

lab2-1-nlp-ner-pos

September 19, 2023

```
[86]: import spacy
import json
from collections import Counter
import matplotlib.pyplot as plt

# Load the English model
nlp = spacy.load("en_core_web_sm")
```

```
[87]: #Load jsonl file and preprocess the data
# Read JSONL file and process each line
with open('climate_data_set/climate-fever.jsonl', 'r') as f:
    for line_number, line in enumerate(f, start=1):
        if line_number > 10: # Stop after reading 10 lines
            break
        data = json.loads(line.strip())

        # Extract pass_summary field for text analysis
        claims_summary = data.get('claim', 'Key not found')

        # Initialize Spacy Doc
        doc = nlp(claims_summary)

        # Extract tokens, lemmas, and stop words
        tokens = [token.text for token in doc]
        lemmas = [token.lemma_ for token in doc]
        stop_words_removed = [token.text for token in doc if not token.is_stop]
        stemmed_words = [stemmer.stem(token.text) for token in doc]

        # Display the data
        print(f"==== Line {line_number} =====")
        print(f"Claim Summary: {claims_summary}")
        print(f"Tokens: {' | '.join(tokens)}")
        print(f"Lemmas: {' | '.join(lemmas)}")
        print(f"Stop Words Removed: {' | '.join(stop_words_removed)}")
        print(f"Stemmed Words: {' | '.join(stemmed_words)}")
        print(f"==== End of Line =====\n")
```

==== Line 1 =====

Claim Summary: Global warming is driving polar bears toward extinction
 Tokens: Global | warming | is | driving | polar | bears | toward | extinction
 Lemmas: global | warming | be | drive | polar | bear | toward | extinction
 Stop Words Removed: Global | warming | driving | polar | bears | extinction
 Stemmed Words: global | warm | is | drive | polar | bear | toward | extinct
 ===== End of Line =====

===== Line 2 =====

Claim Summary: The sun has gone into 'lockdown' which could cause freezing weather, earthquakes and famine, say scientists
 Tokens: The | sun | has | gone | into | ' | lockdown | ' | which | could | cause | freezing | weather | , | earthquakes | and | famine | , | say | scientists
 Lemmas: the | sun | have | go | into | ' | lockdown | ' | which | could | cause | freeze | weather | , | earthquake | and | famine | , | say | scientist
 Stop Words Removed: sun | gone | ' | lockdown | ' | cause | freezing | weather | , | earthquakes | famine | , | scientists
 Stemmed Words: the | sun | ha | gone | into | ' | lockdown | ' | which | could | caus | freez | weather | , | earthquak | and | famin | , | say | scientist
 ===== End of Line =====

===== Line 3 =====

Claim Summary: The polar bear population has been growing.
 Tokens: The | polar | bear | population | has | been | growing | .
 Lemmas: the | polar | bear | population | have | be | grow | .
 Stop Words Removed: polar | bear | population | growing | .
 Stemmed Words: the | polar | bear | popul | ha | been | grow | .
 ===== End of Line =====

===== Line 4 =====

Claim Summary: Ironical study finds more CO2 has slightly cooled the planet
 Tokens: Ironical | ' | study | finds | more | CO2 | has | slightly | cooled | the | planet
 Lemmas: ironical | ' | study | find | more | CO2 | have | slightly | cool | the | planet
 Stop Words Removed: Ironical | ' | study | finds | CO2 | slightly | cooled | planet
 Stemmed Words: iron | ' | studi | find | more | co2 | ha | slightli | cool | the | planet
 ===== End of Line =====

