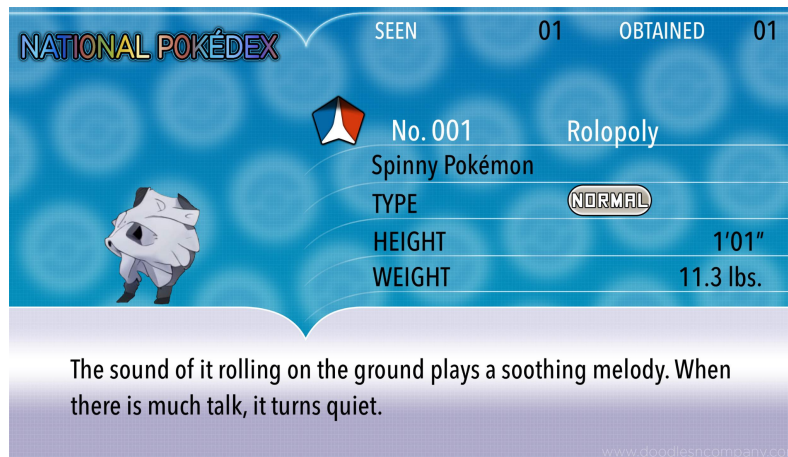


Full Pokedex Entry Generator



Group 8

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Description

Our final project is an expansion of Project 3, in which we generated Pokedex entries that contain small descriptions about a Pokemon's attributes, habits or activities. In our final project, we decided to expand and create the entire Pokedex from the *Pokemon* series. This includes an image of the Pokemon, the description (what we generated in Project 3), a height, weight, and type of the Pokemon. Therefore, our final project involved generating Pokedex entries by having a text generator generate a pokemon type, weight, height, and description, and then feeding this to an image generator to create an associated image and combining it all together in an appealing visual format. We were able to create good quality Pokemon images that were mostly related to the prompts we gave, although at times may not fully match their height and weight.

Concept

The Pokedex entry is a player's first introduction to many of the creatures found in the Pokemon games. They contain useful information such as the Pokemon's type, physical attributes, and descriptions of its behavior and habits. Many of these entries have even gone viral for their cuteness, silliness, or irreverence. By generating entries that are similar to the Pokedex entries to the game, we hope to capture some of the iconic elements of the Pokedex entries and replicate them with our generator.

Technique

For this multimodal project, we decided to use the same GPT-2 algorithm as Project 3 to generate our text, but instead of a dataset simply consisting of blurbs describing Pokemon, each entry in our dataset consisted of a Pokemon type, a weight, a height, and a description of the Pokemon. The notebook used to generate these holistic pokedex entries was a copy of the Fine Tuned GPT-2 notebook and the dataset was handmade, mapping each pokemon in a Google Sheets to a type, weight, height and multiple pokedex entries. At first our dataset only included one description per Pokemon, but decided it would be better to have a larger dataset. Therefore, we went back to our original 6500 entry dataset we used in Project 3, but with the additions of type, height and weight. Although this can create bias in the data as older Pokemon will have more Pokedex entries, we believed that having only 900 entries was too small.

To generate the images we first used the DALL-E Pytorch notebook. We finetuned it with a dataset that mapped images to Pokemon and also mapped descriptions to Pokemon, and gave it a description in order for it to output an image. After those attempts ended in failure, we used the ruDALL-E notebook. We input descriptive generated Pokedex entries and had ruDALL-E output images after being fine tuned. We picked the outputs that best fit the given prompt to display as our results, and edited them using a digital art program to have our generated Pokemon appear like it came from a Pokedex entry in the game.

Process

We created our text-image pairs by picking the most descriptive Pokedex entries for each Pokemon and pairing it with the official artwork for the Pokemon. This gave us exactly 898 text-image pairs to work with. At first, we tried using DALL-E in Pytorch to generate our images. We attempted to train it using pre-existing models but ran into some compatibility issues between the model and the code that wouldn't allow us to continue training off of the model. As a result, we ended up creating our own models. For our first model, we paired Pokedex entries and images from 898 Pokemon and trained our model for 20 epochs.



“In battle, it throws eggs at high speed, with a sudden and shockingly high rate of success.”

These results we produced did not look like Pokemon. They did not have any details and did not seem to have any correlation to the text input.

