

Clement Nyanhongo

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EDUCATION

Dartmouth College, Thayer School of Engineering 2019 - present

Degree: Ph.D. in Computer Engineering

Advisor: Eugene Santos Jr.

Research Interests: Artificial Intelligence, Machine Learning, Human Factors

Dartmouth College 2013 - 2018

Degree: B.Eng. in Computer Engineering

Relevant Coursework: Numerical Methods of Computation, Artificial Intelligence, Network Science and Complex Systems, Operations Research, Deep Generative Models, Machine Learning, Logic and AI, Deep Learning, Probabilistic Systems, Full Stack Web Development, Statistics, Modern Information Technologies, Database Systems, Data Structures and Algorithms, Digital Electronics, Distributed Systems, System Dynamics

Computer Skills: Python, Java, C++/C, Bash, Web Dev (JavaScript, React, NodeJS), MySQL, MongoDB, Distributed Computing

RESEARCH EXPERIENCE

Distributed Information and Intelligence Analysis Lab (Thayer School), Graduate Research Assistant 2019 - Present

Research Overview: Developing algorithms to help understand and explain human behavior using theoretical foundations from inverse reinforcement learning, knowledge representation and generative models. The goal is to infer an agent's motivations and provide prescriptive measures to enhance the agent's decision-making process.

Projects:

Human-Machine Cooperation 2020-Present

- Building adaptive human-machine interfaces through interference management. The goal is to design automated systems that can adapt to a user's unique behavior and preferences.

Behavioral Transfer 2019

- Utilizing general adversarial neural networks to understand the evolution of human expertise and determine if it can be accelerated or improved using other individuals' positive experiences.

Synthetic Trajectory Generation 2019

- Utilizing Recurrent Neural Networks to generate sequences that can generate new instances of data that can be used to infer an agent's behavior in a different scenario or situation.

Computational Opinion Dynamics 2019

- Modelling the process of human opinion formation using Inverse Reinforcement Learning to analyze reward functions that interacting agents exploit in determining their choices during conversations.

Accepted Publications

- Santos Eugene Jr, Nguyen Hien, Keumjoo Kim, Hyde Gregory, **Nyanhongo Clement**, and Luke Veenhuis, "Interference Detection amongst Interdependent Human-Machine Teams," AAAI Spring Symposium (to be published), Palo Alto, CA, 2020
- Santos Eugene Jr., Nguyen Hien, **Nyanhongo Clement**, Hyde Gregory, Kim Keumjoo, and Russell Jacob, "A Decision-Making Framework for Agents in Complex Environments," Proceedings of 14th International Naturalistic Decision-Making Conference, 176-181, San Francisco, CA, 2019.
- Santos Eugene Jr. and **Nyanhongo Clement**, "A Contextual-based Framework for Opinion Formation" Proceedings of the 32nd International FLAIRS Conference, 62-67, Sarasota, FL, 2019.

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Manuscripts in Preparation

- **Clement Nyanhongo**, Eugene Santos, Hien Nguyen, Gregory Hyde “Incorporating Interference to assess Team Strength via Inverse Reinforcement Learning”, International Joint Conference on Autonomous Agents and Multi-Agent Systems (ready for submission: October 9th).
 - Santos Eugene Jr, Nguyen Hien, Keumjoo Kim, Hyde Gregory, **Nyanhongo Clement** “Validation of the Double Transition Model by Analyzing Reward Distributions”, ACM/IEEE Web Intelligence Conference (submitted)
 - Gregory Hyde, Eugene Santos, Hien Nguyen, **Clement Nyanhongo**, Kuemjoo Kim “Cyclic Q-learning” International Conference of Robotics and Automation (ready for submission: October 1st)
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INDUSTRY EXPERIENCE

TerraClear Inc. (Rock Map Design Project, ENGS 90)

Sept 2017 – March 2018

- Developed image processing techniques to detect rocks from agricultural fields.
- Combined gaussian filtering, hierarchical and k-means clustering to pre-process field images for classification with convolutional neural networks.
- Model was 80% accurate compared to 90% human accuracy, however, it would be faster and more scalable.

KPMG, Corporate Finance Intern

June 2017 – Sept 2017

- Analyzed financial data for clients to identify historical operational trends and provide recommendations on how to improve execution and profitability.
 - Drafted valuations and due diligence reports for clients involved in M&As, debt equity swaps and IPOs
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AWARDS, HONORS and LEADERSHIP

- NSF Data Science in STEM Fellow – Awarded a 6-month fully-funded fellowship to teach data science to undergraduate students with non-STEM backgrounds (Jan –June 2020).
 - AAAI 2020 Conference Travel Award Grant Recipient (Black in AI)
 - Academic citation for Meritorious Performance in Engineering Software Design (ENGS 65)
 - Academic citation for Meritorious Performance in Logic and AI (COSC 189)
 - Joshua Nkomo Scholarship Recipient- Awarded to the top 50 high school academic achievers in Zimbabwe. Advanced level 4/4 distinctions, Ordinary level 12/12 distinctions.
 - United States Achievers Program - Selected in a leadership fellowship program that aims to train leaders who give back to their communities. About 30 (out of 1000) students are selected from Zimbabwe and are supported in US college applications.
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TEACHING EXPERIENCE

- Teaching Assistant – Modern Information Technologies, System Dynamics, Engineering Statistics
 - Dartmouth Emerging Engineers Peer Tutor (Intro to Calculus, Intro to Physics, Software Design etc.)
 - Resident Fellow (Teaching Assistant for the West House Resident cluster for different introductory classes)
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EXTRACURRICULAR ACTIVITIES

- Past participant in Kaggle, Hackathons and Thayer Consulting Case Competitions.
- Societies and Clubs: National Society of Black Engineers (NSBE), Black in AI, Sigma Xi, IEEE
- Voluntary project – Drafted and set up a poultry farm project in Nicaragua through a non-profit called Bridges to Community (2018).
- Undergraduate Advisor – Provided individual support to residents in meeting their personal, social and academic needs.
- Sport Activities: Cricket player for the Dartmouth Cricket Club