CSC 490 – Senior Project

9/24/18

# Project Vulpix

# I.  Introduction

When most people think of Pokémon they associate it with the Gameboy games of their childhood or the wildly popular Pokémon Go.  The Pokémon Trading Card Game (PTCG) is a card game created by Game Freaks and The Pokémon Company in 1996.  The game was initially very popular. While its popularity waned slightly over the years, it has enjoyed a renaissance over the past few years. It has sold over 20 billion cards worldwide to date. Initially conceived for children, people of all ages enjoy the game; some at a very high level of competition. With a thriving competitive scene, thousands of competitors gather at tournaments in major cities and small towns alike. These tournaments range from casual 'leagues' where new players can cut their teeth learning basic strategies, to the world championships where the best players all over the world come to try and prove their skills. Unfortunately, most of the larger events are in places that many players can't attend. These players have difficulty continuing to improve without consistent access to stiffer competition. The Pokémon Company tried to alleviate this by creating an online client, Pokémon Trading Card Game Online (PTCGO), that allows people to play against others all over the world.

# II.  Motivation

Despite PTCGO being a great client, not many professional players use the service. Without the skill of the professional players, most isolated players will have a hard time practicing against better competition. That is where our project comes in. We want to make high level gameplay more accessible for players all around the world.

# III.  Objectives

a.  We will create and train an artificial intelligence to play the game at a competitive level.

   This will allow everyone the opportunity to practice against better competition.

b.  Our AI will be able to develop strategies and decks to help turn the meta.

# IV.  Features

a.  **Playing the game**

   a.  *Turns*

      i.   What the player can do during turns (i.e. attack, attach energy)

      ii.  Limits of each action (i.e. 1 Supporter played per turn)

   b.  *Win Conditions*

      i.   The program needs to know how to win the game

         1.  Deck out (run opponent out of cards)

         2.  Take all prizes

         3.  Eliminate all opposing Pokémon on the field

   c.  *Attacking*

      i.   What are the attack costs?

      ii.  Can it get a knockout?

      iii. Can/Should the program target a different Pokémon

      iv.  Effects of attacks (i.e. poison, confusion)

   d.  *General Play States*

      i.   Determine when cards should be played (i.e. sequencing)

b. **Reading Cards**

    a. ***Should be able to read the following from the game***:

        i. Cards in hand

        ii. Number of cards in hand (Both player and opponent)

        iii. Pokemon on bench (Both player and opponents)

        iv. Number of Pokémon on bench

        v. Active Pokemon

        vi. Defending Pokémon

        vii. Status effects on the Pokémon

        viii. Discards

        ix. Stadiums

    b. ***Should be able to determine what the card is using Tensorflow.***

    c. ***Looks up cards in a database or reads from the card to determine stats.***

        i. Name

        ii. HP

        iii. Attacks

        iv. Type

        v. Effects of attacks

        vi. Attack Cost

        vii. Retreat Costs

        viii. Is it a supporter

        ix. Is it an item

        x. Is it an energy

        xi. Is it a stadium

    c. **Informed Decision**

        a. ***Use probability to determine what cards to use and when***

            i. If you need an energy and you have two cards in your hand that can be used to draw cards, determine what card gives you the better chance to draw an energy and play that.

# V. Team

    a. Chris Crisson - Training Lead - Computer Science

    b. Andrew Siddall - Implementation Lead - Computer Science

    c. Adlene Bellaoucha - Design Lead - Computer Science

    d. Matthew Bedellion - Testing Lead - Computer Science

# VI. Implementation

    a. Python 3 – Currently a popular language for machine learning

    b. Tensorflow - A python 3 library used for machine learning

    c. Web scraping - To create a database of cards for the machine.

    d. Pokémon Trading Card Game Online - The client the AI will interact with