Krishna Bathina

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PROFILE

Versatile Data Science professional with strong experience performing research and applying analysis techniques to interdisciplinary projects. Proven success managing projects from conception through successful conclusion. Creative and detail-oriented with strengths in planning and assessment. Demonstrated ability to analyze issues and identify new techniques/solutions to resolve them. Recognized as a trusted team member who thrives in collaborative settings, contributing analytical and resourceful approach to problem solving.

EDUCATION

<u>Indiana University</u> – Bloomington, IN

PhD, Complex Systems	anticipated 12/2020

- Working thesis title: Resilience in Complex Systems

Master of Science (MS), Computer Science	2017

<u>University of Michigan</u> – Ann Arbor, MI

Bachelor of Science (BS), Complex Systems	2014
Bachelor of Science (BS), Psychology	2014

KEY SKILLS SUMMARY

Analysis: Data Science | Machine Learning| Natural Language Processing (NLP) | Big Data | Network Science | Exploratory Data Analysis | Deep Learning | Topological Data Analysis | Sentiment Analysis | Statistics

Programming: Python | Bash | R

Tools: MySQL | PySpark | Git/GitHub

Python Analysis: nltk | scikit-learn | gensim | pymc3 | theano | gudhi | Keras / TensorFlow | PyTorch

Python Data: beautifulsoup | sqlalchemy

Visualization: matplotlib | seaborn | plotly | ggplot2

RESEARCH EXPERIENCE

<u>Indiana University</u> – Bloomington, IN

Graduate Researcher	08/2014 – Present

- Conducted five projects relating to thesis on collective intelligence and human resilience (emotional, mental, and group) across different systems. Research focused on social media and immune response as well as how group decisions affect individuals. Submitted / published three papers, with two additional papers in progress.
  - Collected data from APIs and cleaned / organized big data using MySQL.
  - Implemented machine learning algorithms; calculated and characterized emotional trends using NLP.
  - Performed topological data analysis of time series data. Completed model fitting and data analysis.
  - Employed various statistical analysis methodologies, including building null models as well as bootstrapping and jackknifing resampling.
  - Overcame challenges of nonstandard formats and inaccurate data received as well as company providing processed data without details about processing methods. Wrote code to reformat and standardize data and performed manual inspections to ensure accuracy.

RESEARCH EXPERIENCE

Indiana University – Bloomington, IN
Graduate Researcher   08/2014 – 08/2017

- Completed independent project on community detection in graphs, with aim of maintaining accuracy while reducing complexity of a novel community detection method using a message-passing algorithm.
  - Approximated algorithm mathematically and programmatically, involving much trial and error.
  - Tested new algorithm on data sets and compared to prior model.
  - Performed statistical analysis using information entropy.
  - Reduced complexity of algorithm and published paper.
- Built computer privacy tool and conducted 12-week study to monitor participants' behaviors as well as self-reported perceptions of behaviors and gauge perception of tool.
  - Planned and built web extension tool for computer privacy after extensive design and build process, offering users three levels of privacy in settings.
  - Recruited study participants and installed tool on their computer.
  - Studied data from participants' internet usage and conducted surveys and interviews to gather feedback.
  - Coded and analyzed interview responses, overcoming challenges in obtaining reliable results due to qualitative nature of data.
  - Published government report with findings about increasing sophistication of privacy tools and static technological literacy.

HRL Laboratories, LLC – Malibu, CA
Intern, Information and Systems Science Laboratory   2016 – 2016

- Developed research plan for short-term project to investigate the spread of Ferguson protest hashtags, comparing how people used and spread protest hashtags compared to standard hashtags for sports, holidays, entertainment, etc.
- Proposed project and collected social media data from Tumblr using Hadoop with MapReduce. Reported to the Principal Investigator and collaborated with senior researchers in the lab.
- Built agent-based model, fit model to data, then analyzed model of the spread of viral protest hashtags using network analysis for future predictions and generalizations about other protests.

