

Rule-Based Techniques

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1. Perform necessary data preprocessing, e.g. removing punctuation and stop words, stemming, lemmatizing, and replace sensitive information with a class tag. You may use the outputs from previous weekly assignments. (10 points)

```
In [5]: from collections import defaultdict
import demoji
import svgling
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.stem import PorterStemmer, WordNetLemmatizer
from nltk import pos_tag
from autocorrect import Speller
import re

# Initialize tools
spell = Speller()
stop_words = set(stopwords.words('english'))
lemmatizer = WordNetLemmatizer()
stemmer = PorterStemmer()

email_re = r"\b[A-Za-z]+@\S+\b"
ssn_re = r"\b[0-9]{3}-[0-9]{2}-[0-9]{4}\b"
ip_re = r"\b\d{1,3}[\.]\d{1,3}[\.]\d{1,3}[\.]\d{1,3}\b"

street_number_re = r"^\d{1,}"
street_name_re = r"[a-zA-Z0-9\s]+,?"
city_name_re = r"[a-zA-Z]+(\,)?"
state_abbrev_re = r"[A-Z]{2}"
postal_code_re = r"[0-9]{5}$"
address_pattern_re = r"" + street_number_re + street_name_re + city_name_re + st

def clean_text(text):
    # Replace emojis
    text = demoji.replace(text)

    # Remove smart quotes and dashes
    text = text.replace("“", "\"").replace("”", "\"").replace("-", " ").replace(

    # Lowercase text
    text = text.lower()

    # Tokenize text
    words = word_tokenize(text)
    # print(words)

    # Spelling correction + replace all t with not
```

```

words = ['not' if word == 't' else (
    'ADDRESS' if re.match(address_pattern_re, word)
    else (
        'EMAIL' if re.match(email_re, word)
        else (
            'SSN' if re.match(ssn_re, word)
            else (
                'IP' if re.match(ip_re, word)
                else spell(word)
            )
        )
    )
) for word in words]

# Remove stop words and non-alphabetic tokens and punctuation
words = [word for word in words if word.isalnum() and word not in stop_words]

# POS tagging and Lemmatization
tagged_words = pos_tag(words)

tag_map = defaultdict(lambda: "n")
tag_map["N"] = "n"
tag_map["V"] = "v"
tag_map["J"] = "a"
tag_map["R"] = "r"

words = [lemmatizer.lemmatize(word, pos=tag_map[tag[0]]) for word, tag in tagged_words]

# Return cleaned words as a single string
return ' '.join(words)

```

```

In [6]: import pandas as pd

data = (pd.read_csv('../data/text/combined_raw.csv'))
data = data.dropna(how='any')

for row in data.values:
    row[0] = clean_text(row[0])

data.to_csv('../data/text/combined_cleaned.csv', index=False)

print(data.head(10))

```

	text	emotion
0	freshwater fish drink water skin via osmosis s...	happy
1	think everyone must use daily become grained e...	neutral
2	agree google headquarters mountain view califo...	neutral
3	thats funny current ceo sunday ficha didnt kno...	neutral
4	oh yeah not know either also want go google al...	surprised
5	say	surprised
6	yeah apparently lol instead hire people row	happy
7	thats funny guess imaginative leave huge tech ...	surprised
8	yeah exactly sure cheap one thing bet not expl...	surprised
9	remember hearing immortality waste jellyfish h...	neutral

2. Generate additional training data for your project by substituting different words with the

same superordinate term in different sentence patterns. (30 points)

In [20]: `import pandas as pd`

```
data = (pd.read_csv('../data/text/combined_cleaned.csv'))
data = data.dropna(how='any')
```

