Anthony Rios

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Research Interests

Machine Learning; Natural Language Processing; Neural Networks; Biomedical Informatics; Computational Social Science

Education

2012–2018 **Ph.D. in Computer Science**, *University of Kentucky*, Lexington, Kentucky.
Advisor: Ramakanth Kavuluru, Ph.D.
Proposed Dissertation Title: Deep Neural Networks for Multi-Label Text Classification: Application to Coding Electronic Medical Records

2007–2011 **B.S. in Computer Science**, *Georgetown College*, Georgetown, Kentucky.

Research Experience

2018–present **Assistant Professor in Information Systems and Cyber Security**, *University of Texas at San Antonio*, San Antonio, Texas.

Summer 2017 **Summer Research Fellow**, *National Institute of Health (NCBI/NLM/NIH)*, Bethesda, Maryland.

2013–2018 **Graduate Research Assistant**, *University of Kentucky*, Lexington, Kentucky.

Teaching and Tutoring Experience

Fall 2016 **Guest Lecturer**, *Biomedical Natural Language Processing*, University of Kentucky.
Instructor: Ramakanth Kavluluru, Ph.D.
Convolutional Neural Networks for Text Classification

2010–2011 **Computer Science Peer Tutor**, *Georgetown College*, Georgetown, Kentucky.

Professional Experience

2016–2018 **Consulting Data Scientist**, *MAKETIME Inc. (Now Xometry)*, Lexington, Kentucky.

2010–2013 **Software Engineer Intern**, *Lexmark International*, Lexington, Kentucky.

Spring 2010 **Software Engineer Intern**, *Corevalus Systems LLC.*, Georgetown, Kentucky.

Awards

- 2017 – Best poster, Annual Commonwealth Computational Summit
- 2017 – Ranked 1st (among 13 teams; 500 Euro prize) in the BioCreative text mining chemical-protein interactions (CHEMPROT) shared task
- 2017 – Ranked 2nd (among 11 teams) in the shared task on classification of medication intake messages on Twitter for online pharmacovigilance (at Social media mining for health workshop at AMIA)
- 2017 – NIH Intramural Research Training Award (IRTA)
- 2016 – Ranked 3rd (among 24 teams) in the CEGS NGRID shared task on predicting psychiatric symptom severity scores based on clinical notes (RDoC for Psychiatry workshop at AMIA)
- 2016 – Graduate School Travel Grant, University of Kentucky
- 2015 – Thaddeus B. Curtz Memorial Scholarship, University of Kentucky
- 2015 – Best paper nomination, IEEE International conference on healthcare informatics, IEEE ICHI 2015.
- 2015 – Ranked 2nd (among 18 teams), Annual BioASQ Semantic Indexing Challenge, Task A (Batch 2)
- 2014 – Distinguished poster nomination, American Medical Informatics Assoc. (AMIA) Annual Symposium
- 2011 – Outstanding Senior in Computer Science, Georgetown College

Publications

Impact factors are based on the year the paper was published.

Peer-reviewed Journal Publications

1. A. Sarker, M. Belousov, J. Friedrichs, K. Hakala, S. Kiritchenko, F Mehryary, S Han, T. Tran, **A. Rios**, R. Kavuluru, B. de Bruijn, F. Ginter4, D. Mahata, S. M. Mohammad, G. Nenadic, and G. Gonzalez-Hernandez. Data and systems for medication-related text classification and concept normalization from Twitter: Insights from the Social Media Mining for Health (SMM4H) 2017 shared task. JAMIA. 2018 (Impact Factor: **4.270**)
2. Y. Peng, **A. Rios**, R. Kavuluru, and Z. Lu. Extracting chemicalâĂŞprotein relations with ensembles of SVM and deep learning models. Database. 2018. (*Extension to our 1st place method in the 2017 BioCreative CHEMPROT shared task*) (Impact Factor: **3.290**)

3. **A. Rios**, R. Kavuluru, and Z. Lu. Generalizing Biomedical Relation Classification with Neural Adversarial Domain Adaptation. Bioinformatics. 2018. (Impact Factor: **7.307**)

4. **A. Rios** and R. Kavuluru, Ordinal Convolutional Neural Networks for Predicting RDoC Positive Valence Psychiatric Symptom Severity Scores. Journal of Biomedical Informatics, Volume 75, Pages S85-S93, 2017. (Impact Factor: **2.753**)

5. R. Kavuluru, **A. Rios**, and Y. Lu. An Empirical Evaluation of Supervised Learning Approaches in Assigning Diagnosis Codes to Electronic Medical Records. Artificial Intelligence in Medicine, Volume 65, Issue 2; 2015 May. (Impact Factor: **2.009**)

Peer-reviewed Conference Publications

Note: For computer science publication venues, conference proceedings are highly selective (20%-40% acceptance rates), and are considered prestigious – sometimes **more prestigious than journals**. Therefore, highly-selective conferences are generally considered the most respected publication venues within certain communities such as natural language processing and computer vision.

6. **A. Rios** and R. Kavuluru. Few-Shot and Zero-Shot Multi-Label Learning for Structured Label Spaces. Conference on Empirical Methods in Natural Language Processing (EMNLP); 2018. (Acceptance Rate: **25%**)

7. **A. Rios** and R. Kavuluru. EMR Coding with Semi-Parametric Multi-Head Matching Networks. Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL); 2018. (Acceptance Rate: **32%**)

8. R. Kavuluru and **A. Rios**. Automatic Assignment of Non-Leaf Medical Subject Headings to Biomedical Articles. Proceedings of the American Medical Informatics Association annual symposium; 2015.

