Study of the Effectiveness of Machine Learning Methods for Classification of Clinical Interview Fragments into a Large Number of Categories”, *Journal of Biomedical Informatics*, volume 62, pages 21–31, 2016.

Full conference papers:

- C.1. Mona Zamiri, Yao Qiang, Fedor Nikolaev, Dongxiao Zhu and **Alexander Kotov**, “Benchmark and Neural Architecture for Conversational Entity Retrieval from a Knowledge Graph”, *Proceedings of the 33rd International World Wide Web Conference (WWW)*, pages 1519–1528, 2024.
- C.2. Fedor Nikolaev and **Alexander Kotov**, “Joint Word and Entity Embeddings for Entity Retrieval from a Knowledge Graph”, *Proceedings of the 42nd Annual European Conference on Information Retrieval (ECIR)*, pages 141–155, 2020.
- C.3. Mehedi Hasan*, **Alexander Kotov***, Sylvie Naar, Gwen Alexander, April Idalski Carcone, “Deep Neural Architectures for Discourse Segmentation in E-mail Based Behavioral Interventions”, *Proceedings of the 2019 Summit of the American Medical Informatics Association on Clinical Research Informatics (CRI)*, pages 443–452, 2019.
- C.4. Saeid Balaneshinkordan, **Alexander Kotov**, Fedor Nikolaev, “Attentive Neural Architecture for Ad-hoc Structured Document Retrieval”, *Proceedings of the 27th ACM International Conference on Information and Knowledge Management (CIKM)*, pages 1173–1182, 2018.
- C.5. Mehedi Hasan*, **Alexander Kotov***, April Idalski Carcone, Ming Dong, Sylvie Naar, “Predicting the Outcome of Patient-Provider Communication Sequences using Recurrent Neural Networks and Probabilistic Models”, *Proceedings of the 2018 Summit of the American Medical Informatics Association on Clinical Research Informatics (CRI)*, pages 64–73, 2018.
- C.6. Saeid Balaneshinkordan, **Alexander Kotov**, “Deep Neural Architecture for Multi-Modal Retrieval based on Joint Embedding Space for Text and Images”, *Proceedings of the 11th ACM International Conference on Web Search and Data Mining (WSDM)*, pages 28–36, 2018.
- C.7. Vineeth Rakesh, Niranjan Jadhav, **Alexander Kotov**, Chandan Reddy, “Probabilistic Social Sequential Model for Tour Recommendation”, *Proceedings of the 10th ACM International Conference on Web Search and Data Mining (WSDM)*, pages 631–640, 2017.
- C.8. Saeid Balaneshinkordan, **Alexander Kotov**, “Sequential Query Expansion using Concept Graph”, *Proceedings of the 25th ACM International Conference on Information and Knowledge Management (CIKM)*, pages 155–164, 2016.
- C.9. Saeid Balaneshinkordan, **Alexander Kotov**, “Optimization Method for Weighting Explicit and Latent Concepts in Clinical Decision Support Queries”, *Proceedings of the 2nd ACM International Conference on the Theory of Information Retrieval (ICTIR)*, pages 241–250, 2016.
- C.10. Fedor Nikolaev*, **Alexander Kotov***, Nikita Zhiltsov, “Parameterized Fielded Term Dependence Models for Ad-hoc Entity Retrieval from Knowledge Graph”, *Proceedings of the 39th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pages 435–444, 2016.
- C.11. Lijun Wang, Ming Dong, **Alexander Kotov**, “Multi-level Approximate Spectral Clustering”, *Proceedings of the IEEE International Conference on Data Mining (ICDM)*, pages 439–448, 2015.

