# Chatbot Project

# Introduction:

Welcome to “Squeakers” the dog chat bot! Squeakers has a lot of love and knowledge for dogs.

Squeakers remembers your favorite dog breeds and all the dog breeds that you asked questions about. You can also ask Squeakers to teach you a trick! Squeakers will remember the tricks that you guys have learned together. Furthermore, you can ask Squeakers specific information (grooming, markings, color, diet, etc.) about any dog breed (golden retrievers, corgis, poodles, terriers, hounds, etc.)

# Getting Started:

There are **two** .py files you have to run in the command line for the project to work.

First, run **python training.py**

This trains the chatbot using neural networks.

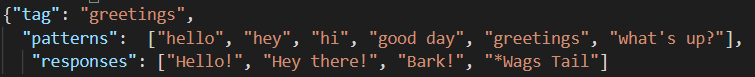
Then, run **python chatbot.py**

Squeakers will ask you for your username, and from there you can chat!

\*If there is some dependency missing that prevents a successful compile, please run **npm install <dependency name>**. I don’t think you should have to do this, but I don’t particularly remember if I installed anything first so please help me out here with a possible npm installation or two.

# System Description and Logic:

The chatbot is trained on an intents.json file using neural networks. The intents.json file has the following format:



There are many tags, each indicating a possible thing that the user could want to ask or indicate. For example, all of the responses above like “hello”, “hey”, “hi”, etc. are things that the user could say that would simply indicate a greeting. The responses are possible things that I would want my chatbot to respond. For some tags, there is only a single response (such as when the user asks about a fact). When there are multiple responses, one of them is chosen at random.

This intents.json file is first tokenized ((**NLTK concept**) and lemmatized (**NLTK concept**) and separated into different classes and documents. The documents are separated into bags of words (**NLTK concept**) arrays. These bags of words are what are fed to the neural network.

The training spits out a model, which is saved as a file. This file is loaded in the chatbot.py file, basically the main file where the chatbot is run.

For every input a user enters, the code cleans up the sentence by tokenizing (**NLTK concept**) and lemmatizing (**NLTK concept**) the user input, and then converting that cleaned up input into a bag of words (**NLTK concept**). The model is used to predict which tag the user input is most likely to match. Given the tag, we then call the get\_response() message which uses logic to either return a response, or figure out the breed of the dog and the fact asked about from the user input the best it can and then return the fact about the breed.

# Diagram of Logic:

Diagram

Description automatically generated

# Sample Dialogs:

There is some excess printing going on in between the user input and chatbot response… this is due to the model.predict() method printing some extra info, I couldn’t figure out how to get rid of it so please just ignore this :)

Text

Description automatically generated

I had chatted with my bot previously with the username ‘Craig’ (those chats aren’t shown, so it remembers info that isn’t shown here). This is how that went again!

Text

Description automatically generated

# Knowledge Base Appendix:

<https://www.akc.org/dog-breeds/> was supposed to be the source of my knowledge base. I successfully scraped a list of all the dog breeds from the site, and the plan was to scrape the information of the breed’s summary, health, grooming, exercise, training, and nutrition off of the site (these are all specific categories given for every breed), but the akc site was not being very scrape friendly. Because I am a CS student with a small amount of pride, I didn’t spend 4 hours going in manually to the page of every single breed and copy and pasting the information manually into a knowledge base. I will figure this part out later.

Anyways, this is what the knowledge base would have looked like for the first breed, Affenpischer (<https://www.akc.org/dog-breeds/affenpinscher/>) :

**Summary:** Loyal, curious, and famously amusing, this almost-human toy dog is fearless out of all proportion to his size. As with all great comedians, it's the Affenpinscher's apparent seriousness of purpose that makes his antics all the more amusing.

The Affen's apish look has been described many ways. They've been called 'monkey dogs' and 'ape terriers.' The French say diablotin moustachu ('mustached little devil'), and Star Wars fans argue whether they look more like Wookies or Ewoks.     Standing less than a foot tall, these sturdy terrier-like dogs approach life with great confidence. 'This isn't a breed you train, 'a professional dog handler tells us, 'He's like a human. You befriend him.' The dense, harsh coat is described as 'neat but shaggy' and comes in several colors; the gait is light and confident. They can be willful and domineering, but mostly Affens are loyal, affectionate, and always entertaining. Affen people say they love being owned by their little monkey dogs.