9. **A. Rios** and R. Kavuluru. Analyzing the Moving Parts of a Large-Scale Multi-Label Text Classication Pipeline: Experiences in Indexing Biomedical Articles. Proceedings of the IEEE International Conference on Healthcare Informatics; 2015. (**Best Paper Finalist**, *the system described in the paper also placed 2nd in the 2nd batch of BioASQ 2015*) (Oral, Acceptance Rate: **28%**)

10. **A. Rios** and R. Kavuluru. Convolutional Neural Networks for Biomedical Text Classication: Application in Indexing Biomedical Articles. Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics; 2015. (Oral, Acceptance Rate: **34%**)

11. R. Kavuluru, **A. Rios**, B. Kulengowski, and P. McNamara. A Knowledge-Based Collaborative Clinical Case Mining Framework. Proceedings of the American Medical Informatics Association (AMIA) annual symposium; 2014. (**Distinguished Poster Nomination**)

12. **A. Rios** and R. Kavuluru. Supervised Extraction of Diagnosis Codes from EMRs: Role of Feature Selection, Data Selection, and Probabilistic Thresholding. Proceedings of the IEEE International Conference on Healthcare Informatics; 2013. (Oral, Acceptance Rate: **30%**)

13. **A. Rios**, R. Vanderpool, P. Shaw, and R. Kavuluru. A Multi-Label Classication Approach to Coding Cancer Information Service Chat Transcripts. Proceedings of 26th International Florida AI Research Society conference; 2013.

Peer-reviewed Workshop Publications

14. **A. Rios**, T. Tran, and R. Kavuluru. Predicting Psychological Health from Childhood Essays with Convolutional Neural Networks for the CLPsych 2018 Shared Task (Team UKNLP). Proceedings of the Fifth Workshop on Computational Linguistics and Clinical Psychology: From Keyboard to Clinic (CLPsych@NAACL); 2018.

15. Y. Peng, **A. Rios**, R. Kavuluru, Z. Lu. Chemical-protein relation extraction with SVM, CNN, RNN and ensemble systems. Proceedings of the 6th BioCreative Challenge Evaluation Workshop; October 2017. (**Ranked 1st in the 2017 BioCreative CHEMPROT shared task**)

16. S. Han, T. Tran, **A. Rios**, R. Kavuluru. Team UKNLP: Detecting ADRs, Classifying Medication In-take Messages, and Normalizing ADR Mentions on Twitter. Proceedings of the 2nd Social Media Mining for Health Applications Workshop and Shared Task (SMMH@AMIA); 2017. (**Ranked 2nd in SMMH Workshop Shared Task at AMIA**)

17. R. Kavuluru, **A. Rios**, and T. Tran. Extracting Drug-Drug Interactions with Word and Character-Level Recurrent Neural Networks. Proceedings of the 5th IEEE International Conference on Healthcare Informatics, Workshop on Healthcare Knowledge Discovery and Management (IEEE HKDM@ICHI); 2017.

Abstracts/Poster Presentations

18. **A. Rios**, R. Kavuluru, Z. Lu. Adversarial Discriminative Domain Adaptation for Extracting Protein-Protein Interactions from Text. Poster to be presented at: 2017 Annual Commonwealth Computational Summit; 2017. (**Best Poster Award**)

19. E. Carter, **A. Rios**, K. Mann. Sick Jump: Maximizing Vertical Air to Optimize Tricks on a Half-pipe. Kentucky Section of the MAA Annual Meeting, Eastern Kentucky University, 2011

Professional Memberships and Activities

- **Reviewer** for the Journal of Biomedical Informatics (JBI)
- **Reviewer** for the Information Sciences Journal
- **Reviewer** for the Bioinformatics Journal
- **Reviewer** for the American Medical Informatics Association Annual Symposium (AMIA)
- **Member** of the Association for Computational Linguistics

Talks

- **A. Rios**. Generalizing Biomedical Relation Extraction with Neural Adversarial Domain Adaptation. Bluegrass Data Science Group, 2018.
- **A. Rios**. Convolutional Neural Networks for Biomedical Text Classification: Applications in Indexing Biomedical Articles, Keeping Current, University of Kentucky, Department of Computer Science 2015 and Lexmark International 2016.
- **A. Rios**. Multi-label Collective Classification, Keeping Current, University of Kentucky, Department of Computer Science 2014.
- **A. Rios**. Data Science Workflow with IPython Notebook, Keeping Current, University of Kentucky, Department of Computer Science 2014.

Selected Open Source Software `https://github.com/AnthonyMRios`

Stars measures how many people have supported each project. Likewise, # Forks measures community involvement. For example, many users have found pyMetaMap useful and have volunteered their time to extend it.

- **pyMetaMap** – Developed a python interface for the widely used named entity recognition tool (MetaMap) by the National Library of Medicine. (# Stars: **50**, # Forks: **39**)
- **pyClausIE** – Created a python interface for the OpenIE tool ClausIE. (# Stars: **8**, # Forks: **2**)
- **relation-extraction-rnn** – Bi-directional LSTM method for relation extraction. (# Stars: **7**, # Forks: **5**)
- **LEML** – Python implementation of a matrix factorization based method for extreme mulit-label classification. (# Stars: **6**, # Forks: **2**)