- C.12. **Alexander Kotov**, Mehedi Hasan, April Carcone, Ming Dong, Sylvie Naar-King and Kathryn Brogan Hartlieb, “Interpretable Probabilistic Latent Variable Models for Automatic Annotation of Clinical Text”, *Proceedings of the 2015 Annual Symposium of the American Medical Informatics Association (AMIA)*, pages 785–794, 2015.
- C.13. Nikita Zhiltsov, **Alexander Kotov**, Fedor Nikolaev “Fielded Sequential Dependence Model for Ad-hoc Entity Retrieval in the Web of data”, *Proceedings of the 38th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pages 253–262, 2015.
- C.14. Zaihan Yang, **Alexander Kotov**, Aravind Mohan, Shiyong Lu, “Parametric and Non-parametric User-aware Sentiment Topic Models”, full paper, *Proceedings of the 38th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pages 413–422, 2015.
- C.15. **Alexander Kotov**, Vineeth Rakesh, Eugene Agichtein and Chandan Reddy, “Geographical Latent Variable Models for Microblog Retrieval”, *Proceedings of the 37th European Conference on Information Retrieval (ECIR)*, pages 635–647, 2015.
- C.16. **Alexander Kotov**, ChengXiang Zhai, “Tapping into Knowledge Base for Concept Feedback: Leveraging Concept-Net to Improve Search Results for Difficult Queries”, *Proceedings of the 5th ACM International Conference on Web Search and Data Mining (WSDM)*, pages 403–412, 2012.
- C.17. **Alexander Kotov**, ChengXiang Zhai, “Interactive Sense Feedback for Difficult Queries”, *Proceedings of the 20th ACM International Conference on Information and Knowledge Management (CIKM)*, pages 163–172, 2011.
- C.18. **Alexander Kotov**, Paul Bennett, Ryen White, Susan Dumais, Jaime Teevan, “Modeling and Analysis of Cross-Session Search Tasks”, *Proceedings of the 34th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pages 5–14, 2011.
- C.19. **Alexander Kotov**, ChengXiang Zhai, Richard Sproat, “Mining Named Entities with Temporally Correlated Bursts from Multilingual Web News Streams”, *Proceedings of the 4th ACM International Conference on Web Search and Data Mining (WSDM)*, pages 237–246, 2011.
- C.20. **Alexander Kotov**, Pranam Kolari, Lei Duan and Yi Chang, “Temporal Query Log Profiling to Improve Web Search Ranking”, *Proceedings of the 19th ACM International Conference on Information and Knowledge Management (CIKM)*, pages 1149–1158, 2010.
- C.21. **Alexander Kotov**, ChengXiang Zhai, “Towards Natural Question-Guided Search”, *Proceedings of the 19th International World Wide Web Conference (WWW)*, pages 541–550, 2010.

Short conference papers:

- S.1. Diana Diaz, Aliccia Bollig-Fischer and **Alexander Kotov**, “Tensor Decomposition for Sub-typing of Complex Diseases based on Clinical and Genomic Data”, *Proceedings of the 2019 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pages 647–651, 2019.
- S.2. Jiaxing Tan, **Alexander Kotov**, Rojiar Pir Mohammadiani, Yumei Huo, “Sentence Retrieval with Sentiment-specific Topical Anchoring for Review Summarization”, *Proceedings of the 26th ACM International Conference on Information and Knowledge Management (CIKM)*, pages 2323–2326, 2017.
- S.3. Faegheh Hasibi, Fedor Nikolaev, Chenyan Xiong, Krisztian Balog, Svein Erik Bratsberg, **Alexander Kotov**, Jamie Callan, “DBpedia-Entity v2: A Test Collection for Entity Search”, *Proceedings of the 40th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pages 1265–1268, 2017.
Best Short Paper Honorable Mention
- S.4. Saeid Balaneshinkordan, **Alexander Kotov**, “Embedding-based Query Expansion for Weighted Sequential Dependence Retrieval Model”, *Proceedings of the 40th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pages 1213–1216, 2017.
- S.5. Saeid Balaneshinkordan, **Alexander Kotov**, “A Study of Document Expansion using Translation Models and Dimensionality Reduction Methods”, *Proceedings of the 2nd ACM International Conference on the Theory of Information Retrieval (ICTIR)*, pages 233–236, 2016.
- S.6. Mehedi Hasan, **Alexander Kotov**, Aravind Mohan, Shiyong Lu and Paul M. Stieg, “Feedback or Research: Separating Pre-purchase from Post-purchase Consumer Reviews”, *Proceedings of the 38th European Conference on Information Retrieval (ECIR)*, pages 682–688, 2016.
- S.7. Saeid Balaneshinkordan, **Alexander Kotov**, “An Empirical Comparison of Term Association and Knowledge Graphs for Query Expansion”, *Proceedings of the 38th European Conference on Information Retrieval (ECIR)*, pages 761–767, 2016.

