Roger Garcia

Contact Information

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Education

Mississippi State University, Starkville, Mississippi, USA — June 2015 - Present
Ph.D. Student, Computer Science

- Advisor: Christopher Archibald, Ph.D
- GPA: 3.79 / 4.0

Relevant courses: Data Science with R, Digital Systems in Engineering Education, Cyptography & Network Security, Human-Computer Interaction, AI-Robotics, Artificial Intelligence, Algorithms for Artificial Intelligence and Machine Learning

Kean University (NJCSTM), Union, New Jersey, USA
M.S., Science and Technology, Computational Mathematics Option — May 2015

- Advisor: David Joiner, Ph.D
- Thesis Title: Extrasolar Planetary Dynamics with the Linear Laplace-Lagrange Secular Theory
- GPA: 3.70 / 4.0

B.S., Science and Technology — May 2014

- Minor: Physics
- GPA: 3.39 / 4.0

Relevant courses: High Performance Computing, Knowledge Discovery and Data, Computer Programming, Operating Systems, Data Structures, and Software Engineering, as well as required coursework in Calculus, Differential Equations, Partial Differential Equations, Numerical analysis, and Statistics

Technical Skills

Frequently used programming languages: Python, C/C++, R(Rstudio) and LaTeX
Previously used programming languages: Matlab and Java

Operating Systems: Linux and Microsoft Windows
Software: ROS (Robot Operating System)
Version Control: Git

Professional Activities

STEM Communication Club — 2018 - Present
Vice-President

Mississippi Machine Intelligence Collective — 2017 - Present
AI-Group Member

NASA Mining Robotics Competition — 2016 - 2017
Mississippi State Space Robotics Team

Air Force Research Laboratory Collaboration Program, Dayton, Ohio — Sept 2016
Presentation: Unmanned Air Vehicle (UAV) Multi-Agent Coordination

Frontiers in Applied and Computational Mathematics, Newark, New Jersey — June 2015
Thesis work at New Jersey Institute of Technology

Professional Experience

Camgian Microsystems, Starkville, Mississippi — May 2019 - Aug 2019
AI/ML Engineer Intern

Artificial Intelligence and Machine Learning Team

- As a member of the AI/ML team, worked on object detection, tracking and classification.
- Develop basic knowledge and strategies when working with common Machine Learning frameworks.
- Collaborated in maintenance of documentation, about this work, and strengthen programming skills in C++.

Mississippi State University, Starkville, Mississippi — May 2015 - Sept 2018
Graduate Research Assistant

Air Force Research Laboratory

- Use real-world geospatial database (OpenStreetMap) for generating graphs to evaluate K-RPP algorithms
- Test performance of machine learning algorithms to reduce 20% of work on search

Pacific Northwest National Laboratory

- Testing for algorithmic efficiency from custom library
- Topic modeling with R in high performance computing environment

Kean University, Union, New Jersey — Sept 2014 - May 2015
Graduate Asisstant for STEM-High Performance Computing

- Develop secular equations to explore effects induced on planetary systems (MATLAB)
- Assisted faculty and students with Kean's cluster and CAVE visualization facility
- Assisted students with tech support and laptop troubleshooting

Marshall University, Huntington, West Virginia — June 2012 - Aug 2012
Research Intern

- Developed algorithm for the construction of mates of certain squares
- Ran computational experiments with SSH and MPI library on (Big Green) cluster

University of Illinois, Champaign, Illinois — June 2011 - May 2012
Research Intern

- Implemented a Document Object Model (DOM) to read files in XML format (C++)

Technical Applications

Forecasting Cryptodata, Mississippi State University — Jan 2019 - May 2019
Data Science with R, Professor: Dr. J. Edward Swan II
Project Overview: The goal is to find a dataset and go through all of the stages of *The Data Science Workflow*

Key highlights and deliverables:

- Presentation and Written Report
- Dataset: `crypto` package to get current and historical market data
- Other packages: `"tidyverse", "lubridate", "tseries", "forecast" and "highercharter"`
- Technical skills: R(Rstudio), R Markdown and LaTeX

In this project, I developed skills essential to communicating insights gathered from the analysis of a dataset in the form of simple stories or visualizations. Furthermore, I learning the underlying structure and functions used in working with financial time series data in R. I will continue to analyze collected dataset beyond this project and findings will be share in Github

Accreditation for Informal Learning, Mississippi State University Jan 2019 -
Dig Sys in Engineering Education, Professor: Dr. M. Jean Mohammadi-Aragh May 2019
Project Overview: The goal is to conduct a literature review on blockchain driven works that aim to accredit informal learning

Key highlights and deliverables:

- Presentation and Written Report
- Technical skills: Python, Git and LaTeX

In this project, I am conducting a literature review that aims to map the full status of the *badge* movement and works that aim to accredit informal learning with the use of blockchain technology. Furthermore, I am developing a *literature tracker* in Python, essentially a database that tracks initial `.bib` references and updates variables that are used to input summary from papers such as *key idea, method, blockchain or informal learning related*. I will continue to code literature tracker and share code in Github