In [21]: `from nltk.corpus import wordnet`

```
def get_superordinate(word):
    synsets = wordnet.synsets(word)
    if synsets:
        hypernyms = synsets[0].hypernyms()
        if hypernyms:
            return hypernyms[0].lemma_names()[0]
    return word

def generate_augmented_data(text):
    tokens = word_tokenize(text)
    augmented_tokens = [get_superordinate(word) for word in tokens]
    return " ".join(augmented_tokens)

data = data.head(100)
# Apply the function to generate new training data
data['text'] = data['text'].apply(generate_augmented_data)
data.to_csv('additional_data.csv', index=False)

print(data)
```

	text	emotion
0	water aquatic_vertebrate helping liquid body_c...	happy
1	deliberation everyone necessity activity newsp...	neutral
2	agree google office natural_elevation orientat...	neutral
3	thats joke electrical_phenomenon corporate_exe...	neutral
4	oh yeah not knowing either also poverty shift ...	surprised
..
95	not deliberation achromatic_color taste aquati...	surprised
96	probably not domestic_animal locomotion advant...	neutral
97	digit shift knowing adapt organism create pers...	neutral
98	coldness conversation knowing 6331 abstraction...	surprised
99	deliberation sad relation animal right hyperse...	sad

[100 rows x 2 columns]

3. Perform context-free grammars and parsing on one of sentences in your project data. (20 points)

In [73]: `import pandas as pd`

```
data = (pd.read_csv('../data/text/combined_raw.csv'))
data = data.dropna(how='any')
```

In [16]: `import nltk`
`from nltk import CFG`

```

# "I am really bad, but it is a good time."
# Define the CFG
grammar = nltk.CFG.fromstring("""
S -> NP VP Conj S | NP VP
NP -> PRP | Det Adj N | PRP
VP -> V Adv Adj | V NP | V Adj
PRP -> 'i' | 'it'
V -> 'am' | 'is'
Adv -> 'really'
Adj -> 'bad' | 'good'
Det -> 'a'
N -> 'time'
Conj -> 'but'
""")

# Sentence to parse
sentence = nltk.tokenize.word_tokenize((data.values[20][0]).lower())
sentence = [word for word in sentence if word.isalnum()]

# Parser
parser = nltk.ChartParser(grammar)

# Parse
trees = list(parser.parse(sentence))
print(trees[0])
trees[0]

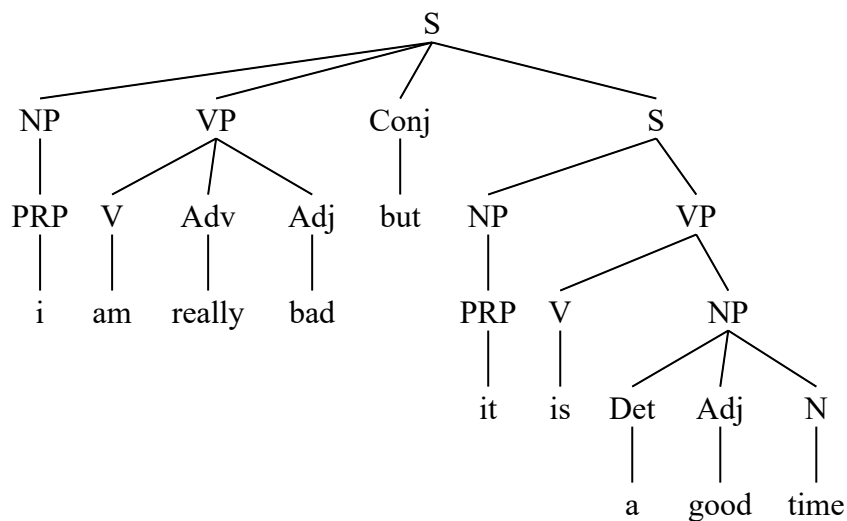
```

```

(S
 (NP (PRP i))
 (VP (V am) (Adv really) (Adj bad))
 (Conj but)
 (S (NP (PRP it)) (VP (V is) (NP (Det a) (Adj good) (N time)))))

```

Out[16]:



```

In [17]: with open("parse_tree.txt", "w") as f:
          f.write(str(trees[0])) # Write the parse tree as a string

```

4. Develop search criteria for your project and perform slot filling and slot visualization. (40 points)

```

In [1]: import pandas as pd