===== Line 5 =====

Claim Summary: Human additions of CO2 are in the margin of error of current measurements and the gradual increase in CO2 is mainly from oceans degassing as the planet slowly emerges from the last ice age.
 Tokens: Human | additions | of | CO2 | are | in | the | margin | of | error | of | current | measurements | and | the | gradual | increase | in | CO2 | is | mainly | from | oceans | degassing | as | the | planet | slowly | emerges | from | the | last | ice | age | .
 Lemmas: human | addition | of | CO2 | be | in | the | margin | of | error | of | current | measurement | and | the | gradual | increase | in | CO2 | is | main | from | ocean | degass | as | the | planet | slow | emerg | from | the | last | ice | age | .
 Stop Words Removed: Human | additions | of | CO2 | are | in | the | margin | of | error | of | current | measurements | and | the | gradual | increase | in | CO2 | is | mainly | from | oceans | degassing | as | the | planet | slowly | emerges | from | the | last | ice | age | .
 Stemmed Words: human | addition | of | CO2 | be | in | the | margin | of | error | of | current | measurement | and | the | gradual | increase | in | CO2 | is | main | from | ocean | degass | as | the | planet | slow | emerg | from | the | last | ice | age | .

Lemmas: human | addition | of | CO2 | be | in | the | margin | of | error | of | current | measurement | and | the | gradual | increase | in | CO2 | be | mainly | from | ocean | degas | as | the | planet | slowly | emerge | from | the | last | ice | age | .

Stop Words Removed: Human | additions | CO2 | margin | error | current | measurements | gradual | increase | CO2 | mainly | oceans | degassing | planet | slowly | emerges | ice | age | .

Stemmed Words: human | addit | of | co2 | are | in | the | margin | of | error | of | current | measur | and | the | gradual | increas | in | co2 | is | mainli | from | ocean | degass | as | the | planet | slowli | emerg | from | the | last | ice | age | .

===== End of Line =====

===== Line 6 =====

Claim Summary: They tell us that we are the primary forces controlling earth temperatures by the burning of fossil fuels and releasing their carbon dioxide.

Tokens: They | tell | us | that | we | are | the | primary | forces | controlling | earth | temperatures | by | the | burning | of | fossil | fuels | and | releasing | their | carbon | dioxide | .

Lemmas: they | tell | we | that | we | be | the | primary | force | control | earth | temperature | by | the | burning | of | fossil | fuel | and | release | their | carbon | dioxide | .

Stop Words Removed: tell | primary | forces | controlling | earth | temperatures | burning | fossil | fuels | releasing | carbon | dioxide | .

Stemmed Words: they | tell | us | that | we | are | the | primari | forc | control | earth | temperatur | by | the | burn | of | fossil | fuel | and | releas | their | carbon | dioxid | .

===== End of Line =====

===== Line 7 =====

Claim Summary: The Great Barrier Reef is experiencing the most widespread bleaching ever recorded

Tokens: The | Great | Barrier | Reef | is | experiencing | the | most | widespread | bleaching | ever | recorded

Lemmas: the | Great | Barrier | Reef | be | experience | the | most | widespread | bleaching | ever | record

Stop Words Removed: Great | Barrier | Reef | experiencing | widespread | bleaching | recorded

Stemmed Words: the | great | barrier | reef | is | experienc | the | most | widespread | bleach | ever | record

===== End of Line =====

===== Line 8 =====

Claim Summary: it's not a pollutant that threatens human civilization.

Tokens: it | 's | not | a | pollutant | that | threatens | human | civilization | .

Lemmas: it | ' | not | a | pollutant | that | threaten | human | civilization | .

Stop Words Removed: pollutant | threatens | human | civilization | .
 Stemmed Words: it | 's | not | a | pollut | that | threaten | human | civil | .
 ===== End of Line =====

===== Line 9 =====

Claim Summary: If CO2 was so terrible for the planet, then installing a CO2 generator in a greenhouse would kill the plants.

Tokens: If | CO2 | was | so | terrible | for | the | planet | , | then | installing | a | CO2 | generator | in | a | greenhouse | would | kill | the | plants | .

Lemmas: if | CO2 | be | so | terrible | for | the | planet | , | then | instal | a | CO2 | generator | in | a | greenhouse | would | kill | the | plant | .

Stop Words Removed: CO2 | terrible | planet | , | installing | CO2 | generator | greenhouse | kill | plants | .

Stemmed Words: if | co2 | wa | so | terribl | for | the | planet | , | then | instal | a | co2 | gener | in | a | greenhous | would | kill | the | plant | .

