Luke Harold Miles

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Education

- University of Kentucky, M.S. in Computer Science, December 2019 (expected)
- University of Kentucky, B.S. in Computer Science, May 2019 (expected)
    - In-major GPA of 3.8
    - Minor in Mathematics
- Graduated from the Gatton Academy of Mathematics and Science in Kentucky in May 2016
    - Public magnet STEM school

Awards

- Selected for honorable mention for the Computing Research Association's Outstanding Undergraduate Researcher Award for 2019
- Placed #1 in KY in 2018 ACM International Collegiate Programming Contest (13 teams)
- Placed in USA top 10 at 2017 IEEExtreme Programming Competition
- Awarded 2017 University of Kentucky Summer Research Grant

Service

- Reviewer for SafeAI 2019 Workshop at AAAI Conference
- Reviewer for 2017 Algorithmic Decision Theory Conference
- Board member of the Lexington Traditional Dance Association

Selected Skills

- Auditing, testing, and restructuring software
- Implementing a common environment and benchmark for multiple algorithms
- Collecting and preprocessing datasets for use in ML systems
- Using NLP to classify and generate text (TF-IDF, LSTMs, etc)
- Designing RL environments from specifications (in python, julia, and go)
- Implementing RL algorithms from descriptions (e.g. customized MCTS)

Research Experience

Spring 2019: We are surveying recent papers in reinforcement learning, synthesizing results relevant for robust & safe AI. **Collaborators**: Dr. Brent Harrison (U of Kentucky), Max Williams, Dr. Roman Yampolskiy (U of Louisville)

Fall 2018 & Spring 2019: We are investigating the viability of augmenting NLP techniques with a predictive model of the world. **Collaborators**: Dr. Brent Harrison (U of Kentucky)

Spring 2017: We analyzed a model of political campaigns (introduced by Walter Dean and Rohit Parikh), looking at the computational complexity of deciding who to vote for, and the complexity of deciding what to say as a political candidate. I presented this work at the Algorithmic Decision Theory Conference (ADT 2017) in Luxembourg.

- Siler, Cory, Luke Harold Miles, and Judy Goldsmith. "The Complexity of Campaigning." In International Conference on Algorithmic Decision Theory, pp. 153-165. Springer, 2017.

Fall 2015 & Spring 2016: We analyzed a measure of the integrity of a network and established new upper bounds within certain classes of graphs. No publications from this project. **Collaborators**: Dr. Dominic Lanphier (Western Kentucky University)

Software Engineering Experience

Summer 2018: Williams & I rewrote, optimized, and expanded an experimental computational materials science program called MAST-ML over a ten-week sprint. (We reduced 13,864 lines of code to 5,447.) The program uses ML techniques on materials-science datasets to predict the properties of novel compounds. It will be used for demonstrations and experimentation in classrooms and to aid in materials discovery. A paper is in progress for this project and will be submitted to *Journal of Materials Science*. **Tools:** python, sci-kit learn, tensorflow/keras. **Collaborators:** Dr. Dane Morgan & Dr. Ryan Jacobs (U Wisconsin at Madison), Max Williams (U of Louisville), and Dr. Raphael Finkel (U of Kentucky)

Spring 2018: I made a touchscreen exam/training game for pigeons, to examine whether they are capable of transitive inference. This experiment has just been completed, and a revised manuscript is being prepared for the journal *Animal Cognition*. **Tools:** javascipt & html5, nw.js. **Collaborators:** Dr. Thomas Zentall (U of Kentucky)

Summer 2017: I made a web program [lukemiles.org/hedonic-games] for modeling coalition formation under different preference models. This is a tool used by other researchers for experimentation or to verify their calculations. I presented it at the doctoral consortium at the 2017 Algorithmic Decision Theory conference.

Fall 2016: I made a software package for scoring voter ballots (to choose a winner of an election) according to several different social choice functions (voting rules). This was extended by Trevizan; the social choice functions were used to improve accuracy in his distributed machine learning classification tasks. This project is available at [github.com/qpwo/pySCF]. **Collaborators:** Dr. Judy Goldsmith (U of Kentucky), Bernardo Trevizan (Federal U of Rio Grande do Sul)