Antonio Laverghetta Jr.

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[LinkedIn] ◊ [GitHub] ◊ [Website]

RESEARCH INTERESTS

Natural Language Inference, Computational Psycholinguistics, Psychometrics

EDUCATION

Ph.D. in Computer Science and Engineering May 2024
University of South Florida Tampa, FL

MS in Computer Science May 2021
University of South Florida Tampa, FL

BS in Computer Science December 2018
University of South Florida Tampa FL

RESEARCH EXPERIENCE

Research Assistant January 2019 – Present
Advancing Machine and Human Reasoning Lab Tampa, FL

- *Modeling Psycholinguistic and Psychometric Properties Using Language Models*
  Analyzed the performance of transformer language models at predicting human psychometric properties, using methods from classical test theory and item response theory. Transformers were also used to predict psycholinguistic norms for a word acquisition, and in both cases were shown to demonstrate moderate to strong correlation.
  Publications: [1,2]

- *Curriculum Learning for Natural Language Inference*
  Developed a novel measure of difficulty for the Stanford Natural Language Inference dataset, using human annotations from the dev set. Resulting difficulty models achieved strong correlation with human norms.
  Publications: [3]

- *Generating and Solving Word Analogies Using Word Embeddings*
  Designed a novel model of analogical reasoning, using fastText word embeddings and ConceptNet. The model achieved state-of-the-art performance on multiple analogical reasoning datasets and can generate new word analogies given a seed term.
  Publications: [4]

PROFESSIONAL EXPERIENCE

R&I Intern May 2021 – August 2021
InterDigital Los Altos, CA

- Developed NLP models for comparing and ranking long documents
- Used topic models to analyze model predictions on a dataset of patents
- Created a novel curriculum learning framework based on clustering doc2vec embeddings
- Models achieved 2% increase in precision over baseline on a document ranking task

Teaching Assistant April 2020 – September 2020
Trilogy Education New York, NY

- Mentored students in Trilogy's Data Analytics Bootcamp
- Instructed students on a variety of Data Science tools, including SQL, Spark, AWS, and Keras
- Delivered a lecture on PyTorch for NLP applications
- Overall satisfaction was consistently rated 4 or higher on a 5-point scale

Computer Science Intern May 2018 – September 2018
ConnectWise Tampa, FL

- Created Python test scripts for ConnectWise Manage web application
- Researched original issue to develop reproducible steps for testing
- Troubleshooted issues with REST API using Postman and Requests
- Completed 16 test suites, used for QA in production environments

Intern August 2016 – July 2017
Tenex Software Solutions Tampa, FL

- Developed Tenex's .NET web application platform
- Implemented UI improvements using Bootstrap and DevExpress
- Created and debugged SQL queries to interface with multiple MySQL databases
- Performed maintenance on AWS infrastructure as necessary
- Succeed in resolving approximately 125 bugs

PUBLICATIONS

[1] Laverghetta, A., Jr., Nighojkar, A., Mirzakhalov, J., & Licato, J. (2021). Can Transformer Language Models Predict Psychometric Properties? In *Proceedings of *SEM 2021: The Tenth Joint Conference on Lexical and Computational Semantics* (pp. 12-25). Online: Association for Computational Linguistics.

[2] Laverghetta A., Jr., & Licato, J. (2021). Modeling Age of Acquisition Norms Using Transformer Networks. *The International FLAIRS Conference Proceedings*, *34*.

[3] Laverghetta, A., Jr., Mirzakhalov, J., & Licato, J. (2020). Towards a Task-Agnostic Model of Difficulty Estimation for Supervised Learning Tasks. In *Proceedings of the 1st Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics and the 10th International Joint Conference on Natural Language Processing: Student Research Workshop* (pp. 16-23). Suzhou, China: Association for Computational Linguistics.

[4] Boger, M., Laverghetta, A., Jr., Fetisov, N., & Licato, J. (2019). Generating Near and Far Analogies for Educational Applications: Progress and Challenges. In *2019 18th IEEE International Conference On Machine Learning And Applications (ICMLA)* (pp. 1968-1975). Boca Raton, FL: IEEE.

AWARDS

IMPS 2021 Duolingo Student Award July 2021

- One of 3 to receive award for best student presentation, out of 130 participants

SKILLS

Operating Systems: Windows 10, Linux+ certified
Languages: Java, C, C++, C#, VB.NET, HTML, CSS, Javascript, Python, JSON, SQL, XML, YAML
Libraries: NumPy, SciPy, scikit-learn, NetworkX, OpenCV, Bootstrap, JQuery, Tensorflow, PyTorch, Keras, Transformers, Flask, Matplotlib, Pandas, Jupyter
Development Tools: Visual Studio, git, Notepad++, Anaconda, Postman, github
Cloud: Google Cloud, AWS
Theory: Knowledge Graphs, Natural Language Processing, Deep Learning, Machine Learning, Artificial Intelligence
Productivity: Word, PowerPoint, Excel, Teams, Slack

LEADERSHIP AND COMMUNITY SERVICE

Member November 2020 – Present
Turkic Interlingua Research Group

- Assisted in curating a dataset and baseline language models for low resource Turkic languages

Founding President November 2017 – December 2018
Society of Competitive Programmers USF Student Organization