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AA 228 Project Update

We are designing an agent for super smash bros melee that uses Q-learning with global approximation to generate an optimal policy to win a match. We define a state space and an action space to frame our problem.

1 State Space

Our state state space contains the following parameters

Non-binary:

- x_a - position of our agent
- y_a - position of our agent
- $\dot{x}_a$ - velocity of our agent
- $\dot{y}_a$ - velocity of our agent
- x_d - distance from our agent to opponent
- y_d - distance from our agent to opponent
- $\dot{x}_d$ - relative velocity from our agent to opponent
- $\dot{y}_d$ - relative velocity from our agent to opponent

Binary:

- Υ_1 - 1 if not off stage
- Υ_2 - 1 if agent has remaining jump
- Υ_3 - 1 if agent is facing the opponent
- Υ_4 - 1 if the agent in in an attacking state
- Υ_5 - 1 if the agent in in an blocking state
- Υ_6 - 1 if the opponent in in an attacking state
- Υ_7 - 1 if the opponent in in an blocking state

2 Action Space

Our Action space contains the following parameters to form a reduced set of possible inputs from a gamecube controller. We discretize the analog stick (used to control the movement of agent) and remove redundant inputs.

Non-binary:

- Ψ_1 - x position of the analog stick
- Ψ_2 - y position of the analog stick

Binary:

- Ω_1 - L
- Ω_2 - B
- Ω_3 - A
- Ω_4 - X