

Text and Speech Analysis-CCS369 EXP-10

Code:

```
import nltk

from nltk import word_tokenize, sent_tokenize, pos_tag, ne_chunk
from nltk.tree import Tree

def download_nltk_resources():
    for resource in ['punkt', 'averaged_perceptron_tagger', 'maxent_ne_chunker', 'words']:
        nltk.download(resource)

def perform_nlp_analysis(news_article):
    sentences = sent_tokenize(news_article, language='english')
    word_tokens = [word_tokenize(sentence) for sentence in sentences]
    pos_tagged_sentences = [pos_tag(tokens) for tokens in word_tokens]
    ner_chunks = [ne_chunk(tagged) for tagged in pos_tagged_sentences]

    print("\n--- POS Tags ---")

    for word, tag in pos_tagged_sentences[0][:10]:
        print(f"{word}: {tag}")

    print("\n--- Named Entities ---")

    for tree in ner_chunks:
        for subtree in tree:
            if isinstance(subtree, Tree):
                entity = " ".join([token for token, pos in subtree.leaves()])
                label = subtree.label()
                print(f"{entity} → {label}")

article = (
    "Dr. Jane Foster, a leading astrophysicist from the California Institute of Technology, "
    "announced today, on October 23, 2025, that her team successfully launched a new satellite. "
    "The launch took place in Cape Canaveral, Florida. The satellite, named 'Stargazer V', "
    "will observe data regarding Mars and Jupiter. The project is funded by NASA."
)

if __name__ == "__main__":
    download_nltk_resources()
    perform_nlp_analysis(article)
```

Output:

```
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data] Package punkt is already up-to-date!
[nltk_data] Downloading package averaged_perceptron_tagger to
[nltk_data] /root/nltk_data...
[nltk_data] Package averaged_perceptron_tagger is already up-to-
[nltk_data] date!
[nltk_data] Downloading package maxent_ne_chunker to
[nltk_data] /root/nltk_data...
[nltk_data] Package maxent_ne_chunker is already up-to-date!
[nltk_data] Downloading package words to /root/nltk_data...
[nltk_data] Package words is already up-to-date!
```

--- POS Tags ---

```
Dr.: NNP
Jane: NNP
Foster: NNP
,,:
a: DT
leading: VBG
astrophysicist: NN
from: IN
the: DT
California: NNP
```

--- Named Entities ---

```
Jane Foster → PERSON
California Institute → ORGANIZATION
Technology → GPE
Cape → GPE
Florida → GPE
Mars → PERSON
Jupiter → PERSON
NASA → ORGANIZATION
```