

Anthony Rios

Ph.D. Candidate

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Research Interests

Natural Language Processing; Text Classification; Information Extraction; Deep Neural Networks; Matrix Factorization; Machine Learning

Education

- 2012–present **Ph.D. in Computer Science**, *University of Kentucky*, Lexington, Kentucky.
Advisor: Ramakanth Kavuluru, Ph.D.
Proposed Dissertation Title: Exploiting Label Correlations for Multi-label Text Classification
- 2007–2011 **B.S. in Computer Science**, *Georgetown College*, Georgetown, Kentucky.

Research Experience

- 2017 **Summer Research Fellow**, *NATIONAL INSTITUTE OF HEALTH (NIH)*, Bethesda, Maryland.
- Developed methods to extract protein-protein and chemical-protein interactions from text with applications to precision medicine.
- 2013–present **Graduate Research Assistant**, *UNIVERSITY OF KENTUCKY*, Lexington, Kentucky.
- Developed multi-label classification methods for biomedical text classification.
 - Created a biomedical article search engine based on drug properties.
 - Implemented a techniques to extract drug-drug interactions from free text

Teaching and Tutoring Experience

- Fall 2016 **Guest Lecturer**, *Biomedical Natural Language Processing*, University of Kentucky.
Instructor: Ramakanth Kavuluru, Ph.D.
Convolutional Neural Networks for Text Classification
- 2010–2011 **Computer Science Peer Tutor**, *GEORGETOWN COLLEGE*, Georgetown, Kentucky.

Professional Experience

- 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

In Preparation

1. **A. Rios**, R. Kavuluru, Z. Lu. Biomedical Relation Classification with Neural Adversarial Domain Adaptation. *In preparation*
2. **A. Rios** and R. Kavuluru. Transfer Learning with Convolutional Neural Networks for Biomedical Text Classification: From MeSH Heading Prediction to Diagnosis Code Assignment. *In preparation*

Peer-reviewed Journal Publications

3. **A. Rios** and R. Kavuluru, Ordinal Convolutional Neural Networks for Predicting RDoC Positive Valence Psychiatric Symptom Severity Scores, *Journal of Biomedical Informatics* (2017)

4. 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.

Peer-reviewed Conference Publications

5. 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 November 14-18; San Francisco, CA.
6. **A. Rios** and R. Kavuluru. Analyzing the Moving Parts of a Large-Scale Multi-Label Text Classification Pipeline: Experiences in Indexing Biomedical Articles. Proceedings of the IEEE International Conference on Healthcare Informatics; 2015 Oct 21-23; Dallas, TX. (**Best Paper Finalist**, *the system described in the paper also placed 2nd in the 2nd batch of BioASQ 2015*)
7. **A. Rios** and R. Kavuluru. Convolutional Neural Networks for Biomedical Text Classification: Application in Indexing Biomedical Articles. Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics; 2015 September 09-12; Atlanta, GA.
8. **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 September 09-11; Philadelphia, PA.
9. **A. Rios**, R. Vanderpool, P. Shaw, and R. Kavuluru. A Multi-Label Classification Approach to Coding Cancer Information Service Chat Transcripts. Proceedings of 26th International Florida AI Research Society conference; May 22-24; St. Pete Beach, FL.

Peer-reviewed Workshop Publications

10. 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. Bethesda, MD.
11. 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 at AMIA. 2017.
12. 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 Conf. on Healthcare Informatics, Workshop on Healthcare Knowledge Discovery and Management (IEEE ICHI 2017), pp. 5-12
13. **A. Rios**, R. Kavuluru. Ordinal Convolutional Neural Networks for RDoc Classification. Proceedings of the 2016 CEGS N-GRID Shared-Tasks and Workshop on Challenges in Natural Language Processing for Clinical Data; 2016 November 18; Chicago, IL.

Peer-reviewed Posters

14. R. Kavuluru and **A. Rios**. A Knowledge-Based Collaborative Clinical Case Mining Framework. Proceedings of the American Medical Informatics Association (AMIA) annual symposium; 2014 November 15-19; Washington, DC. (**Distinguished Poster Nomination**)

Abstracts/Poster Presentations

15. **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 October 17; Lexington, KY. (**Best Poster**)
16. 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** Journal of Biomedical Informatics (JBI)
- **Student Member** Association for Computer Machinery (ACM)
- **Student Member** and **Reviewer** American Medical Informatics Association (AMIA)

Talks

- **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 Work ow with IPython Notebook, Keeping Current, University of Kentucky, Department of Computer Science 2014.

Open Source Software <https://github.com/AnthonyMRios>

- Released a CNN model for biomedical text classification.
- Developed a python interface for the widely used named entity recognition tool (MetaMap) by the National Library of Medicine
- Created a python interface for the Open Information Extraction tool (ClausIE)