

Project: Connect 4

Team Members: Abhishek Bais, Haley Feng, Princy Joy, Shannon Phu

Team Lead: Shannon Phu

Summary: Connect Four is a two player game in which players select different colored circular pieces, take turns to drop them in a 6x7 grid. The first player to place four of their pieces consecutively in a row, column, or a diagonal line wins. A computer’s agent can learn to play Connect Four using reinforcement learning techniques, compete against human opponents and place pieces to win the game.

Timeline: 10/24/2021 -to-12/05/2021

SPRINT [1] BACKLOG 10/24/2021 - 10/31/2021											
ID	User Story	Tasks	Owner	Status	Estimated effort (man weeks)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
CF001	Research various RL techniques	Perform background research on playing Connect 4 using different AI approaches	All	Completed	1	1	0	0	0	0	0
CF002	Design the connect4 board, pieces and players to play and visualize the game	Implement the connect 4 game design	Shannon Phu	In Progress	1	0	1	0	0	0	0
CF003	Design a reusable framwork to play the game using different AI approaches	Refactor the game into classes, have it accept different AI approaches as game players, train players by battling each other	Abhishek Bais	Planned	1	0	0	1	0	0	0
CF004	Put in a baseline RL implementation for Connect Four	Implement MiniMax approach	Shannon Phu	Planned	2	0	1	1	0	0	0
CF005	Implement an action, value RL algorithm for Connect Four	Implement Q learning approach	Haley Feng	Planned	2	0	1	1	0	0	0
CF006	Implement a policy guided RL algorithm for Connect Four	Implement Monte Carlo approach	Princy Joy	Planned	2	0	1	1	0	0	0
CF007	Implement an action, value RL algorithm for Connect Four	Implement Sarsa learning approach	Abhishek Bais	Planned	2	0	1	1	0	0	0

CF008	Design a scheme to evaluate different RL players vs Random move player/ vs other RL players	Evaluate the results of a battle over 'n' games between an RL player and Random Move player, draw visual graphics	Abhishek Bais	Planned	0.5	0	0	0	0.5	0	0
CF009	Use evaluation metrics to iteratively improve qlearner algorithm	Fine tune qlearner hyper-params, re-evaluate results, capture best results	Haley Feng	Planned	0.5	0	0	0	0.5	0	0
CF010	Use evaluation metrics to iteratively improve sarsa algorithm	Fine tune sarsa hyper-params, re-evaluate results, capture best results	Abhishek Bais	Planned	0.5	0	0	0	0.5	0	0
CF011	Use evaluation metrics to iteratively improve montecarlo algorithm	Fine tune montecarlo hyper-params, re-evaluate results, capture best results	Princy Joy	Planned	0.5	0	0	0	0.5	0	0
CF012	Use evaluation metrics to perform sensitivity analysis for Qlearner, Sarsalearner	Perform sensitivity analysis by battling Qlearner, SarsaLeaer with Random Move player for different values of alpha, gamma	Abhishek Bais	Planned	1	0	0	0	0	1	0
CF013	Document the approaches taken, tabulate results, summarize findings in presentation, report	Prepare Final Presentation, Report and Give Demo	All	Planned	1	0	0	0	0	0	1

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Timeline:

10/24/2021 -to-12/05/2021

SPRINT [2] BACKLOG 10/31/2021 - 11/07/2021											
ID	User Story	Tasks	Owner	Status	Estimated effort (man weeks)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
CF001	Research various RL techniques	Perform background research on playing Connect 4 using different AI approaches	All	Completed	1	1	0	0	0	0	0
CF002	Design the connect4 board, pieces and players to play and visualize the game	Implement the connect 4 game design	Shannon Phu	Completed	1	0	1	0	0	0	0
CF003	Design a reusable framwork to play the game using different AI approaches	Refactor the game into class, have it accept different AI approaches as game players, train players by battling each other	Abhishek Bais	In Progress	1	0	0	1	0	0	0
CF004	Put in a baseline RL implementation for Connect Four	Implement MinMax approach	Shannon Phu	In Progress	2	0	1	1	0	0	0
CF005	Implement an action, value RL algorithm for Connect Four	Implement Q learning approach	Haley Feng	In Progress	2	0	1	1	0	0	0
CF006	Implement a policy guided RL algorithm for Connect Four	Implement Monte Carlo approach	Princy Joy	In Progress	2	0	1	1	0	0	0
CF007	Implement an action, value RL algorithm for Connect Four	Implement Sarsa learning approach	Abhishek Bais	In Progress	2	0	1	1	0	0	0