To try and get results that would be more related to the Pokemon type, we tried pairing Pokemon types and images from 898 Pokemon and trained our model for 20 epochs, but this was similarly ineffective.



“Fire/Poison”

Since our results from running DALL-E Pytorch were not very successful at creating a Pokemon-like image, we decided to try a different implementation of DALL-E, ruDALL-E. We used the Looking Glass v1.4 notebook for this. The main reason for this was that this Colab notebook included a pretrained model that we could use to fine-tune, unlike with the Pytorch DALL-E. For this notebook, we had to translate our Pokedex entries into Russian. After running fine-tuning for 3 epochs, we were able to get an image with a similar art style to Pokemon.



“In battle, it throws eggs at high speed, with a sudden and shockingly high rate of success.”

While the images generated were not always correlated with the text, we were finally able to generate something that could almost pass as a Pokémon.

Now that we had our image generation figured out, we had to change our text generation so that they do not generate only the description for the Pokémon. We typed out by hand a Google Sheets that maps each Pokémon to a type, height, weight, and description and then generated text using these entries as the dataset. We then ran the notebook for 500 epochs and the results were promising.

```
Normal/Fairy, 12, 2.2, It has a very delicate body. It can be seen running around with its tongue out. It usually wears its full-grown lifeform out
Dragon/Flying, 77, 6.6, It's said that Dragonite come bearing the wings of their favorite Pokémon. The wings are then used to fly around like wings
Grass/Psychic, 83, 130, Its aroma smells so delicious it's used for a thousand years. The stalk on its head is known as a mushroom'.
Normal/Ghost, 63, 70.5, A GENGAROX's shell is rich in toxic substances. If it is exposed to heat, the shell gradually becomes moldy.
Bug, 51, 88.2, Goldeen is very territorial. If one of its fingers gets tangled up, it leaves the whole thing hanging with a splintering motion. That
Water, 12, 8.4, When its tail is raised, the air expands sharply. If it is attacked, it moves steadily until it reaches the very bottom of the ocean
Psychic, 51, 124.6, When attacked by a large enemy, its eyes snap shut so that it can only see with the telekinetic capabilities of the enemy.
Rock/Ground, 168, 518.1, Poliwrath is said to have grown tall to serve as a training ground for its geologists. It has gained popularity because of
Fire, 51, 98.1, The fire inside its body flares with the fragrance of life. The flame can be seen as an object in a streetlight.
Fire, 39, 66.1, An adult Poliwrath is full of happiness. But it's said to use its nine tails for fire's defense. If it burns down a mountain, its fl
Water/Flying, 256, 518.1, From birth, its wings are always brimming with soot, so it is very adept at flapping its wings.
Water, 31, 73.4, It is said to have been created with the core of a dinosaur. The core contained the core.
Bug/Poison, 51, 0.2, It usually stays in places where people's trash becomes common. As a result, it is easily torn up.
Grass, 39, 70.5, One large leaf can be grown and planted on any soil. People eat the leaf just for beauty.
Water, 51, 77.7, Their bodies are so heavy, they can withstand even heavy waves. They swim at an astounding speed.
Water, 12, 8.8, The tail is covered like a beautiful cloak, and it cannot be seen. Even the faint light of the moon can be seen.
Electric, 20, 19.8, A Pokémon from antiquity has been linked to mystical powers, but many experts disagree.
Normal/Flying, 43, 66.1, The body is extremely soft. When you touch it, the surface of the fur on its back feels soft and soft and doesn't move.
```

The problem was that the current dataset we were using only utilized one description per Pokémon, so we only had 898 entries in our dataset. To remedy this we went back to our old dataset from Project 3 that had multiple entries per Pokémon and mapped all 6500 descriptions to a type, weight, and height for the corresponding Pokémon. We tried generating entries again with 500 epochs with this new larger dataset to similar success.