```

```
data = (pd.read_csv('.././.././../data/text/combined_raw.csv'))
data = data.dropna(how='any')
data = data.head(100)
```

```
In [14]: import spacy
from spacy.lang.en import English

nlp = English()

ruler = nlp.add_pipe("entity_ruler")
POLARITY_patterns = [
    {"label": "POLARITY", "pattern": "bad"},
    {"label": "POLARITY", "pattern": "good"},
    {"label": "POLARITY", "pattern": "nice"},
    {"label": "POLARITY", "pattern": "cool"},
    {"label": "POLARITY", "pattern": "great"},
    {"label": "POLARITY", "pattern": "funny"},
    {"label": "POLARITY", "pattern": "awful"},
    {"label": "POLARITY", "pattern": "fun"}]
SUBJECT_patterns = [
    {"label": "SUBJECT", "pattern": "i"},
    {"label": "SUBJECT", "pattern": "it"},
    {"label": "SUBJECT", "pattern": "you"}]
ACTION_patterns = [
    {"label": "ACTION", "pattern": "be"},
    {"label": "ACTION", "pattern": "am"},
    {"label": "ACTION", "pattern": "m"},
    {"label": "ACTION", "pattern": "is"},
    {"label": "ACTION", "pattern": "s"},
    {"label": "ACTION", "pattern": "re"},
    {"label": "ACTION", "pattern": "are"}]
ADDITION_patterns = [
    {"label": "ADDITION", "pattern": "very"},
    {"label": "ADDITION", "pattern": "too"},
    {"label": "ADDITION", "pattern": "so"},
    {"label": "ADDITION", "pattern": "really"},
    {"label": "ADDITION", "pattern": "pretty"}]

ruler.add_patterns(POLARITY_patterns)
ruler.add_patterns(SUBJECT_patterns)
ruler.add_patterns(ACTION_patterns)
ruler.add_patterns(ADDITION_patterns)

arr = []

# Open file to write output
with open("slot_filling.txt", "w") as f:
    for row in data.values:
        doc = nlp(row[0])
        val = [(ent.text, ent.label_) for ent in doc.ents]
        arr.append(val)
        f.write(str(val) + "\n") # Write each result to the file
        print(val)
```

```

[('are', 'ACTION')]
[('i', 'SUBJECT'), ('it', 'SUBJECT')]
[('is', 'ACTION')]
[('funny', 'POLARITY'), ('is', 'ACTION'), ('i', 'SUBJECT')]
[('it', 'SUBJECT')]
[]
[]
[('funny', 'POLARITY'), ('i', 'SUBJECT'), ('it', 'SUBJECT')]
[('am', 'ACTION'), ('are', 'ACTION'), ('is', 'ACTION'), ('are', 'ACTION'), ('so', 'ADDITION'), ('cool', 'POLARITY'), ('is', 'ACTION'), ('is', 'ACTION')]
[('i', 'SUBJECT'), ('is', 'ACTION'), ('you', 'SUBJECT'), ('is', 'ACTION')]
[('is', 'ACTION'), ('so', 'ADDITION'), ('funny', 'POLARITY'), ('it', 'SUBJECT'), ('is', 'ACTION'), ('so', 'ADDITION')]
[('i', 'SUBJECT')]
[]
[('i', 'SUBJECT')]
[('i', 'SUBJECT')]
[('be', 'ACTION'), ('fun', 'POLARITY'), ('so', 'ADDITION'), ('be', 'ACTION'), ('nice', 'POLARITY')]
[('i', 'SUBJECT')]
[('so', 'ADDITION'), ('s', 'ACTION')]
[('you', 'SUBJECT')]
[('you', 'SUBJECT')]
[('am', 'ACTION'), ('really', 'ADDITION'), ('bad', 'POLARITY'), ('it', 'SUBJECT'), ('is', 'ACTION'), ('good', 'POLARITY')]
[('is', 'ACTION'), ('fun', 'POLARITY'), ('you', 'SUBJECT'), ('great', 'POLARITY')]
[]
[('is', 'ACTION')]
[('is', 'ACTION'), ('too', 'ADDITION')]
[('pretty', 'ADDITION'), ('cool', 'POLARITY')]
[('is', 'ACTION')]
[('is', 'ACTION')]
[]
[('is', 'ACTION'), ('it', 'SUBJECT')]
[('be', 'ACTION')]
[]
[('is', 'ACTION'), ('be', 'ACTION')]
[('very', 'ADDITION'), ('be', 'ACTION')]
[('great', 'POLARITY')]
[('so', 'ADDITION'), ('nice', 'POLARITY'), ('you', 'SUBJECT'), ('nice', 'POLARITY')]
[]
[('so', 'ADDITION'), ('is', 'ACTION'), ('good', 'POLARITY')]
[]
[]
[('you', 'SUBJECT')]
[('really', 'ADDITION'), ('is', 'ACTION'), ('is', 'ACTION')]
[('s', 'ACTION'), ('fun', 'POLARITY')]
[]
[('fun', 'POLARITY'), ('you', 'SUBJECT')]
[('is', 'ACTION'), ('is', 'ACTION')]
[('is', 'ACTION'), ('cool', 'POLARITY'), ('are', 'ACTION'), ('pretty', 'ADDITION')]
[('are', 'ACTION'), ('very', 'ADDITION'), ('it', 'SUBJECT'), ('you', 'SUBJECT')]
[]
[]
[('is', 'ACTION'), ('it', 'SUBJECT')]
[('is', 'ACTION'), ('is', 'ACTION')]
[('it', 'SUBJECT'), ('is', 'ACTION')]

