

YS-9 — Quantum Game Theory

<https://qgtheory.info/>

CS 4850 - Section 01 – Spring 2023

April 29th, 2023



Christian Thomassy



Cody Lacey



Sean Curtis

Project Team

Roles	Name	Responsibilities	Email
Project Owner	Yong Shi (Project Owner)	Provide project details; act as a resource for specifics on deliverables; critique milestones and final projec	yshi5@kennesaw.edu
Team Leader	Christian Thomassy (Team Lead)	Documentation, Schedule Meetings	thomassycm@msn.com
Team Member	Sean Curtis	Coding and Developing	seanjcurt@gmail.com
Team member	Cody Lacey	Coding and Developing	clacey2256@gmail.com
Advisor/ Instructor	Sharon Perry (Advisor)	Facilitate project progress; advise on project planning and management.	Sperry46@kennesaw.edu

Overview

Quantum computing is a new type of qubit enabled computing paradigm based on the quantum properties such as superposition, interface and entanglement for data process and other tasks. It can be used to work on problems traditional supercomputers would not be able to handle efficiently. Classical game theory is a process of modeling that is widely used in AI applications. The extension of this theory to the quantum field is the quantum game theory. It can be a promising tool for overcoming critical problems in quantum communication and the implementation of quantum artificial intelligence. This project will begin with learning of quantum computing and game theory, then followed by the development of a system that applies quantum computing to game theory and analyze their performance.

Project website

<https://www.qgtheory.info/>

Final Deliverables

1. Research Paper- properly documented research conducted
2. Prototype- presentable model of research and testing conducted
3. Presentation
4. Website

Milestone Events

#1 - By March 17th

- Prototype Presentation

#2 - By April 14th

- Draft of Final Report

Deliverables

Research Concentration (Group)

Team Selection document (Individual)

Weekly Activity Reports (WARs - Individual)

Peer Reviews (Individual)

Project Plan (Group)

Present Prototype for Peer Review (Group – usually called Milestone 1 or M1)

Website (Group)

Video Demo (Group)

C-Day Application/Submission (Group – Bonus Points)

Final Project Report (Group)

Meeting Schedule Date/Time

Milestone Meetings: #1 March 17th

#2 April 14th

Group Meeting times:

5:30pm-8:00pm Tuesday, Thursday

10:30am-5:00pm Friday

Collaboration and Communication Plan

1. Google Colab (Coding Environment)
2. Github (Team Website)
3. Discord (Team Member Communication)
4. Teams (Team Owner and Advisor meetings)

Project Schedule and Task Planning

Project Name: YS-9 Quantum Game Theory		Report Date: 04/29/2023																																																	
Deliverable	Tasks	Complete %	Current Status Memo	Assigned To	Milestone #1				Milestone #2				Milestone #3				Final																																		
					02/01	02/10	02/17	02/24	03/03	03/10	03/17	03/24	03/31	04/07	04/14	04/21		04/28																																	
Research	Meet with stakeholder(s)	100%	Meet with Yong Shi	Team	1																																														
	Study Quantum Computing	100%	Continue to study while implementing	Team		6	6	5	1	1	1	1	1																																						
	Study Game Theory	100%	Continue to study while implementing	Team		6	6	5	1	1	1	1	1																																						
	Decide on Project Concentration	100%		Team				1																																											
Project Design	Define Tech Required	100%	Google Colab	Team				1																																											
	Platform	100%	Pennylane/Tensorflow	Team				1																																											
	Website Development	100%		Cody				2																																											
	Start Coding Implementation	100%	Coinflip, Prisoner's Dilemma, Survival of the Fittest, Tic Tac Toe, Monty Hall	Sean, Cody				3																																											
	Documentation/Deliverables	100%		Christian				2	2	2	2	2	2	2	2	2																																			
	Develop Prototype	100%		Sean, Cody					6	8	6																																								
	Finish Prototype	100%		Sean, Cody						6																																									
	Testing Prototype	100%		Sean, Cody							6																																								
Development	Review Prototype Design	100%		Sean, Cody									4																																						
	Rework Requirements	100%		Team								2																																							
	Document Updated Design	100%		Christian										3																																					
	Test Product	100%		Sean, Cody									4																																						
	Compare Performance to Classical	100%		Team											4																																				
Final Report	C-Day Presentation	100%		Sean													1																																		
	Poster Preparation	100%		Christian													2																																		
	Finish Website	100%		Cody													2																																		
	Presentation Preparation	100%		Team													3																																		
	Final Report Submission	100%		Christian													2																																		
					<table border="1"> <tr> <td>Total Hours (Weekly):</td> <td>1</td> <td>12</td> <td>12</td> <td>20</td> <td>10</td> <td>12</td> <td>16</td> <td>10</td> <td>10</td> <td>9</td> <td>6</td> <td>8</td> <td>2</td> <td colspan="3"></td> </tr> <tr> <td>Total Hours (Overall):</td> <td>128</td> <td colspan="14"></td> </tr> </table>														Total Hours (Weekly):	1	12	12	20	10	12	16	10	10	9	6	8	2				Total Hours (Overall):	128														
Total Hours (Weekly):	1	12	12	20	10	12	16	10	10	9	6	8	2																																						
Total Hours (Overall):	128																																																		

Version Control Plan

Maintain and utilize Google Collab for the Sr. Project; where all code is shared and run.