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

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

- Developed multi-label classification methods for biomedical text classification [3,4,5].
- Created a biomedical article search engine based on drug properties [8].
- Implemented a technique to extract drug-drug interactions from free text [11].

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.

Other Professional Experience

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

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

Peer-reviewed Publications

Peer-reviewed Journal Publications

1. 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

2. R. Kavuluru and **A. Rios**. Automatic Assignment of Non-Leaf Medical Subject Headings to Biomedical Articles. Paper to be presented at: AMIA 2015. Proceedings of the American Medical Informatics Association annual symposium; 2015 November 14-18; San Francisco, CA.

3. **A. Rios** and R. Kavuluru. Analyzing the Moving Parts of a Large-Scale Multi-Label Text Classication Pipeline: Experiences in Indexing Biomedical Articles. Paper presented at: ICHI 2015. 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*)

4. **A. Rios** and R. Kavuluru. Convolutional Neural Networks for Biomedical Text Classication: Application in Indexing Biomedical Articles. Paper presented at: ACM-BCB 2015. Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics; 2015 September 09-12; Atlanta, GA.

5. **A. Rios** and R. Kavuluru. Supervised Extraction of Diagnosis Codes from EMRs: Role of Feature Selection, Data Selection, and Probabilistic Thresholding. Paper presented at: ICHI 2013. Proceedings of the IEEE International Conference on Healthcare Informatics; 2013 September 09-11; Philadelphia, PA.

6. **A. Rios**, R. Vanderpool, P. Shaw, and R. Kavuluru. A Multi-Label Classication Approach to Coding Cancer Information Service Chat Transcripts. Paper presented at: FLAIRS 2013. Proceedings of 26th International Florida AI Research Society conference; May 22-24; St. Pete Beach, FL.

Peer-reviewed Workshop Publications

7. **A. Rios**, R. Kavuluru. Ordinal Convolutional Neural Networks for RDoc Classification. Paper presented at: 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

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

Work Under Review

9. **A. Rios**, R. Kavuluru. Improved Ordinal Convolutional Neural Networks for RDoc Classification. Submitted to: Journal of Biomedical Informatics (JBI); 2017 February 1

Work in Progress

10. **A. Rios** and R. Kavuluru. Transfer Learning with Convolutional Neural Networks for Biomedical Text Classification: From MeSH Heading Prediction to Diagnosis Code Assignment. To be submitted to: Artificial Intelligence in Medicine (AIIM)

11. R. Kavuluru and **A. Rios**. Extracting Drug-Drug Interactions from Text using Recurrent Neural Networks. *In Progress*

Awards

- 2017 – NIH Intramural Research Training Award (IRTA) Summer Training
- 2016 – 3rd Place in Task 2 of the CEGS N-GRID 2016 Shared Task in Clinical Natural Language Processing [7]
- 2016 – University of Kentucky, Graduate School Travel Grant
- 2015 – University of Kentucky, Department of Computer Science, Thaddeus B. Curtz Memorial Scholarship
- 2015 – Finalist for the IEEE International Conference on Healthcare Informatics best paper award [3]
- 2015 – 2nd in the Large-scale Biomedical Semantic Indexing Challenge 3A Batch 2 [3]
- 2014 – Distinguished Poster Nomination [8] (2014)
- 2011 – Georgetown College, Outstanding Senior in Computer Science

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)
- **Collaborated** with a bioelectronics group at MIT by creating code used for the analysis of neural activity from fluorescent videos (my name is in the **acknowledgments**):
  - G. Romero, M. G. Christiansen, L. Stocche Barbosa, F. Garcia, and P. Anikeeva (2016). Localized Excitation of Neural Activity via Rapid Magnetothermal Drug Release. Advanced Functional Materials, 26(35), 6471-6478.

Talks

- A. Rios. Convolutional Neural Networks for Biomedical Text Classification: Applications in Indexing Biomedical Articles, Lexmark International 2016.
- A. Rios. Convolutional Neural Networks for Biomedical Text Classification: Applications in Indexing Biomedical Articles, Keeping Current, University of Kentucky, Department of Computer Science 2015.
- 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.
- 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

Community Contributions `https://github.com/AnthonyMRios`

- Developed a python interface for the widely used named entity recognition tool (MetaMap) by the National Library of Medicine (*This project currently has 17 stars on github and has been forked 16 times*)
- Produced an iPython Notebook to show how to perform sentiment classification on twitter and SMS data
- Created a python interface for the Open Information Extraction tool (ClausIE)