===== End of Line =====

===== Line 10 =====

Claim Summary: Sea level rise has been slow and a constant, pre-dating industrialization

Tokens: Sea | level | rise | has | been | slow | and | a | constant | , | pre | - | dating | industrialization

Lemmas: sea | level | rise | have | be | slow | and | a | constant | , | pre | - | dating | industrialization

Stop Words Removed: Sea | level | rise | slow | constant | , | pre | - | dating | industrialization

Stemmed Words: sea | level | rise | ha | been | slow | and | a | constant | , | pre | - | date | industri

===== End of Line =====

```
[88]: #Apply NER with spacy
# Read JSONL file and process each line
with open('climate_data_set/climate-fever.jsonl', 'r') as f:
    for line_number, line in enumerate(f, start=1):
        if line_number > 20: # Stop after reading 20 lines
            break

    data = json.loads(line.strip())

    # Extract claim_summary field for text analysis
    claims_summary = data.get('claim', 'Key not found')

    # Initialize Spacy Doc
    doc = nlp(claims_summary)
```

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# Extract named entities
named_entities = [(ent.text, ent.label_) for ent in doc.ents]

# Display the data
print(f"===== Line {line_number} =====")
print(f"Claim Summary: {claims_summary}")
print(f"Named Entities: {named_entities}")
print("===== End of Line =====\n")

# Plot the named entities
entities = [ent.label_ for ent in doc.ents]
entity_counts = Counter(entities)
plt.bar(entity_counts.keys(), entity_counts.values())
plt.title(f"Named Entities for Line {line_number}")
plt.show()

===== Line 1 =====
Claim Summary: Global warming is driving polar bears toward extinction
Named Entities: []
===== End of Line =====

===== Line 2 =====
Claim Summary: The sun has gone into 'lockdown' which could cause freezing
weather, earthquakes and famine, say scientists
Named Entities: []
===== End of Line =====

===== Line 3 =====
Claim Summary: The polar bear population has been growing.
Named Entities: []
===== End of Line =====

===== Line 4 =====
Claim Summary: Ironical study finds more CO2 has slightly cooled the planet
Named Entities: []
===== End of Line =====

===== Line 5 =====
Claim Summary: Human additions of CO2 are in the margin of error of current
measurements and the gradual increase in CO2 is mainly from oceans degassing as
the planet slowly emerges from the last ice age.
Named Entities: []
===== End of Line =====

===== Line 6 =====
Claim Summary: They tell us that we are the primary forces controlling earth
temperatures by the burning of fossil fuels and releasing their carbon dioxide.

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Named Entities: []

===== End of Line =====

===== Line 7 =====

Claim Summary: The Great Barrier Reef is experiencing the most widespread bleaching ever recorded

Named Entities: [('The Great Barrier Reef', 'WORK_OF_ART')]

===== End of Line =====

===== Line 8 =====

Claim Summary: it's not a pollutant that threatens human civilization.

Named Entities: []

===== End of Line =====

===== Line 9 =====

Claim Summary: If CO2 was so terrible for the planet, then installing a CO2 generator in a greenhouse would kill the plants.

Named Entities: []

===== End of Line =====

===== Line 10 =====

Claim Summary: Sea level rise has been slow and a constant, pre-dating industrialization

Named Entities: []

===== End of Line =====

===== Line 11 =====

Claim Summary: Earth about to enter 30-YEAR 'Mini Ice Age'

Named Entities: [('30-YEAR 'Mini Ice Age', 'DATE')]

===== End of Line =====

===== Line 12 =====

Claim Summary: Volcanoes Melting West Antarctic Glaciers, Not Global Warming

Named Entities: []

===== End of Line =====

===== Line 13 =====

Claim Summary: the bushfires [in Australia] were caused by arsonists and a series of lightning strikes, not 'climate change'

Named Entities: [('Australia', 'GPE')]

===== End of Line =====

===== Line 14 =====

Claim Summary: Discovery Of Massive Volcanic CO2 Emissions Discredits Global Warming Theory

Named Entities: [('Discovery Of Massive Volcanic CO2 Emissions Discredits Global Warming Theory', 'WORK_OF_ART')]

===== End of Line =====

===== Line 15 =====

Claim Summary: Harvard study finds that wind turbines create MORE global warming than the fossil fuels they eliminate

Named Entities: [('Harvard', 'ORG')]

===== End of Line =====

===== Line 16 =====

Claim Summary: Ice berg melts, ocean level remains the same.

