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Machine Learning  
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## GA Semester Project Proposal

### Description of the Problem Domain

Our problem domain will be in the *Pokémon* battle system. *Pokémon* is a game in which you build a team of creatures called Pokémon which you use to battle other players (called “trainers”). Each Pokémon has a type, a move-set (containing 1-4 different moves). Each move does something different (some deal damage, boost stats, etc.). Each move also has its own type.

#### Types

There are 18 different types. Typing is important when it comes to dealing damage to other Pokémon, because certain types are stronger/weaker than (or completely ineffective against) other types.

#### Goal

The goal in each battle is to reduce the HP of every Pokémon in your opponent’s party to 0. Once accomplished, you win the battle.

### Description of Our Specific Problem

The specific problem we will be trying to solve (and will be experimenting against) is the problem of selecting a team of Pokémon with the right move-sets to battle against a pre-selected gauntlet of opponents. This team should be able to battle all opponents in sequence and emerge victorious.

### Description of Our Genetic Solution

Our solution will be in two parts: building the team and using the team. To build the team, we will use a genetic algorithm that will attempt to assemble the best possible team (complete with optimal move-sets) to compete with the pre-selected opposition. The population should converge on a team of six Pokémon that are especially effective against the Pokémon we selected to battle with.

The second part of the solution will be using genetic programming to build the logic of how to use the team. Once the team has been assembled, we will run this team through a genetic programming algorithm that will attempt to determine how to best use the team against the opposition. Given the different factors at play during battle (the type of the opponent’s current Pokémon, the moves your Pokémon can use, the other Pokémon in your party, etc.), the algorithm should be able to determine what best to do in any given situation.