**Pokemon Trainer AI**

Goals

* The Pokemon Trainer AI will pick a composition of Pokemons and assemble them in a team to battle other Pokemon teams
* The Pokemon Trainer AI will engage in battle and try to knock out all enemy Pokemons and win the battle

Environment

* We will run the Pokemon Trainer AI in the 1st generation Pokemon game: Pokémon Red, Blue, and Yellow emulated in Pygame
* The Pokemon game consists of starting Pokemons, wild Pokemons, and enemy trainers to battle
* A leveling system such that Pokemons will get experience after the battle and eventually level up and become more powerful
* An evolution system that allows Pokemons to evolve into the next generation and become more powerful
* A stats system that indicates Pokemon’s attack, defense, speed, and HP
* A move-set system that allows Pokemon to have 4 moves in its skill set to use during battle. The Pokemons can learn new moves to replace old moves
* A PP system that limits moves to a certain number of usage
* A type system that has counter mechanics such that a certain type will deal more or less damage to another type
* A status system that buffs or debuffs Pokemons during battle
* A turn system that has each Pokemon act once (higher speed Pokemon act first) each turn
* Items that boost Pokemons, heal Pokemons, and capture Pokemons
* Facilities (Hospital, Shop, Dojo)
* A weather system that has positive or negative effects on Pokemon during battle

Adaptation

* The AI will pick an optimal composition of Pokemons given the opponent’s team composition, the Pokemon type-counter mechanic, and the Pokemon stats, strength, and weakness
* The AI will command Pokemon to use the move that maximizes damage (type counter mechanic is being considered) that will maximize the probability of winning
* The AI will alter the order of Pokemon in play to maximize the chance to win a battle
* We will use damage dealt as a measurement to train AI
* AI wants to deal maximum damage to enemy Pokemon within the least amount of turns

Extra

* We will limit the number of Pokemons to 151 of the first generation game Pokémon Red, Blue, and Yellow database
* We will also limit the number of moves of the Pokemon to 165 of the Pokémon Red, Blue, and Yellow database
* We will also set every Pokemon (evolved or not) to level 50 and their move-set at lv 50 to create balance in combat (so level, evolution, and stats is similar between Pokemons)
* So far we have emulated a 1 vs 1 combat in Pygame and we will train AI on 1 vs 1 Pokemon only instead of 6 vs 6 team combat for simplicity
* We will neglect items, weather, and status to simplify the combat process
* We are considering using neuro-nets or RBES to program the AI
* We are setting the accuracy of every move to 100% to simplify the damage calculation algorithm
* Due to AI getting trained in combat, we will probably neglect the facilities and Pokemon game world. We will just focus on the combat section of the Pokemon game