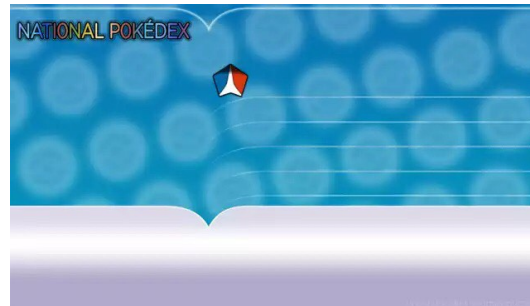
Psychic, 51, 124.6, It can tell the time of day even when it comes to making its nest. The moonlight will not obstruct th
 Normal, 13, 11.3, The sound of it rolling on the ground plays a soothing melody. When there is much talk, it turns quiet.
 Fire, 55, 110.4, It uses its horn continuously to hunt for prey. If it spots someone with an injury, the fire will go up in a blaze.
 Water, 39, 65, It has a thick hide. Its body constantly inflates as it walks. It can withstand severe attacks from all types of foes.
 Fire, 43, 76.1, Its fire breath is outstanding at keeping its enemy at bay as long as possible. If it becomes enraged, it will explode at the last
 Electric, 20, 22.9, It is a very docile Pokémon that appears to train by shooting electricity at the targets it touches.
 Water, 51, 132.3, It swims slowly by lifting and dropping rocks with ease. Its graceful movement makes opponents nervous and prepares it for battle
 Psychic/Fairy, 51, 88.1, A Pokémon that appears to be children. It is said to be the reincarnation of a king.
 Rock/Flying, 71, 130.1, An abnormal form of flying. It stands without form while flying.
 Grass/Poison, 39, 13.3, This Pokémon uses its long, heavy leaves to support itself in any weather, even if the surrounding soil becomes excessively
 Poison, 43, 66.1, While attacking, it emits a weak, poisonous gas that causes pain instantly. If this Pokémon thinks it has made an enemy, it won't
 Water, 24, 27.3, It uses its powerful vines to pick up prey. When it goes into overdrive, its vines grow larger and stronger.
 Electric, 31, 29.3, It has a very hard shell with strong, thick claws that dig deep into the fossil world.
 Fairy, 10, 6.6, It lives in snowy mountains and caves, where it sleeps quietly. It is extremely timid.
 Ghost/Poison, 39, 65, A MAROWAK's weak sense of smell is sufficient to cause paralysis. It's also incapable of distinguishing what it smells from o
 Poison, 39, 66.1, If you see anything like an STAB, it's probably something else. Stabby's presence could cause poison gas to fall from the sky, bl
 Electric, 31, 22.9, If it senses danger, it will run around freely to avoid it. It is extremely docile.
 Fairy, 51, 88.2, Even if it is asleep, those fluffy ears on its head continue to live and grow strong.
 Ghost/Poison, 36, 16.5, If one of its horns becomes lodged in its body, its internal organs explode, sending it flying back to its shell.
 Poison/Ground, 31, 76.1, There are a number of legends surrounding this Pokémon. They tell that it was created by a malfunctioning plant.
 Fairy, 51, 88.2, Once one of its ears is removed, this Pokémon remains static for 24 hours. It always uses its long and proud fangs.
 Ground, 8, 1.8, Its feet have three toes. When it moves, it uses its long gait and sharp claws to dig through the stone.
 Normal, 12, 14.3, It is rarely seen in the wild, but in the mountains above it, there are often ferocious races fighting.

Now that we had the text and image generation working, we set to making our Pokedex entries in order to have presentable results. We gave ruDALLE some of our generated Pokedex entries in order to generate images for the corresponding Pokemon.



“Its aroma smells so delicious it’s used for a thousand years. The stalk on its head is known as a mushroom.”

Once we had generated multiple images that fit with the Pokedex descriptions, we then formatted them to look like actual Pokedex entries. We found an empty Pokedex entry template, and found a font to use, as well as the different type icons. We used a digital art program to edit out the background of the generated images, and input all of the information we generated. A name and classification were created by us, as these are unique to each individual Pokemon, and would have been difficult to generate from our dataset that would fit the Pokedex descriptions. The final results can be found in the corresponding subsection.



Empty Pokedex entry template

Reflection

Many of the issues we faced at the beginning of our project were due to the nature of our dataset, similar to the Animal Crossing dataset from Project 2, we had a very limited amount of Pokedex entries to fill out our dataset, so even using every single possible non-duplicate Pokedex entry, the size of our dataset was smaller than ideal. The first DALL-E Pytorch notebook we used was not able to generate images with a resemblance to Pokemon, instead outputting blobs. If we had spent less time trying to fit our dataset to the notebook or change parameters in search of better results with DALL-E Pytorch, we would have had more time to work with ruDALL-E and generate even better visualizations. We also could have found a more efficient way to map each Pokemon to a type, height, and weight instead of inputting them all by hand, such as an API. The output images were reasonably correlated to the inputted descriptions, but it is possible that with more finetuning there could have been an even better correlation between the two.