Named Entities: []

===== End of Line =====

===== Line 17 =====

Claim Summary: When the exact same group of 'experts' who claimed it was global cooling in 1977 now claim it's global warming you can easily see why I am skeptical

Named Entities: [('1977', 'DATE')]

===== End of Line =====

===== Line 18 =====

Claim Summary: Scientists studying Antarctica sea ice warn a rise in accumulation could spark the next ice age.

Named Entities: [('Antarctica', 'LOC'), ('the next ice age', 'DATE')]

===== End of Line =====

===== Line 19 =====

Claim Summary: More than 500 scientists and professionals in climate and related fields have sent a 'European Climate Declaration' to the Secretary-General of the United Nations

Named Entities: [('More than 500', 'CARDINAL'), ('European', 'NORP'), ('the United Nations', 'ORG')]

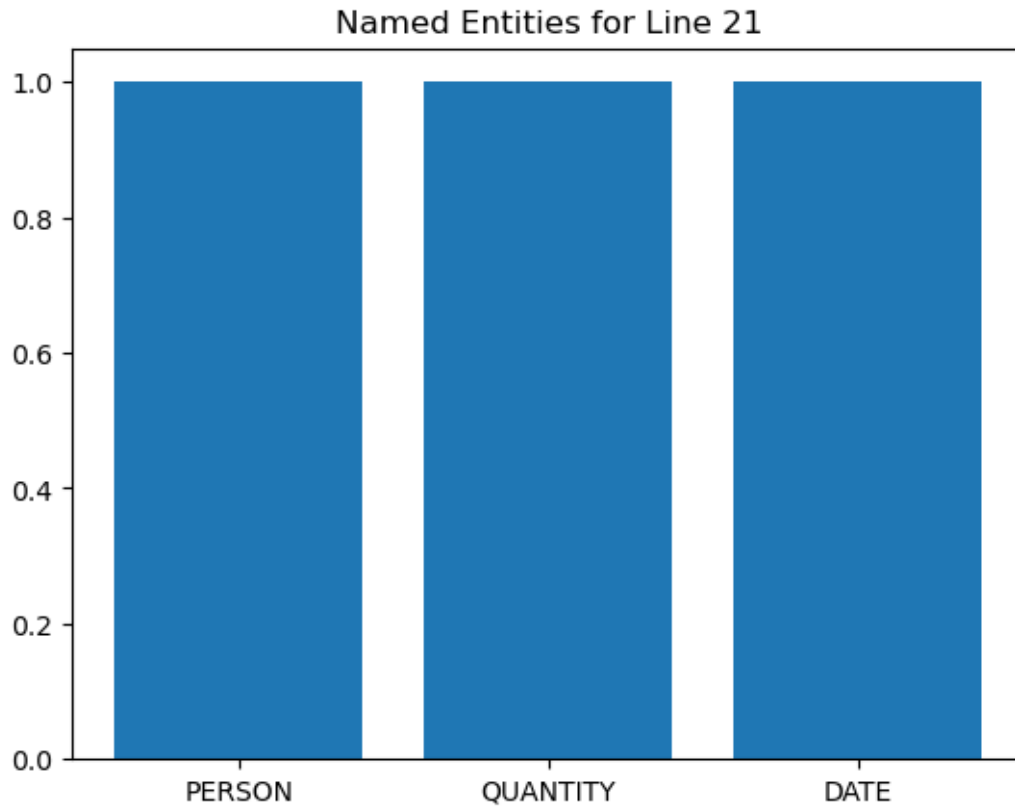
===== End of Line =====

===== Line 20 =====

Claim Summary: Unprecedented climate change has caused sea level at Sydney Harbour to rise approximately 0.0 cm over the past 140 years.