TEACHING EXPERIENCE

Indiana University – Bloomington, IN
Associate Instructor   2014 – Present

- Developed and presented lectures in various undergraduate courses, including:
  - INFO-I 469: Collective Intelligence (2017, 2020)
  - INFO-I 210: Information Infrastructure (2019)
  - INFO-I 308: Information Representation (2017 – 2018)
  - INFO-C 201: Mathematical Foundations of Informatics (2014 – 2015)

University of Michigan – Ann Arbor, MI
Undergraduate Instructor   2013 – 2013

- Prepared and graded homework assignments and exams in various undergraduate courses, including:
  - CSCS 270: Agent-based modeling (2013)
  - CSCS 391: Modeling in Political Science (2013)

LEADERSHIP & INVOLVEMENT

<u>Young Researchers of the Complex Systems Society (yrCSS)</u>
Treasurer   2018 – 2020
- Organized Young Researchers events for PhD students and recent graduates at the annual Conference of Complex Systems in Thessaloniki, Greece (CCS 2018) and Singapore (CCS 2019).
  – Established scholarships for young researchers to attend conferences and collaborate with external scientists.
  – Planned event logistics and secured venues and guest speakers.

PUBLICATIONS

K.C. Bathina, M.T. Thij, L. Lorenzo-Luaces, L.A. Rutter, J. Bollen. "Depressed individuals express more distorted thinking on social media." arXiv preprint arXiv:2002.02800 (2020). Submitted to *Science*.

K.C. Bathina, F. Radicchi. "Error-correcting decoders for communities in networks." *Applied Network Science*, vol. 4 (9), 2019. DOI: 10.1007/s41109-019-0114-7.

P. Grim, M. Liu, **K.C. Bathina**, N. Liu, J.W. Gordon. "How Stable Is Democracy? Suggestions from Artificial Social Networks." *Journal on Policy and Complex Systems*, 4(1), 2018. DOI: 10.18278/jpcs.4.1.5.

K.C. Bathina, A. Jammalamadaka, J. Xu, T.C. Lu. "An Agent-Based Model of Posting Behavior During Times of Societal Unrest." In: Lee D., Lin YR., Osgood N., Thomson R. (eds) *Social, Cultural, and Behavioral Modeling*. SBP-BRiMS 2017. Lecture Notes in Computer Science, vol. 10354. Springer, Cham, 2017. DOI: 10.1007/978-3-319-60240-0_6.

K.C. Bathina, P. Rajivan, J. Minor, S. Gopavaram, J. Blythe, L.J. Camp. "Instrumenting Simple Risk Communication to Enable Online Self-Protection." Federal Trade Commission. 2016.

CONFERENCE PRESENTATIONS

K.C. Bathina and J. Bollen, "Physical Activity and Mood Dynamics on Twitter," presented at CCS 2019, Singapore, October 2019.

K.C. Bathina and F. Radicchi, "Error-Correcting Decoders for Communities in Networks," presented at CCS 2018, Thessaloniki, Greece, September 2018.

K.C. Bathina and J. Bollen, "Using Social Media Indicators to Study Regional Socio-Economic Resilience," presented at CCS 2018, Thessaloniki, Greece, September 2018.

K.C. Bathina and F. Radicchi, "Error-Correcting Decoders for Communities in Networks," presented at NetSci 2018, Paris, France, June 2018.

K.C. Bathina, "Predicting Epistatic Interactions Using Information and Network Theory," presented at CCS 2017, Cancun, Mexico, September 2017.

K.C. Bathina, A. Jammalamadaka, J. Xu, and T. Liu, "An Agent-Based Model of Posting Behavior During Times of Societal Unrest," presented at SBP-BRiMS 2017, Washington DC, July 2017.

K.C. Bathina and J. Camp, "Bridging the Gap between Privacy by Design and Privacy in Practice," presented at CHI 2016, San Jose, CA, May 2016.

P. Grim, M. Liu, **K.C. Bathina**, N. Liu, J. Gordon, "Opinion Instability in Democratic and Anti-Democratic Networks: Suggestions from an Agent-Based Model," presented at SPSP 2014, Austin, TX, February 2014.