- S.8. Rajul Anand, **Alexander Kotov**, “Improving Difficult Queries by Leveraging Clusters in Term Graph”, *Proceedings of the 11th Asia Information Retrieval Societies Conference (AIRS)*, pages 387–393, 2017. **Best Short Paper Award**
- S.9. **Alexander Kotov**, Eugene Agichtein, “The Importance of Being Socially-Savvy: Quantifying the Influence of Social Networks on Microblog Retrieval”, *Proceedings of the 22nd ACM International Conference on Information and Knowledge Management (CIKM)*, pages 1905–1908, 2013.
- S.10. **Alexander Kotov**, Yu Wang, Eugene Agichtein, “Leveraging Geographical Metadata to Improve Search over Social Media”, poster paper, In *Proceedings of the 22nd International World Wide Web Conference (WWW)*, pages 151–152, 2013.

Tutorials:

- T.1. Laura Dietz, **Alexander Kotov**, Edgar Meij, “Utilizing Knowledge Bases in Text-centric Information Retrieval”, presented at the 41st Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**), Ann Arbor, USA, 2018.
- T.2. David Atkins, Veronica Perez-Rosas, Ken Resnicow, **Alexander Kotov**, April Idalski Carcone, “Computational Technology to Support Automated Motivational Interviewing Fidelity Feedback and Communication Science”, presented at the 2017 International Conference on Motivational Interviewing (**ICMI**), Philadelphia, USA, 2017.
- T.3. Laura Dietz, **Alexander Kotov**, Edgar Meij, “Utilizing Knowledge Bases in Text-centric Information Retrieval”, presented at the 10th ACM International Conference on Web Search and Data Mining (**WSDM**), Cambridge, UK, 2017.
- T.4. Laura Dietz, **Alexander Kotov**, Edgar Meij, “Utilizing Knowledge Bases in Text-centric Information Retrieval”, presented at the 2nd ACM International Conference on the Theory of Information Retrieval (**ICTIR**), Newark, USA, 2016.
- T.5. **Alexander Kotov**, “Entity Representation and Retrieval from Knowledge Graphs”, presented at the 10th Russian Summer School in Information Retrieval (**RuSSIR**), Saratov, Russia, 2016.

Teaching:

Wayne State University

- CSC 8710 Seminar on Deep Learning (graduate)
- CSC 8710 Seminar on Health Informatics (graduate)
- CSC 7991 Information Retrieval (graduate)
- CSC 7710 Database Management Systems II (NoSQL Databases) (graduate)
- CSC 5710 Design of Intelligent Information Retrieval Systems (graduate/undergraduate)
- CSC 2200 Computer Science II (Data structures in C++) (undergraduate)

Emory University

- CS 572 Information Retrieval (graduate)

Current graduate students:

- Mona Zamiri, Ph.D. student, 2021–present
- Yermakhan Magzym, Ph.D. student, 2023–present

Graduated students:

- Fedor Nikolaev, Ph.D., 2015–2021
- Diana Diaz Herrera, Ph.D., 2017–2020
- Md. Mehedi Hassan, Ph.D., 2014–2019
- Saeid Balaneshinkordan, Ph.D., 2014–2019
- Niranjan Jadhav, M.S., 2015–2017