Team HUMO, Mississippi State University Aug 2018 -
Adv. Human-Computer Interaction, Professor: Dr. Cindy L. Bethel Dec 2018
Project Overview: The goal was to incorporate hands-on design, programming and evaluation of an interface for real-world interactive technologies. The HUMO project was an unique opportunity to take part in since it set itself apart from the projects offered from a *top 100 logistic company*

Key highlights and deliverables:

- Presentations (*multiple checkpoints throughout semester*)
- Technical skills: Git, Qt Creator, Android Studio, User Design and User Experience

In this project, I had the opportunity to take part in preliminary work for designing the interface for HUMO, a team that focuses on *Alhlete Engineering from The Ground Up*. The core focus was on designing and prototyping an interface for displaying measure ankle range of motion, force data and total work per steps inferred from the data. This project allowed to collaborate and interact with individuals from a wide variety of disciplines and ultimately added value to my learning pursuit and personal growth

Graduate Research Assistant, Mississippi State University May 2016 -
AFRL: UAV Working Group, Supervisor: Dr. Christopher Archibald Sept 2018
Project Overview: In this project, I took part in working on scheduling and path planning for UAVs (agents), specifically in the scenario (disaster-affected area) where we wanted to minimize the time it takes for exploring

Key highlights and deliverables:

- Presentation: *Unmanned Air Vehicle (UAV) Multi-Agent Coordination*
- Quartely Reports
- Technical skills: Git, Python, R(Rstudio), Pytorch and LaTeX

In this project, I had the opportunity to conduct research for the Airforce Research Laboratory Collaboration Program, in which I worked with R for extracting map information using `OpenStreetMap` package, coded clustering algorithms to compare performance to that of local search algorithms and explore the use of machine learning techniques for the development of an intelligent agent. This project allowed to collaborate and interact with individuals from a wide variety of disciplines and ultimately added value to my learning pursuit and professional growth

Profiling Project, Mississippi State University Aug 2017 -
Algorithms, Professor: Dr. Mahalingam Ramkumar Dec 2017
Project Overview: The goal was to develop algorithms and data structures for storing and querying dynamic `(key,value)` pairs and evaluate time and memory complexity vs number `(N)` of key-value pairs, as the database grows

Key highlights and deliverables:

- Presentation (*sorting algorithm*) and Written Report
- Technical skills: Python

In this project, I explored the use of different data structures (*Dict, Skiplist and Red-BlackTree*) in order to conduct a written report on the profiling time of insertion and query complexity. A random sequence generator was used to model the data and queries. As a result of this project, I was able to share my results and value the importance it is in choosing the right data structure, because not doing so may result in a negative impact on the performance for the problem in hand.

Computational Billiards Agents, Mississippi State University Aug 2017 -
Machine Learning, Professor: Dr. Christopher Archibald Dec 2017
Project Overview: The goal was to investigate and integrate machine learning techniques for the creation of a computational pool player (agent)

Key highlights and deliverables:

- Presentation and Written Report
- Technical skills: C/C++, Tensorflow and LaTeX

In this project, I took part in investigating different machine learning techniques that could be beneficial for the creation of a computational pool agent. In particularly, with the use of *FastFiz*, a Physics library and simulator, and previous work on *CUECARD*, a computational billiards intelligent agent, we develop the construction of our agent by two different approaches: supervised learning and unsupervised learning with the goal of having our agent lean how to play billiards by itself and conduct a performance comparison to that of *CUECARD*.

Q-Learning, Mississippi State University Jan 2017 -
Algorithms for Artificial Intellgience, Professor: Dr. Eric Hansen April 2017
Project Overview: The goal was to develop an understanding of Q-learning and simulate algorithm

Key highlights and deliverables:

- Presentation
- Technical skills: Git and Python

In this project, I developed my understanding of Q-learning, a reinforcement learning technique used in machine learning. Based on previous work from multiple sources and `Tkinter`, an GUI toolkit, I explored the influence of parameters in different grid world sizes. I was able to share my own variant of Q-learning and have open discussion on the underlying structure of the algorithm. Developed code and presentation is shared on Github

PUBLICATIONS

PEER-REVIEWED RESEARCH PAPERS

1 Megan Bryant, James Figler, Roger Garcia, Carl Mummert, and Yudhishthir Singh, The number of mates of latin squares of sizes 7 and 8, *Congressus Numerantium*, Vol. 217, pp. 53–64, 01, 2013. [PDF]

AWARDS

Alpha Chapter of Upsilon Pi Epsilon Honor Society in Computer Science
Mississippi State University, Mississippi, 2017

Louis Strokes Alliance for Minority Participation Scholar
Kean University, Union, New Jersey, 2013

New Jersey Center for Science, Technology and Mathematics Scholar
Kean University, Union, New Jersey, 2010

Ronald McDonald House Charities (RMHC/HACER) National Scholarship
Yankee Stadium, Bronx, New York, 2010

LANGUAGES

English and Spanish

CITIZENSHIP

USA

REFERENCES

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