```

```

[]
[('is', 'ACTION')]
[('be', 'ACTION'), ('pretty', 'ADDITION')]
[('"s"', 'ACTION'), ('good', 'POLARITY'), ('it', 'SUBJECT')]
[('you', 'SUBJECT'), ('is', 'ACTION'), ('be', 'ACTION'), ('be', 'ACTION'), ('is', 'ACTION'), ('so', 'ADDITION')]
[]
[('is', 'ACTION'), ('be', 'ACTION'), ('are', 'ACTION'), ('too', 'ADDITION')]
[('are', 'ACTION')]
[('is', 'ACTION'), ('is', 'ACTION')]
[]
[('is', 'ACTION'), ('you', 'SUBJECT'), ('you', 'SUBJECT'), ('is', 'ACTION'), ('is', 'ACTION'), ('is', 'ACTION')]
[('you', 'SUBJECT'), ('it', 'SUBJECT'), ('be', 'ACTION'), ('very', 'ADDITION')]
[('am', 'ACTION'), ('you', 'SUBJECT'), ('it', 'SUBJECT'), ('s', 'ACTION')]
[]
[('it', 'SUBJECT'), ('is', 'ACTION'), ('so', 'ADDITION')]
[]
[('nice', 'POLARITY')]
[('am', 'ACTION'), ('it', 'SUBJECT'), ('be', 'ACTION'), ('is', 'ACTION'), ('so', 'ADDITION'), ('cool', 'POLARITY')]
[('it', 'SUBJECT'), ('funny', 'POLARITY'), ('s', 'ACTION')]
[('is', 'ACTION')]
[('you', 'SUBJECT'), ('is', 'ACTION')]
[('so', 'ADDITION')]
[('it', 'SUBJECT'), ('so', 'ADDITION'), ('s', 'ACTION'), ('good', 'POLARITY'), ('s', 'ACTION')]
[('it', 'SUBJECT'), ('are', 'ACTION'), ('you', 'SUBJECT'), ('it', 'SUBJECT'), ('s', 'ACTION'), ('funny', 'POLARITY'), ('s', 'ACTION'), ('s', 'ACTION')]
[('it', 'SUBJECT'), ('you', 'SUBJECT'), ('s', 'ACTION'), ('pretty', 'ADDITION')]
[]
[]
[('it', 'SUBJECT'), ('s', 'ACTION'), ('cool', 'POLARITY'), ('are', 'ACTION')]
[('be', 'ACTION'), ('it', 'SUBJECT')]
[('re', 'ACTION'), ('is', 'ACTION')]
[('s', 'ACTION'), ('s', 'ACTION'), ('be', 'ACTION'), ('you', 'SUBJECT')]
[('s', 'ACTION')]
[('you', 'SUBJECT'), ('are', 'ACTION')]
[('s', 'ACTION'), ('awful', 'POLARITY')]
[('s', 'ACTION')]
[('cool', 'POLARITY'), ('be', 'ACTION')]
[('are', 'ACTION'), ('are', 'ACTION'), ('be', 'ACTION'), ('you', 'SUBJECT'), ('be', 'ACTION')]
[('you', 'SUBJECT'), ('are', 'ACTION')]
[('is', 'ACTION')]
[('you', 'SUBJECT'), ('are', 'ACTION')]
[('are', 'ACTION'), ('good', 'POLARITY'), ('too', 'ADDITION')]
[('be', 'ACTION'), ('very', 'ADDITION'), ('good', 'POLARITY'), ('you', 'SUBJECT'), ('are', 'ACTION')]
[('be', 'ACTION'), ('good', 'POLARITY'), ('it', 'SUBJECT')]
[('is', 'ACTION'), ('good', 'POLARITY'), ('it', 'SUBJECT')]
[('you', 'SUBJECT')]
[('cool', 'POLARITY'), ('you', 'SUBJECT'), ('you', 'SUBJECT'), ('are', 'ACTION'), ('are', 'ACTION')]
[]