Past postdocs:

- Zaihan Yang, 2014–2015

Funding:

- National Institutes of Health** “Neural Conversational Agent for Automated Weight Loss Counseling” (R21), Role: PI, Total: \$403,501, Share: \$353,492, 2023–2025

National Institutes of Health “Scale it up: Effectiveness-Implementation Research to Enhance HIV-related Self-Management among Youth” (U19), Role: Sub-contract PI, Total: \$13,913,263, Share: \$150,213, 2016–2022

National Institutes of Health “Automated Coding of eCoaching Exchanges to Promote Healthier Eating” (R21), Role: MPI, Total: \$424,561, Share: \$211,546, 2016–2018

Office of Vice President for Research at Wayne State University “Electronic Health Records Information Extraction for Improving the Study of Cancer Risk and Outcomes”, Role: co-PI, Total: \$70,000, Share: \$30,000, 2014–2016

Ford Motor Company “Extraction of actionable insights from on-line automotive consumer reviews”, Role: PI, Total: \$12,700, Share: \$12,700, 2014–2015

Professional activities:

National Science Foundation panelist: 2014, 2015, 2017, 2018, 2021–2024

Program Committee Chair:

10th Russian Summer School in Information Retrieval (**RuSSIR**), 2016

Senior Program Committee / Meta-reviewer

2021 Machine Learning for Healthcare Workshop at NeurIPS 2022 (**ML4H'22**)

2021 Machine Learning for Healthcare Workshop at NeurIPS 2021 (**ML4H'21**)

2020 Machine Learning for Healthcare Workshop at NeurIPS 2020 (**ML4H'20**)

Conference program committee member:

Annual Meeting of the Association for Computational Linguistics (**ACL**): 2017, 2019–2023

Conference on Empirical Methods in Natural Language Processing (**EMNLP**): 2012, 2017, 2020–2023

Conference on Language Modeling (**COLM**): 2024

Conference of the European Chapter of the Association for Computational Linguistics (**EACL**): 2021, 2022

Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (**NAACL-HLT**): 2013, 2015, 2021

International Joint Conference on Natural Language Processing (**IJCNLP**): 2013

AAAI Conference on Artificial Intelligence (**AAAI**): 2012

International Joint Conference on Artificial Intelligence (**IJCAI**): 2016

ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**): 2012–2020, 2023

International World Wide Web Conference (**WWW**): 2012, 2013, 2015, 2017–2019, 2024

ACM International Conference on Web Search and Data Mining (**WSDM**): 2014, 2015, 2017, 2018

ACM International Conference on Information and Knowledge Management (**CIKM**): 2012, 2013, 2016

European Conference on Information Retrieval (**ECIR**): 2014–2016

ACM SIGIR International Conference on the Theory of Information Retrieval (**ICTIR**): 2015

Annual Symposium of the American Medical Informatics Association (**AMIA**): 2015–2020

IEEE International Conference on Big Data (**Big Data**): 2013, 2017

Editorial board member:

Frontiers in Bioinformatics, 2020–2022

Journal reviewer:

ACM Transactions on Information Systems, ACM Transactions on Computing for Healthcare, Journal of Biomedical Informatics, PLoS ONE, Frontiers in Bioinformatics, IEEE Transactions on Knowledge and Data Engineering, Information Retrieval, Information Processing & Management, Journal of the Association for Information Science and Technology, IEEE/ACM Transactions on Computational Biology and Bioinformatics, Data Mining and Knowledge Discovery, IEEE Intelligent Systems, Knowledge and Information Systems, The Knowledge Engineering Review

Session Chair

27th ACM International Conference on Information and Knowledge Management (**CIKM'18**), Turin, Italy

2019 Informatics Summits of the American Medical Informatics Association (**AMIA Summits 2019**), San Francisco, USA

Local Organizer

41st Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR'18**), Ann Arbor, USA