RESULT

NATIONAL POKÉDEX

SEEN 01 OBTAINED 01

 No. 001 Rolopoly
Spinny Pokémon

TYPE NORMAL

HEIGHT 1'01"

WEIGHT 11.3 lbs.

The sound of it rolling on the ground plays a soothing melody. When there is much talk, it turns quiet.

www.doodlesncompany.com

Rolopoly, the Spinny Pokemon

NATIONAL POKÉDEX

SEEN 01 OBTAINED 01

 No. 002 Throom
Fungus Pokémon

TYPE GRASS PSYCHIC

HEIGHT 6'11"

WEIGHT 130.0 lbs.

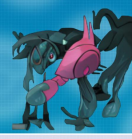
Its aroma smells so delicious it's used for a thousand years. The stalk on its head is known as a mushroom.

www.doodlesncompany.com

Throom, the Fungus Pokemon

NATIONAL POKÉDEX

SEEN 01 OBTAINED 01

 No. 003 Voltam
Static Pokémon

TYPE ELECTRIC

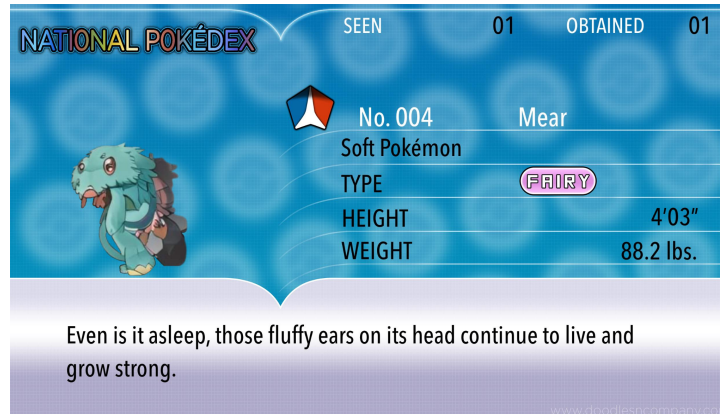
HEIGHT 2'07"

WEIGHT 22.9 lbs.

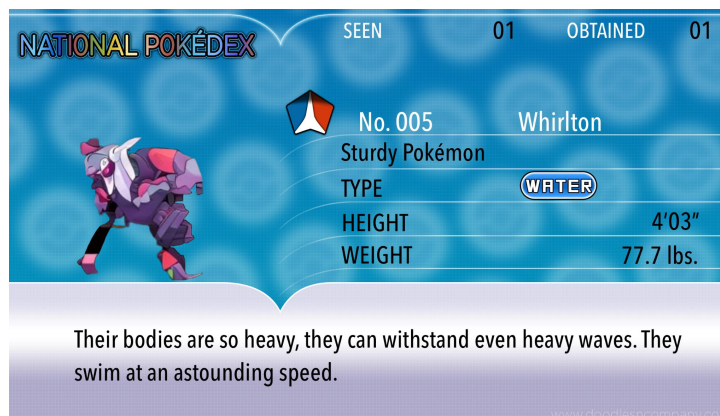
If it senses danger, it will run around freely to avoid it. It is extremely docile.

www.doodlesncompany.com

Voltam, the Static Pokemon



Mear, the Soft Pokemon



Whirlton, the Sturdy Pokemon

All other results can be seen in the Google Drive folder below:

<https://drive.google.com/drive/folders/14bXFnPhBqZENU5thqISpSDwJ33Nv0wms?usp=sharing>

CODE

The link to the dataset we used (PokeAPI) can be seen here:

https://github.com/PokeAPI/pokeapi/blob/master/data/v2/csv/pokemon_species_flavor_text.csv

The code we used for text generation can be found here:

https://colab.research.google.com/drive/1smnWUdNi4oksyWp8DF1_fKE06QiXvpt9?usp=sharing

The code for ruDALL-E can be found here:

https://colab.research.google.com/drive/12_85FTdbVjHyWNYZbhbNPZCcfAFdTbb2?usp=sharing

The code for DALL-E Pytorch can be found here:

<https://colab.research.google.com/drive/1DhWJDdIBwxKeeO3kl5QIIIauNyjkiNtJ?usp=sharing>

The Pokedex Entry Template can be found here:

<https://imgur.com/a/AW6B6>