Project Proposal

**Problem**

The problem I intend to solve is the difficulty of long-term weight loss. Many people believe that they can lose weight simply by starving themselves or exercising vigorously in a short period of time. However, researchers have shown that these techniques cause people to regain the weight in the long-run (Korkeila et al., 1999). Although there are short-term benefits of dieting, most people want to keep the weight off for good.

**Solution**

There are people, though, who are able to keep off the weight after dieting. Pagoto and Appelhans (2013) found that a change of lifestyle is the most effective way to “diet,” per se. This would mean that people need to continue to eat as if they are on a diet for as long as they wish to keep the weight off.

Here is where my solution comes into play. Most people break their diets because they’re unhappy with it. So, I propose to create a lifestyle app that helps people choose what to eat (or how to workout) and incorporate happiness as a factor.

*Why it’s different and innovative— Utility Algorithm and ML Adaptability*

The power of Deciduo’s algorithm is its ability to understand that more food/exercise does not necessarily equate to more happiness in the long run. The utility function adapts to individual users using machine learning. Here is a simple example: suppose you want cake for dessert, and your main course is a salad. Deciduo will consider how happy that cake will make you, and it will tell you how much to eat in order to stay temporarily satisfied but not feel guilty later on. The same goes for exercising— if you exercise for too long one day, you’ll feel unhappy if you don’t exercise the same amount the next day.

*Utility function—how it works*

I let people rate how happy foods or exercises make them on a scale. I also consider factors such as how important it is for them to be satisfied from the meal/workout and how important it is for them to enjoy this meal/workout. I then estimate parameters for a utility function using a specific formula that I generated. From there, I ask for their constraints (maximum calories/money etc.). Using Legranage optimization, I calculate the optimal amount of food or exercise they should eat/do as well as which foods/exercises are the best.

My utility function is an equation that assumes each additional consumption of a good has a lower net gain in utility than the last. For example, your first hamburger will make you happier than your second. Or, running for too long will eventually make you unhappy. By maximizing the utility function (or happiness) given the constraints, people can stay on their diet while remaining happy. People can maintain a happy lifestyle because they are able to make the choices that provides them the most pleasure.

**Necessary Modules**

I will be using pygame to run the animation. I will also use brenth from scipy.optimize as a non-linear systems of equations solver. I will also use matplotlib for graphing.

**Breaking project down into different tasks**

I will have the following files:

• Databases

• Music and fonts

• The math

• Animation

My math will be broken down by food or exercise. From there, it will be broken down by utility function, constraints, and questions.

My animation will all be in the same files, except for graphing. I plan to break up the animation by page, and by food/exercise.

**References**

Korkeila M, Rissanen A, Kaprio J, Sorensen TI, Koskenvuo M. Weight-loss attempts and

risk of major weight gain: a prospective study in Finnish adults. American Journal

of Clinical Nutrition. 1999;70:965–75

Pagoto, S.L.; Appelhans, B.M. A call for an end to the diet debates. JAMA 2013, 310, 687–688.

**Update 1:**

I added a suggestion for searches in both the food and exercise searches. Other programs did not have these suggestions.