Natural Language Processing

1.Natural Language Processing

- Overview
  - Understanding and replying the human language
  - NLP is a part of Computer science and Artificial Intelligence which deals Human language
- Branch
  - Natural Language Understanding
    - (NLU) is a branch of artificial intelligence (AI) that uses computer software to understand input made in the form of sentences in text or speech format.
  - Natural Language Generation
    - Natural-language generation is a software process that transforms structured data into natural language. It can be used to produce long form content for organizations to automate custom reports, as well as produce custom content for a web or mobile

2. NLP Terminology

- 1 Tokenization
  - Breaking strings into small individual Tokens or words
    - **Example**

      What's the time now?
      to
      What's
      The
      Time
      now
- 2 Stemming
  - Normalize words into its base form or its root form
    - **Example**

      Playing , played, plays
      to
      play
- 3 Lemmatization
  - Grouping different inflected form of word called Lemma

    Similar to Stemming, but returns perfect word
    - **Example**

      Better, super
      to
      Good
- 4 POS – parts of speech
  - The most popular POS tagging would be identifying words as nouns, verbs, adjectives, etc.
    - **Example**

      Google about pantech solutions

      Google may be Noun/Verb
- 5 Named entity recognition
  - Recognizing the words as movie, monetary values, organization, location, quantity or person.
    - **Example**

      Google about pantech solutions

      Google – verb
      Pantech solutions - organization
- 6 Chunking
  - Picking pieces of words and form into phrases
    - **Example**

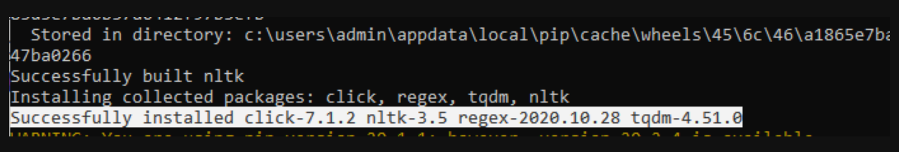
      Google
      About
      Pantech
      Solutions
      to
      Google about pantech solutions

3. Natural Language Toolkit - NLTK

- This toolkit is one of the most powerful NLP libraries which contains packages to make machines understand human language and reply to it with an appropriate response.
- Tokenization, Stemming, Lemmatization, Punctuation, Character count, word count are some of these packages which will be discussed in this tutorial.

4. Install NLTK

pip install nltk



```
  Stored in directory: c:\users\admin\appdata\local\pip\cache\wheels\45\6c\46\a1865e7ba
47ba0266
Successfully built nltk
Installing collected packages: click, regex, tqdm, nltk
Successfully installed click-7.1.2 nltk-3.5 regex-2020.10.28 tqdm-4.51.0
```

5.Feature extraction in Text

- CountVectorizer
  - Convert a collection of text documents to a matrix of token counts
- HashingVectorizer
  - Convert a collection of text documents to a matrix of token occurrences
- TfidfVectorizer
  - Overview
    - Term-frequency times inverse document-frequency
    - Convert a collection of raw documents to a matrix of TF-IDF features
    - Equivalent to CountVectorizer followed by TfidfTransformer
  - Example

```
TfidfVectorizer. get_feature_names

DATA= [
        'This is the first document.',
        'This document is the second
document.',
        'And this is the third one.',
        'Is this the first document?']
X = vectorizer.fit_transform(DATA)
TfidfVectorizer. get_feature_names

['and', 'document', 'first', 'is', 'one', 'second', '
the', 'third', 'this']
```