Alexander Bock

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Education

Rice University — Houston, Texas
Ph.D., Computer Science — September 2023 – present

Tufts University — Medford, Massachusetts
B.S., Computer Science and Biology — September 2015 – May 2019

Honors: Neubauer scholarship
Core: Data structures, algorithms, programming languages, theory of computation
Specialized: Computational biology, natural language processing, computational systems biology, computational modeling

Work Experience

Generate Biomedicines — Cambridge, Massachusetts
Machine Learning Operations Engineer — November 2021 – May 2023

- Built and maintained scalable data transformation and modeling pipelines for protein sequence data
- Designed user interfaces for researchers to analyze datasets and model performance
- Automated deployment routines for pipelines capable of processing up to 10^9 sequences

Boston Fusion — Lexington, Massachusetts
Research Programmer — July 2019 – October 2021

- Developed customized data analysis and machine learning pipelines for R&D efforts
- Presented approaches and results to customers regularly across project life cycle
- Delivered software prototypes to scientists on large-scale projects with DARPA and ONR
- Introduced and led Agile development methodology for interdisciplinary teams of 10-20 people

Human-Robot Interaction Laboratory, Tufts University — Medford, Massachusetts
Research Intern — June 2017 – May 2019

- Developed C++ agent-based model simulation of an area coverage task to measure performance in a high-dimensional parameter space
- Developed Python pipeline to infer and classify sentiment in human conversations using NLP techniques (text processing, topic modeling)
- Interfaced with graduate students to translate hypotheses into technical prototypes and summarize results in publications

Publications

ORCID: 0000-0003-1870-8499

Conference papers

C1. **A. Bock**, A. Palladino, S. Smith-Heisters, I. Boardman, E. Pellegrini, E.J. Bienenstock, A. Valenti. "An NLP approach to quantify dynamic salience of predefined topics in a text corpus." *2021 International Conference on Social Computing, Behavioral-Cultural Modeling Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS)*, 2021. [Acceptance rate: $< 50\%$]

C2. A. Palladino, M. Duff, **A. Bock**, T. Parsons, R. Arantes, B. Chartier, C. Weir, K. Moore. "AI-augmented human performance evaluation for automated training decision support." *6th International Conference on Intelligent Human Systems Integration: Integrating People and Intelligent Systems (IHSI)*, 2021.

C3. A. Valenti, M. Chita-Tegmark, T. Law, **A. Bock**, B. Oosterveld, M. Scheutz. "When your face and tone of voice don't say it all: Inferring emotional state from word semantics and conversational topics." *Workshop on Cognitive Architectures for HRI: Embodied Models of Situated Natural Language Interactions at the International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2019*, 2019. [Acceptance rate: 24%]

C4. D. Buckingham, G. Ferreira, **A. Bock**, M. Scheutz. "Comparison of the effectiveness of simple agent capabilities for an on-line area coverage task." *IEEE Symposium Series on Computational Intelligence (SSCI)*, 2018.

Journal articles

J1. A. Valenti, M. Chita-Tegmark, L. Tickle-Degnen, **A. Bock**, M. Scheutz. "Using topic modeling to infer the emotional state of people living with Parkinson's disease." *Assistive Technology*, 2019.

Honors and Awards

NSF Computer and Information Science and Engineering Graduate Fellowship August 2022
(CSGrad4US) Annual stipend and cost-of-education allowance for 3 years of study

De Florez Prize in Human Engineering April 2019
Recognition for human factors engineering research at Tufts University

Neubauer Scholar September 2015 - May 2019
Grant for undergraduate students to pursue independent research efforts

Projects

Sequence characterization using generative topic modeling 2019
github.com/alex-bock/enzyme_FP_LDA

Working with an enzyme sequence dataset labeled with Enzyme Commission (EC) classifications, this project sought to apply a latent Dirichlet allocation (LDA) topic modeling approach used in NLP to sequence data, generating "topic" representations of individual sequences and comparing representation similarity within EC taxa.

Skills

Programming Python · C++ · MATLAB · SQL

Infrastructure AWS · Prefect · Docker · Kafka · ArangoDB

Analysis & modeling NumPy · SciPy · pandas · PyTorch · scikit-learn · Plotly · pytest

Development & documentation Git · Agile/Scrum