CF008	Design a scheme to evaluate different RL players vs Random move player/ vs other RL players	Evaluate the results of a battle over 'n' games between an RL player and Random Move player, draw visual graphics	Abhishek Bais	Planned	0.5	0	0	0	0.5	0	0
CF009	Use evaluation metrics to iteratively improve qlearner algorithm	Fine tune qlearner hyper-params, re-evaluate results, capture best results	Haley Feng	Planned	1.5	0	0	0	0.5	1	0
CF010	Use evaluation metrics to iteratively improve sarsa algorithm	Fine tune sarsa hyper-params, re-evaluate results, capture best results	Abhishek Bais	Planned	1	0	0	0	0	1	0
CF011	Use evaluation metrics to iteratively improve montecarlo algorithm	Fine tune montecarlo hyper-params, re-evaluate results, capture best results	Princy Joy	In Progress	0.5	0	0	0	0.5	0	0
CF012	Use evaluation metrics to perform sensitivity analysis for Qlearner, Sarsalearner	Perform sensitivity analysis by battling Qlearner, SarsaLearner with Random Move player for different values of alpha, gamma	Abhishek Bais	Planned	1	0	0	0	0	1	0
CF013	Document the approaches taken, tabulate results, summarize findings in presentation, report	Prepare Final Presentation, Report and Give Demo	All	Planned	1	0	0	0	0	0	1

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	pieces consecutively in a row, column, or a diagonal line wins. A computer’s agent can
	learn to play Connect Four using reinforcement learning techniques, compete against
	human opponents and place pieces to win the game.
Timeline:	10/24/2021 -to-12/05/2021

SPRINT [3] BACKLOG 11/07/2021 - 11/14/2021											
ID	User Story	Tasks	Owner	Status	Estimated effort (man weeks)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
CF001	Research various RL techniques	Perform background research on playing Connect 4 using different AI approaches	All	Completed	1	1	0	0	0	0	0
CF002	Design the connect4 board, pieces and players to play and visualize the game	Implement the connect 4 game design	Shannon Phu	Completed	1	0	1	0	0	0	0
CF003	Design a reusable framework to play the game using different AI approaches	Refactor the game into classes, have it accept different AI approaches as game players, train players by battling each other	Abhishek Bais	Completed	1	0	0	1	0	0	0
CF004	Put in a baseline RL implementation for Connect Four	Implement MiniMax approach	Shannon Phu	Completed	2	0	1	1	0	0	0
CF005	Implement an action, value RL algorithm for Connect Four	Implement Q learning approach	Haley Feng	In Progress	2	0	1	1	0	0	0
CF006	Implement a policy guided RL algorithm for Connect Four	Implement Monte Carlo approach	Princy Joy	In Progress	2	0	1	1	0	0	0
CF007	Implement an action, value RL algorithm for Connect Four	Implement Sarsa learning approach	Abhishek Bais	Completed	2	0	1	1	0	0	0

CF008	Design a scheme to evaluate different RL players vs Random move player/ vs other RL players	Evaluate the results of a battle over 'n' games between an RL player and Random Move player, draw visual graphics	Abhishek Bais	Completed	0.5	0	0	0.5		0	0
CF009	Use evaluation metrics to iteratively improve qlearner algorithm	Fine tune qlearner hyper-params, re-evaluate results, capture best results	Haley Feng	In Progress	0.5	0	0	0	0.5	0	0
CF010	Use evaluation metrics to iteratively improve sarsa algorithm	Fine tune sarsa hyper-params, re-evaluate results, capture best results	Abhishek Bais	In Progress	0.5	0	0	0	0.5	0	0
CF011	Use evaluation metrics to iteratively improve montecarlo algorithm	Fine tune montecarlo hyper-params, re-evaluate results, capture best results	Princy Joy	In Progress	0.5	0	0	0	0.5	0	0
CF012	Use evaluation metrics to perform sensitivity analysis for Qlearner, Sarsalearner	Perform sensitivity analysis by battling Qlearner, SarsaLearner with Random Move player for different values of alpha, gamma	Abhishek Bais	Planned	1	0	0	0	0	1	0
CF013	Document the approaches taken, tabulate results, summarize findings in presentation, report	Prepare Final Presentation, Report and Give Demo	All	Planned	1	0	0	0	0	0	1

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	human opponents and place pieces to win the game.
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SPRINT [4] BACKLOG 11/14/2021 - 11/21/2021											
ID	User Story	Tasks	Owner	Status	Estimated effort (man weeks)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
CF001	Research various RL techniques	Perform background research on playing Connect 4 using different AI approaches	All	Completed	1	1	0	0	0	0	0
CF002	Design the connect4 board, pieces and players to play and visualize the game	Implement the connect 4 game design	Shannon Phu	Completed	1	0	1	0	0	0	0
CF003	Design a reusable framwork to play the game using different AI approaches	Refactor the game into classes, have it accept different AI approaches as game players, train players by battling each other	Abhishek Bais	Completed	1	0	0	1	0	0	0
CF004	Put in a baseline RL implementation for Connect Four	Implement MiniMax approach	Shannon Phu	Completed	2	0	1	1	0	0	0

