

Project Proposal: Using Image Recognition to Solve "Who's That Pokémon?"

Kyle Rossi

The topic for my Junior I.S. will focus on using image recognition technology and convolutional neural networks to determine if a program will be able to correctly guess the silhouette of a given Pokémon. This is inspired by the classic "Who's That Pokémon" skits that appeared during the first season of the Pokémon animated series, where the silhouette of a Pokémon would be given and viewers would be given a few seconds to try and guess the Pokémon (See Figure 1). Instead of using real people, I want to teach my software to recognize 10 to 12 different Pokémon and see if it can correctly guess their silhouettes.

My first source, *Python Machine Learning By Example, Third Edition*, is aimed to help me understand the world of machine learning; something I was not familiar to prior to this project [1]. It is also very important that this book looks at machine learning in Python, the language that I wish to use for my piece of software. Overall, the book has a total of fourteen chapters, although I do not intend to use all of the chapters. Instead, I plan to focus on chapters one through three and eleven through fourteen, as they look to be the most appropriate for my project.

My second source, *Learn TensorFlow 2.0*, will help me understand TensorFlow—one of the most critical components of this project [2]. TensorFlow is a popular open-source software library that is used for machine learning and focuses on deep neural networks. This book in-particular features many easy-to-understand diagrams and explanations, spread out over six chapters. I plan to mainly focus on chapters one through four, as they seem to be the most relevant for my project.

My third source, *Deep Learning Applications, Volume 3*, investigates some of the recent applications in deep learning and the variety of deep learning techniques that exist [3]. Like my first source, this book also uses Python software and code. This book also dedicates time to convolutional neural networks, another important component of this project. There are a total of twelve chapters in this book, but I plan to only look into chapters eight and twelve. However, some of the other chapters—such as chapter five and eleven—could be useful for discussing the challenges of deep learning.

Attached to this document is my software outline. My piece of software will be developed in Python and consist of a single main screen with a variety of different buttons. The user will have to do very little; simply choosing a file to upload. Most of the action will go on behind the scenes. The user will press a button when ready, and the software will do its best to determine which Pokémon is best represented by the silhouette. Depending on how much time I have left, I would like to try and include extra features, such as a "Streak" of how well the software is doing and the "Best" time the software took in figuring out a Pokémon.

The main goals of my work are to learn more about image processing and deep learning, build upon what I have already learned in Python, and to, of course, figure out if I can design a piece of software that can decipher a Pokémon from just its silhouette.

