**NLP Lab 5**

Dixitha Kasturi

[dkasturi@syr.edu](mailto:dkasturi@syr.edu)

**Topic: Context Free Grammars(CFG)**

For this assignment I chose 4 sentences. 3 from the given examples, 1 of my own.

text1 = "I prefer a flight through Houston".split()

text2 = "John gave the dog a bone".split()

text3 = "I want to book that flight".split()

text4 = "I am a dog lover and an ice-cream connoisseur".split() #my own example

When i considered the default flights cfg to parse the first text, it gave me error,

Default cfg :

flight\_grammar = nltk.CFG.fromstring("""

S -> NP VP | VP

VP -> V NP | V NP PP

PP -> P NP

V -> "saw" | "ate" | "walked" | "shot" | "book"

NP -> Prop | Det N | Det N PP

Prop -> "John" | "Mary" | "Bob" | "I"

Det -> "a" | "an" | "the" | "my" | "that"

N -> "man" | "dog" | "cat" | "telescope" | "park" | "elephant" | "pajamas" | "flight"

P -> "in" | "on" | "by" | "with"

""")

Text

Description automatically generated

From here on I understood that the CFG has to be modified according to the requirements(here sentences) to accommodate all possible cases of sentences.

1. For sentence 1 the CFG and tree were : *"I prefer a flight through Houston"*

Text

Description automatically generated

tree :

Text, letter

Description automatically generated

1. For sentence 2 : *"John gave the dog a bone".*

Text

Description automatically generated

tree :

Text, letter

Description automatically generated with medium confidence

1. For sentence 3 : *"I want to book that flight"*

Text

Description automatically generated with medium confidence

tree :

Letter

Description automatically generated with low confidence

1. For sentence 4 : *"I am a dog lover and an ice-cream connoisseur".*

My own sentence, forming the CFG was a little tricky, as the sentence structure was different and I used a conjunction “and”. To parse the sentence, I had to include the condition VP conj NP under VP , and Det N N under NP in the cfg. This is because of the sentence structure of the sentence I chose.

Text

Description automatically generated with medium confidence

Tree :

Text, letter

Description automatically generated

**Inference:**

After trial and error I was able to parse the sentences using the CFG. I understood that including all conditions is important. If there was a case discrepancy, converting the sentence into lowercase (if our grammar only has lowercase tokens) is a much better approach, this would avoid getting errors for upper case tokens. Editing/accommodating different scenarios in the CFG according to the requirement is important. Understanding sentence structure through Parts of speech is important in deciding which CFG elements/parsing structure should be included in the CFG( eg det N PP). I would further like to experiment with complex and inclusive cfgs, which are not limited.