Named Entities: [('Sydney Harbour', 'PERSON'), ('approximately 0.0 cm', 'QUANTITY'), ('the past 140 years', 'DATE')]

===== End of Line =====



```
[89]: # Initialize an empty Counter object for POS tags
pos_counter = Counter()

# Read JSONL file and process each line
with open('climate_data_set/climate-fever.jsonl', 'r') as f:
    for line_number, line in enumerate(f, start=1):
        if line_number > 10: # Stop after reading 10 lines
            break
        data = json.loads(line.strip())

        # Extract claim_summary field for text analysis
        claims_summary = data.get('claim', 'Key not found')

        # Initialize Spacy Doc
        doc = nlp(claims_summary)

        # Extract named entities
        pos_tags = [(token.text, token.pos_) for token in doc]

        # Update the counter object with POS tags
        for _, pos in pos_tags:
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pos_counter[pos] += 1

# Display the data
print(f"===== Line {line_number} =====")
print(f"Claim Summary: {claims_summary}")
print(f"POS Tags: {pos_tags}")
print("===== End of Line =====\n")

# Plot the POS tags as a horizontal bar chart
plt.barh(list(pos_counter.keys()), list(pos_counter.values()))

plt.title('POS Tags')
plt.xlabel('Counts')
plt.ylabel('POS Tags')

plt.show()

===== Line 1 =====
Claim Summary: Global warming is driving polar bears toward extinction
POS Tags: [('Global', 'ADJ'), ('warming', 'NOUN'), ('is', 'AUX'), ('driving',
'VERB'), ('polar', 'ADJ'), ('bears', 'NOUN'), ('toward', 'ADP'), ('extinction',
'NOUN')]
===== End of Line =====

===== Line 2 =====
Claim Summary: The sun has gone into 'lockdown' which could cause freezing
weather, earthquakes and famine, say scientists
POS Tags: [('The', 'DET'), ('sun', 'NOUN'), ('has', 'AUX'), ('gone', 'VERB'),
('into', 'ADP'), (''', 'PUNCT'), ('lockdown', 'NOUN'), (''', 'PUNCT'), ('which',
'PRON'), ('could', 'AUX'), ('cause', 'VERB'), ('freezing', 'VERB'), ('weather',
'NOUN'), ('', 'PUNCT'), ('earthquakes', 'NOUN'), ('and', 'CCONJ'), ('famine',
'NOUN'), ('', 'PUNCT'), ('say', 'VERB'), ('scientists', 'NOUN')]
===== End of Line =====

===== Line 3 =====
Claim Summary: The polar bear population has been growing.
POS Tags: [('The', 'DET'), ('polar', 'ADJ'), ('bear', 'NOUN'), ('population',
'NOUN'), ('has', 'AUX'), ('been', 'AUX'), ('growing', 'VERB'), ('.', 'PUNCT')]
===== End of Line =====

===== Line 4 =====
Claim Summary: 'Irony' study finds more CO2 has slightly cooled the planet
POS Tags: [('Irony', 'ADJ'), (''', 'PUNCT'), ('study', 'NOUN'), ('finds',
'VERB'), ('more', 'ADJ'), ('CO2', 'PROPN'), ('has', 'AUX'), ('slightly', 'ADV'),
('cooled', 'VERB'), ('the', 'DET'), ('planet', 'NOUN')]
===== End of Line =====

```

===== Line 5 =====

Claim Summary: Human additions of CO2 are in the margin of error of current measurements and the gradual increase in CO2 is mainly from oceans degassing as the planet slowly emerges from the last ice age.

POS Tags: [('Human', 'ADJ'), ('additions', 'NOUN'), ('of', 'ADP'), ('CO2', 'PROPN'), ('are', 'AUX'), ('in', 'ADP'), ('the', 'DET'), ('margin', 'NOUN'), ('of', 'ADP'), ('error', 'NOUN'), ('of', 'ADP'), ('current', 'ADJ'), ('measurements', 'NOUN'), ('and', 'CCONJ'), ('the', 'DET'), ('gradual', 'ADJ'), ('increase', 'NOUN'), ('in', 'ADP'), ('CO2', 'PROPN'), ('is', 'AUX'), ('mainly', 'ADV'), ('from', 'ADP'), ('oceans', 'NOUN'), ('degassing', 'VERB'), ('as', 'SCONJ'), ('the', 'DET'), ('planet', 'NOUN'), ('slowly', 'ADV'), ('emerges', 'VERB'), ('from', 'ADP'), ('the', 'DET'), ('last', 'ADJ'), ('ice', 'NOUN'), ('age', 'NOUN'), ('.', 'PUNCT')]

===== End of Line =====

===== Line 6 =====

Claim Summary: They tell us that we are the primary forces controlling earth temperatures by the burning of fossil fuels and releasing their carbon dioxide.