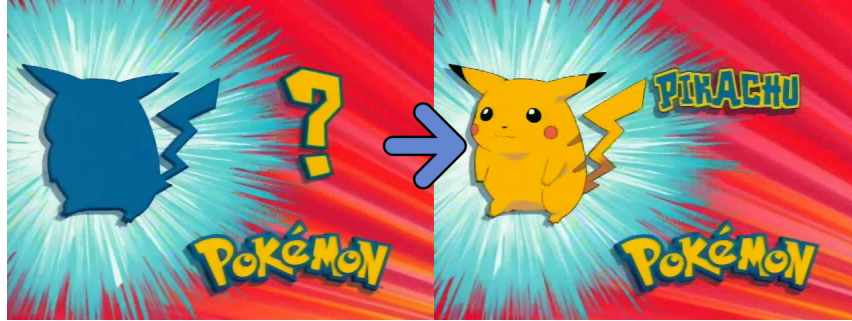


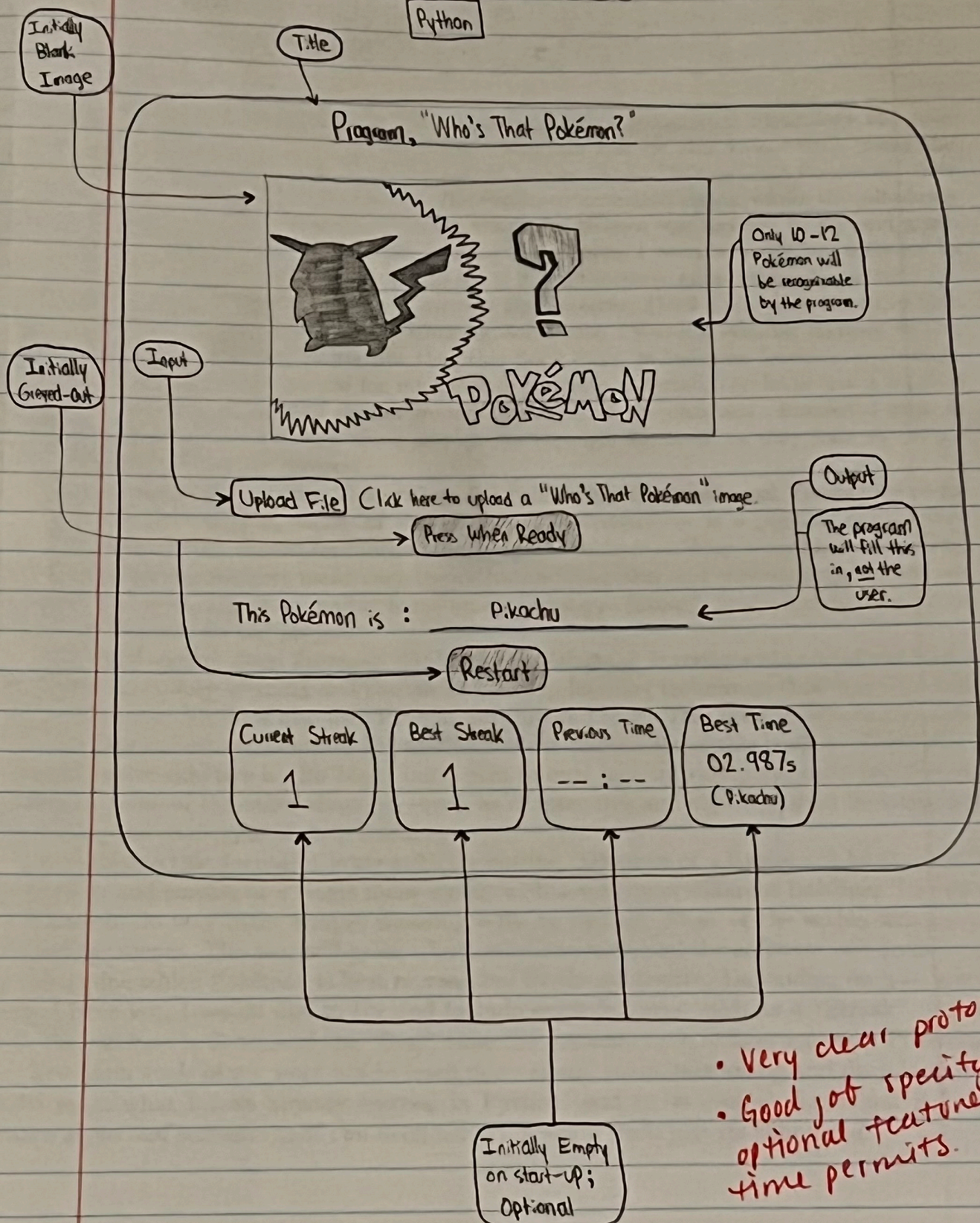
Figure 1: (Left) An example “Who’s That Pokémon” silhouette. (Right) The “reveal”.

References

- [1] Y. H. Liu. *Python Machine Learning By Example, Third Edition*. Packt Publishing, 2020.
- [2] P. Singh and A. Manure. *Learn TensorFlow 2.0*. Apress, 2020.
- [3] M. A. Wani, B. Raj, F. Luo, and D. Dou. *Deep Learning Applications, Volume 3*. Springer Singapore, 2022.

Junior I.S. Software Prototype

Due: 2/25/22
Kyle Rossi



- Very clear prototype!
- Good job specifying optional features if time permits.