CF005	Implement an action, value RL algorithm for Connect Four	Implement Q learning approach	Haley Feng	Completed	2	0	1	1	0	0	0
CF006	Implement a policy guided RL algorithm for Connect Four	Implement Monte Carlo approach	Princy Joy	Completed	2	0	1	1	0	0	0
CF007	Implement an action, value RL algorithm for Connect Four	Implement Sarsa learning approach	Abhishek Bais	Completed	2	0	1	1	0	0	0
CF008	Design a scheme to evaluate different RL players vs Random move player/ vs other RL players	Evaluate the results of a battle over 'n' games between an RL player and Random Move player, draw visual graphics	Abhishek Bais	Completed	0.5	0	0	0.5		0	0
CF009	Use evaluation metrics to iteratively improve qlearner algorithm	Fine tune qlearner hyper-params, re-evaluate results, capture best results	Haley Feng	Completed	0.5	0	0	0	0.5	0	0
CF010	Use evaluation metrics to iteratively improve sarsa algorithm	Fine tune sarsa hyper-params, re-evaluate results, capture best results	Abhishek Bais	Completed	0.5	0	0	0	0.5	0	0
CF011	Use evaluation metrics to iteratively improve montecarlo algorithm	Fine tune montecarlo hyper-params, re-evaluate results, capture best results	Princy Joy	Completed	0.5	0	0	0	0.5	0	0
CF012	Use evaluation metrics to perform sensitivity analysis for Qlearner, Sarsalearner	Perform sensitivity analysis by battling Qlearner, SarsaLearner with Random Move player for different values of alpha, gamma	Abhishek Bais	Completed	1	0	0	0	0	1	0



CF013	Document the approaches taken, tabulate results, summarize findings in presentation, report	Prepare Final Presentation, Report and Give Demo	All	In Progress	1	0	0	0	0	0	1
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SPRINT [5] BACKLOG 11/21/2021 - 11/27/2021											
ID	User Story	Tasks	Owner	Status	Estimated effort (man weeks)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
CF001	Research various RL techniques	Perform background research on playing Connect 4 using different AI approaches	All	Completed	1	1	0	0	0	0	0
CF002	Design the connect4 board, pieces and players to play and visualize the game	Implement the connect 4 game design	Shannon Phu	Completed	1	0	1	0	0	0	0
CF003	Design a reusable framwork to play the game using different AI approaches	Refactor the game into classes, have it accept different AI approaches as game players, train players by battling each other	Abhishek Bais	Completed	1	0	0	1	0	0	0
CF004	Put in a baseline RL implementation for Connect Four	Implement MiniMax approach	Shannon Phu	Completed	2	0	1	1	0	0	0

CF005	Implement an action, value RL algorithm for Connect Four	Implement Q learning approach	Haley Feng	Completed	2	0	1	1	0	0	0
CF006	Implement a policy guided RL algorithm for Connect Four	Implement Monte Carlo approach	Princy Joy	Completed	2	0	1	1	0	0	0
CF007	Implement an action, value RL algorithm for Connect Four	Implement Sarsa learning approach	Abhishek Bais	Completed	2	0	1	1	0	0	0
CF008	Design a scheme to evaluate different RL players vs Random move player/ vs other RL players	Evaluate the results of a battle over 'n' games between an RL player and Random Move player, draw visual graphics	Abhishek Bais	Completed	0.5	0	0	0.5		0	0
CF009	Use evaluation metrics to iteratively improve qlearner algorithm	Fine tune qlearner hyper-params, re-evaluate results, capture best results	Haley Feng	Completed	0.5	0	0	0	0.5	0	0
CF010	Use evaluation metrics to iteratively improve sarsa algorithm	Fine tune sarsa hyper-params, re-evaluate results, capture best results	Abhishek Bais	Completed	0.5	0	0	0	0.5	0	0
CF011	Use evaluation metrics to iteratively improve montecarlo algorithm	Fine tune montecarlo hyper-params, re-evaluate results, capture best results	Princy Joy	Completed	0.5	0	0	0	0.5	0	0
CF012	Use evaluation metrics to perform sensitivity analysis for Qlearner, Sarsalearner	Perform sensitivity analysis by battling Qlearner, SarsaLearner with Random Move player for different values of alpha, gamma	Abhishek Bais	Completed	1	0	0	0	0	1	0

CF013	Document the approaches taken, tabulate results, summarize findings in presentation, report	Prepare Final Presentation, Report and Give Demo	All	Completed	1	0	0	0	0	0	1
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