```

In [15]: `from spacy import displacy`

```

colors = {"POLARITY": "#ea7e7e",
          "SUBJECT": "#baffc9",

```

```

        "ACTION": "#abcdef",
        "ADDITION": "#ffffba"}
options = {"ents": ["POLARITY", "SUBJECT", "ACTION", "ADDITION"], "colors": colors}

html_outputs = []

for row in data.values:
    doc = nlp(row[0])
    if doc.ents:
        html = displacy.render(doc, style="ent", options=options, page=False)
        html_outputs.append(html)

```

Freshwater fish only drink water through the skin via Osmosis, Saltwater fish drink water through the mouth. Dolphins **are ACTION** friendly to human beings.

i SUBJECT think everyone must use **it SUBJECT** daily! its become ingrained in every day life

Agreed. The Google headquarters in Mountain View California **is ACTION** nicknamed the Google Plex.

thats **funny POLARITY** . The current CEO **is ACTION** Sundar Pichai, **i SUBJECT** didnt know Larry Page was replaced

Oh yeah I didn't know that either. I also want to go to google Plex to see the goats who mow their lawn by eating **it SUBJECT** .

thats both **funny POLARITY** and **i SUBJECT** guess imaginative. leave **it SUBJECT** to a huge tech company to employ actual goats!

Yeah exactly I **am ACTION** sure they **are ACTION** cheaper. One thing I bet they couldn't exploit **is ACTION** fish. I think fish **are ACTION** **so ADDITION** **cool POLARITY** there **is ACTION** actually a breed of jellyfish that **is ACTION** immortal.

i SUBJECT had rememered hearing about that before. Immortatlity **is ACTION** wasted on a jellyfish haha. did **you SUBJECT** know a seahorse **is ACTION** the only fish that has an actual neck?

That **is ACTION** **so ADDITION** **funny POLARITY** I guess I never considered a seahorse a fish. The black swallower fish sounds a lot like a snake because **it SUBJECT** can eat pray that **is ACTION** **so ADDITION** large.

i SUBJECT guess they live up to their name then!

thats crazy. **i SUBJECT** wonder why fresh water ones only use osmosis?

no but I would love to! paying hourly to hang out with adorable cats? i **SUBJECT** m in!

Yeah that would be **ACTION** a lot of fun **POLARITY** . I didn't realize that cats sleep so **ADDITION** much. Must be **ACTION** nice **POLARITY** .

i **SUBJECT** guess thats where the phrase "cat nap" comes from

Oh yeah I guess so **ADDITION** ha ha. There 's **ACTION** even a town in Alaska that has a mayor cat.

Hi! do you **SUBJECT** like to dance?

I love to dance a lot. How about you **SUBJECT** ?

I am **ACTION** really **ADDITION** bad **POLARITY** , but it **SUBJECT** is **ACTION** a good **POLARITY** time.

Dancing is **ACTION** a lot of fun **POLARITY** . Did you **SUBJECT** know that Bruce Lee was a great **POLARITY** dancer?

Yes that is **ACTION** amazing. He won the Hong Kong cha-cha championship back in 1958 in fact.

I always just thought of him as a martial arts legend. Now he is **ACTION** a dance legend of sorts too **ADDITION** !