POS Tags: [('They', 'PRON'), ('tell', 'VERB'), ('us', 'PRON'), ('that', 'SCONJ'), ('we', 'PRON'), ('are', 'AUX'), ('the', 'DET'), ('primary', 'ADJ'), ('forces', 'NOUN'), ('controlling', 'VERB'), ('earth', 'NOUN'), ('temperatures', 'NOUN'), ('by', 'ADP'), ('the', 'DET'), ('burning', 'NOUN'), ('of', 'ADP'), ('fossil', 'ADJ'), ('fuels', 'NOUN'), ('and', 'CCONJ'), ('releasing', 'VERB'), ('their', 'PRON'), ('carbon', 'NOUN'), ('dioxide', 'NOUN'), ('.', 'PUNCT')]

===== End of Line =====

===== Line 7 =====

Claim Summary: The Great Barrier Reef is experiencing the most widespread bleaching ever recorded

POS Tags: [('The', 'DET'), ('Great', 'PROPN'), ('Barrier', 'PROPN'), ('Reef', 'PROPN'), ('is', 'AUX'), ('experiencing', 'VERB'), ('the', 'DET'), ('most', 'ADV'), ('widespread', 'ADJ'), ('bleaching', 'NOUN'), ('ever', 'ADV'), ('recorded', 'VERB')]

===== End of Line =====

===== Line 8 =====

Claim Summary: it's not a pollutant that threatens human civilization.

POS Tags: [('it', 'PRON'), ('s', 'VERB'), ('not', 'PART'), ('a', 'DET'), ('pollutant', 'NOUN'), ('that', 'PRON'), ('threatens', 'VERB'), ('human', 'ADJ'), ('civilization', 'NOUN'), ('.', 'PUNCT')]

===== End of Line =====

===== Line 9 =====

Claim Summary: If CO2 was so terrible for the planet, then installing a CO2 generator in a greenhouse would kill the plants.

POS Tags: [('If', 'SCONJ'), ('CO2', 'PROPN'), ('was', 'AUX'), ('so', 'ADV'), ('terrible', 'ADJ'), ('for', 'ADP'), ('the', 'DET'), ('planet', 'NOUN'), ('.', 'PUNCT'), ('then', 'ADV'), ('installing', 'VERB'), ('a', 'DET'), ('CO2',