**Colors:** Beige, Black, Black & Silver, Black & Tan, Red

**Markings:** Black Mask

**Health:** Affenpinschers are generally healthy dogs, and responsible breeders will screen their stock for health conditions such as luxating patella, heart anomalies, vision problems, and hip dysplasia. Like other shorter-faced breeds, Affens can experience breathing problems during hot weather if they are permitted to overheat and then have difficulty panting in order to lower their body temperature, as dogs don't sweat to keep cool.

**Grooming:** The Affenpinscher's medium-length, wiry coat should be groomed twice a week, first with a brush and then with a metal comb. Any mats should be pulled apart with the fingers. The hair on the head is usually brushed forward over the face, and then an inverted V-shape is cut to expose the eyes. Similarly, the hair on the bridge of the nose is trimmed into a fan shape to keep the eyes clear. The Affen's coat does not grow quickly, so a trimming a pet Affen every few months should suffice. The breed's national parent club, the Affenpinscher Club of America, provides a detailed grooming guide. Affens should also have their nails trimmed and their teeth brushed regularly.

**Exercise:** One of the attractions of the toy breeds is that their small size makes them ideal apartment dogs. While Affenpinschers can be perfectly happy living in close quarters, the breed is classified as 'moderately active,' and as such, they do need exercise. Indoor play, both with his owner and just between himself and a toy, can be enough to make up a large chunk of an Affen's exercise regimen. Even so, a brisk walk once or twice a day is required. In addition to providing exercise, these walks give the Affen a chance to socialize both with people and other dogs.

**Training:** Affenpinschers are courageous, bold, and often feisty. Basic obedience training is recommended. The breed has an undeserved reputation as being difficult to train because Affenpinschers are independent minded and can be stubborn. The key is that they are very intelligent and generally eager to please the humans they have bonded with. Keep in mind that they are easily bored and tend to lose interest during long training sessions. Shorter, more frequent sessions with a trainer who has experience working with toy breeds are usually quite successful.

**Nutrition:** The Affenpinscher should do well on a high-quality dog food, whether commercially manufactured or home-prepared with your veterinarian's supervision and approval. Any diet should be appropriate to the dog's age (puppy, adult, or senior). Some dogs are prone to getting overweight, so watch your dog's calorie consumption and weight level. Treats can be an important aid in training but giving too many can cause obesity. Learn about which human foods are safe for dogs, and which are not. Check with your vet if you have any concerns about your dog's weight or diet. Clean, fresh water should be available at all times.

# User Model Appendix:

User models are stored in a json file and look like this:

Text

Description automatically generated

Text

Description automatically generated

Text

Description automatically generated

# Evaluations/ Final Remarks:

I think that other than not being able to scrape the information for an actual knowledge base from the AKC dog site, the chat bot works really well. The model is able to comprehend the intent behind the user’s input with a roughly 80-90% accuracy I’d say, and the times when it doesn’t understand it will just respond with a generic dog response such as \*wags tail, which is a socially acceptable response anyways because dogs are cute and don’t actually understand language.

**Strengths:**

* Able to understand intent quite well
* Usually able to figure out the dog breed from the user’s input
* Usually able to figure out what exactly the user is asking for (summary, color, marking, health, grooming, exercise, training, nutrition)
* Able to interact with user by teaching them tricks
* Able to store user information and remember user’s favorite dogs, breeds they are interested in, and tricks learned together

Weaknesses:

* Wasn’t able to connect the chatbot to an actual knowledge base (though this is just a matter of getting the web scraping code to actually work)
* Still has the annoying extra line printed before the chatbot response
* Sometimes unable to figure out the breed if it’s a multi-word breed like “Romanian Mioritic Shepherd Dog” or might think it’s another breed with the word “Shepherd” in it.
* Didn’t account for general dog fact information such as “how many dogs are there in the world?” I only thought to respond to questions about specific dog breeds.