Yeah! He was the mouse king in the Nutcracker. Thats pretty **ADDITION** cool **POLARITY** , I would definitely never have guessed that about him.

Neither did I. That is **ACTION** insane because Tupac was a famous rapper.

He was indeed, his music is **ACTION** even in the library of congress.

Wow!!! That is **ACTION** amazing coming from such a talented singer and dancer. I couldn't even dance like that even if I dreamed of it **SUBJECT** .

Me neither. I could never be **ACTION** a professional dancer.

That is **ACTION** crazy! That can't be **ACTION** cheap for them.

No. I think its very **ADDITION** expensive for them to be **ACTION** professional ballet dancers based on this.

It has been great **POLARITY** chatting but I must go! Gotta go get my Bruce Lee on, the martial arts part... definitely not the dance.

Ha Ha!!! It was **so ADDITION** **nice POLARITY** chatting with **you SUBJECT** as well!!!

Have a **nice POLARITY** day!!! Bye

Yes and did get used **so ADDITION** that **is ACTION** **good POLARITY** . Nice chat do **you SUBJECT** know how google maps calculates traffic?

Interesting! Google **really ADDITION** **is ACTION** taking over the world. Their data center electricity use **is ACTION** 0.01 percent of all worldwide electricity.

Before Google launched gmail, that was the name of a free email service offered by garfield **'s ACTION** website. That actually seems more **fun POLARITY** .

That seems **fun POLARITY** ! That reminds me of the Anderson house bed and breakfast in Minnesota. They used to offer a free cat for the night when **you SUBJECT** booked a room.

wow. there **is ACTION** a town in alaska where the mayor of the town **is ACTION** a cat

That **is ACTION** **cool POLARITY** . Cats **are ACTION** a **pretty ADDITION** smart species. There has not been a cat species extinction in 10,000 years.

They **are ACTION** indeed **very ADDITION** smart and that proves **it SUBJECT** .

Nice chatting with **you SUBJECT** .

I just read that today. The largest comic book market **is ACTION** in Japan. I believe **it SUBJECT** . My son loves to read those mangas.

The manga market **is ACTION** Japan **is ACTION** valued at \$6 to \$7 billion dollars!

I didn't know that. I wonder how many people use **it SUBJECT** . By comparison to Japan, the US comic book market in the US and Canada **is ACTION** \$1.09 billion!

That interesting. Uranus **is ACTION** different to. It actually rotates sideways and rolls around the sun rather than spins like the other planets.

It must **be ACTION** **pretty ADDITION** big then! I wouldn't want to ever visit the unnamed planet where shards of glass precipitate sideways at 4500 mph!

Hahah That **'s ACTION** a **good POLARITY** way of putting **it SUBJECT** !

Can **you SUBJECT** believe there **is ACTION** stars that can **be ACTION** cold enough to **be ACTION** touched ? The universe **is ACTION** **so ADDITION** diverse.

Yeah and there **is ACTION** even places that exist but we never will **be ACTION** able to see because they **are ACTION** too **ADDITION** far away.

They **are ACTION** saying space pulls galaxies outside of universe that we could see

Yes that **is ACTION** what I was saying, albeit I doubt that there **is ACTION** only one electron in the universe like some people say.

Because an electron **is ACTION** part of matter, the water **you SUBJECT** drink, the chair **you SUBJECT** sit on. Saying there **is ACTION** only 1 electron in the universe **is ACTION** like saying there **is ACTION** 1 grain of wheat in your bread.

It makes sense when **you SUBJECT** put **it SUBJECT** that way but in terms of that universe size the electron could **be ACTION** very **ADDITION** big.

I don't know but I **am ACTION** at the end of knowledge on this subject. What do **you SUBJECT** think about the facts of comics? I would have thought US invented them, but **it SUBJECT** 's **ACTION** Japan or UK.

Not where I lived, if I want to read a comic book, I had to go to the library. But as I think about **it SUBJECT** Tintin **is ACTION** a comic book, **so ADDITION** I was wrong, I did read a lot of them when I was young but they were European.

I did saw a lot of cartoons on TV, but I don't think that considered as a comic book. have a **nice POLARITY** day.