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'PROPN'), ('generator', 'NOUN'), ('in', 'ADP'), ('a', 'DET'), ('greenhouse',
'NOUN'), ('would', 'AUX'), ('kill', 'VERB'), ('the', 'DET'), ('plants', 'NOUN'),
('.', 'PUNCT')]
```

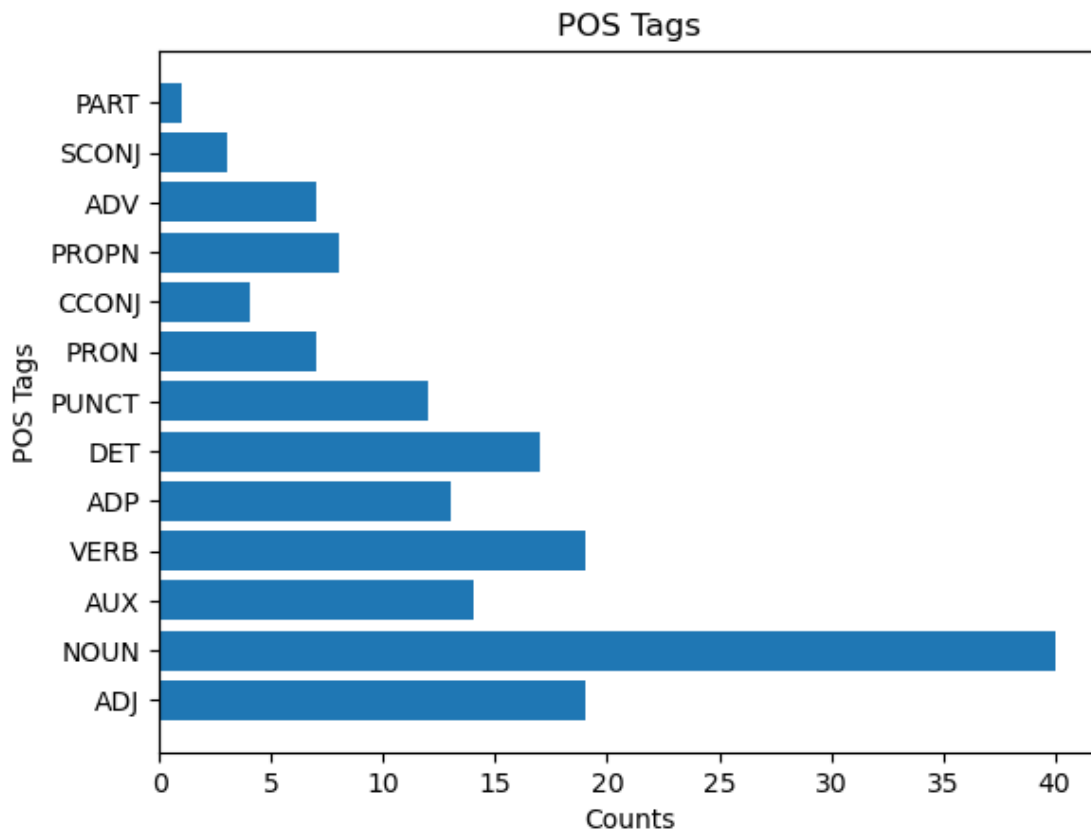
===== End of Line =====

===== Line 10 =====

Claim Summary: Sea level rise has been slow and a constant, pre-dating industrialization

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POS Tags: [('Sea', 'NOUN'), ('level', 'NOUN'), ('rise', 'NOUN'), ('has', 'AUX'),
('been', 'AUX'), ('slow', 'ADJ'), ('and', 'CCONJ'), ('a', 'DET'), ('constant',
'ADJ'), (',', 'PUNCT'), ('pre', 'ADJ'), ('-', 'ADJ'), ('dating', 'ADJ'),
('industrialization', 'NOUN')]
```

===== End of Line =====



```
[90]: #Use AWS Comprehend to extract entities and supplementary
import boto3
import json
from dotenv import load_dotenv
import os
```

```
load_dotenv()

aws_access_key_id = os.getenv("AWS_ACCESS_KEY_ID")
aws_secret_access_key = os.getenv("AWS_SECRET_ACCESS_KEY")
aws_region = os.getenv("AWS_REGION")
```

```
[91]: # Initialize a session using Amazon Comprehend
session = boto3.Session(
    aws_access_key_id=aws_access_key_id,
    aws_secret_access_key=aws_secret_access_key,
    region_name=aws_region
)

comprehend = session.client('comprehend')

# Read JSONL file and process each line
with open('climate_data_set/climate-fever.jsonl', 'r') as f:
    for line_number, line in enumerate(f, start=1):
        if line_number > 10: # Stop after reading 10 lines
            break

        data = json.loads(line.strip())

        # Extract claim_summary field for text analysis
        claims_summary = data.get('claim', 'Key not found')

        # Use Amazon Comprehend for Named Entity Recognition
        response = comprehend.detect_entities(
            Text=claims_summary,
            LanguageCode='en'
        )

        # Display the data
        print(f"==== Line {line_number} =====")
        print(f"Claim Summary: {claims_summary}")
        print(f"Named Entities: {response['Entities']}")
        print(f"==== End of Line =====\n")

# Use Amazon Comprehend for Sentiment Analysis
response = comprehend.detect_sentiment(
    Text=claims_summary,
    LanguageCode='en'
)

# Display the data
print(f"==== Line {line_number} =====")
print(f"Claim Summary: {claims_summary}")
```