Hi! Yes, I **am ACTION** a huge fan of Star Wars! I also loved how **it SUBJECT** was the first major movie to **be ACTION** dubbed in Navajo! I think that **is ACTION** **so ADDITION** **cool POLARITY** !

Agreed. Isn't **it SUBJECT** also **funny POLARITY** James Earl Jones only spent two and half hours recording his lines for Darth Vader? I also can't believe he was only paid \$7500!

Geez, that 's **ACTION** pocket change.

\$7500 **is ACTION** amazingly low. I guess since Darth Vader was masked Jones could just record everything at once in the studio.

Agreed. Can **you SUBJECT** also believe that George Lucas' wife at the time, Marcia, won an academy award for her editing on Star Wars and yet George Lucas didn't win an academy award for directing. That **is ACTION** just downright unbelievable!

A lot of people think the OT was **so ADDITION** much better than the prequels because of her influence.

Yeah **it SUBJECT** was because of her that **so ADDITION** many major changes were made like Leia **'s ACTION** **good POLARITY** luck kiss, Obi Wan **'s ACTION** death, etc. She was truly a big influence!

Yeah I would have to watch **it SUBJECT** as well! So **are ACTION** **you SUBJECT** also a fan of Chewbacca? I love him. I think **it SUBJECT** **'s ACTION** **funny POLARITY** there **'s ACTION** a bat species called the Chewbacca bat. That **'s ACTION** hilarious! I would like to see **it SUBJECT** as well. Did **you SUBJECT** know Chewbacca actually had a wife and two boys? That **'s ACTION** **pretty ADDITION** interesting!

Indeed he doesn't. But I've always liked Chewbacca because he reminded me of a giant dog. Ha! Speaking of dogs, I think **it SUBJECT** **'s ACTION** **cool POLARITY** that dogs, along with elephants, **are ACTION** the only animals that understand pointing! I wouldn't **be ACTION** surprised if cats understood **it SUBJECT** but just didn't care, LOL.

Ha! No kidding. Speaking of dogs and cats, I like how Google prefers dogs over cats and even states in their code of conduct that they **'re ACTION** a dog company! That **is ACTION** awesome!

Yeah, that **'s ACTION** a weird official policy for what **'s ACTION** supposed to **be ACTION** a neutral search engine! Nice chatting with **you SUBJECT** .

Naming a cloned cat "copy cat", that **'s ACTION** cute.

You must have ESP. I was going to tell **you SUBJECT** teh same thing! I have a sad story to tell there **are ACTION** less tigers living in the wild in Asia than as pets in the US.

Really? That **'s ACTION** **awful POLARITY** to hear!

Of Roosevelt **'s ACTION** 20 pets two were a bear and hyena!

Whoa, **cool POLARITY** ! I know he seemed to **be ACTION** quite the animal lover.

And there **are ACTION** more pets in Japan than there **are ACTION** children under 15.

You can't **be ACTION** a pets "OWNER" in Boulder but **you SUBJECT** can **be ACTION** their guardian.

Cool word! Did **you SUBJECT** know there **are ACTION** 20 quintillion animal varieties on Earth?

Yeah, and the Loch Ness monster **is ACTION** protected under the 1912 Scottish Animal Protection Act.

Lol...speaking of water animals, did **you SUBJECT** know that hiccoughs **are ACTION** a left over from evolution when we had gills?

Well, they **are ACTION** **good POLARITY** at helping people adjust to new situations, **too ADDITION** .

Yes, a seahorse wouldn't **be ACTION** **very ADDITION** **good POLARITY** for that purpose. Did **you SUBJECT** know seahorses **are ACTION** the only fish with a neck?

I don't think a black swallower fish would **be ACTION** **good POLARITY** as a companion pet either because **it SUBJECT** can eat prey twice its length!

Probably not. Dog walking **is ACTION** **good POLARITY** because **it SUBJECT** gives companionship and exercise at the same time.

One more before we go...did **you SUBJECT** know domesticated animals develop a white patch on their forehead?

Very **cool POLARITY** chatting with **you SUBJECT** . Did **you SUBJECT** know there **are ACTION** 6331 groups of genes? They **are ACTION** common to all living animals!