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print(f"Sentiment: {response['Sentiment']}")
print(f"Sentiment Score: {response['SentimentScore']}")
print("==== End of Line ====\n")

```

```

# Use Amazon Comprehend for Key Phrase Extraction
response = comprehend.detect_key_phrases(
    Text=claims_summary,
    LanguageCode='en'
)

```

```

# Display the data
print(f"==== Line {line_number} =====")
print(f"Claim Summary: {claims_summary}")
print(f"Key Phrases: {response['KeyPhrases']}")
print("==== End of Line ====\n")

```

==== Line 1 =====

Claim Summary: Global warming is driving polar bears toward extinction

Named Entities: []

==== End of Line =====

==== Line 2 =====

Claim Summary: The sun has gone into 'lockdown' which could cause freezing weather, earthquakes and famine, say scientists

Named Entities: []

==== End of Line =====

==== Line 3 =====

Claim Summary: The polar bear population has been growing.

Named Entities: []

==== End of Line =====

==== Line 4 =====

Claim Summary: Ironical study finds more CO2 has slightly cooled the planet

Named Entities: [{'Score': 0.9601055383682251, 'Type': 'OTHER', 'Text': 'CO2', 'BeginOffset': 25, 'EndOffset': 28}]

==== End of Line =====

==== Line 5 =====

Claim Summary: Human additions of CO2 are in the margin of error of current measurements and the gradual increase in CO2 is mainly from oceans degassing as the planet slowly emerges from the last ice age.

Named Entities: [{'Score': 0.9842271208763123, 'Type': 'OTHER', 'Text': 'CO2', 'BeginOffset': 19, 'EndOffset': 22}, {'Score': 0.9800062775611877, 'Type': 'OTHER', 'Text': 'CO2', 'BeginOffset': 102, 'EndOffset': 105}]

==== End of Line =====

==== Line 6 =====

Claim Summary: They tell us that we are the primary forces controlling earth temperatures by the burning of fossil fuels and releasing their carbon dioxide.

Named Entities: [{ 'Score': 0.7568598985671997, 'Type': 'LOCATION', 'Text': 'earth', 'BeginOffset': 56, 'EndOffset': 61}]

===== End of Line =====

===== Line 7 =====

Claim Summary: The Great Barrier Reef is experiencing the most widespread bleaching ever recorded

Named Entities: [{ 'Score': 0.990327000617981, 'Type': 'LOCATION', 'Text': 'Great Barrier Reef', 'BeginOffset': 4, 'EndOffset': 22}]

===== End of Line =====

===== Line 8 =====

Claim Summary: it's not a pollutant that threatens human civilization.

Named Entities: []

===== End of Line =====

===== Line 9 =====

Claim Summary: If CO2 was so terrible for the planet, then installing a CO2 generator in a greenhouse would kill the plants.

Named Entities: [{ 'Score': 0.9508726596832275, 'Type': 'OTHER', 'Text': 'CO2', 'BeginOffset': 3, 'EndOffset': 6}, { 'Score': 0.8926202654838562, 'Type': 'OTHER', 'Text': 'CO2', 'BeginOffset': 57, 'EndOffset': 60}]

===== End of Line =====

===== Line 10 =====

Claim Summary: Sea level rise has been slow and a constant, pre-dating industrialization

Named Entities: []

===== End of Line =====

===== Line 11 =====

Claim Summary: Sea level rise has been slow and a constant, pre-dating industrialization

Sentiment: NEGATIVE

Sentiment Score: { 'Positive': 0.012448981404304504, 'Negative': 0.7472662925720215, 'Neutral': 0.23052522540092468, 'Mixed': 0.009759470820426941 }

===== End of Line =====

===== Line 11 =====

Claim Summary: Sea level rise has been slow and a constant, pre-dating industrialization

Key Phrases: [{ 'Score': 0.9986878633499146, 'Text': 'Sea level rise', 'BeginOffset': 0, 'EndOffset': 14}]

===== End of Line =====