REG.	No. RA1911027010039
NAME	MAINAK CHAUDHURI
LAB	No. 9
TOPIC	Analysis using NLP

AIM: Classify complete and incomplete sentences.

1. Importing necessary packages for NLP

```
#Deport Library
 import numpy as mp
 import pandas as pd
 import seaborn as ses
 import nltk
nltk.download('stopwords')
 from textblob import TextBlob
 import string
 string punctuation
 import matplotlib.pyplot as plt
 plt.style.use(
 from sklears.model_selection import train_test_split
 from nitk.stem.porter import PorterStemmer
from nitk.stem import WordWetLemmatizer
 from keras.preprocessing.text import Tokenizer
 from keras.preprocessing.sequence import pad sequences
 from keras models import Sequential
 from kerns layers import Embedding, SimpleRNN, Dense, Dropout
 from sklears import metrics
[mltk_data] Downloading package stopwords to /root/mltk_data...
[mltk_data] Package stopwords is already up-to-date!
[mltk_data] Downloading package wordnet to /root/mltk_data...
[mltk_data] Unripping corpora/wordnet.zip.
 df = pd.read jsos("https://ram.githubuse
                                                remntent.com/MainakMepositor/Datumets-/Waster/Finished_sentences/ison')
Removal Punctuation
 *defining to remove punctuation
 def remove_punctuation(text):
      punctuationfree = ".join([i for i in text if i not in string.punctuation])
return punctuationfree
 text['sentence_cleam'] = text['sentence'].apply(lambda text: remove_punctuation(text))
text-head()
                                                                                   sentence_clean
0 Apple supplier AMS cuts forecast, indicating p... Apple supplier AMS cuts forecast indicating po...
      U.S. factory and services activity quicken in ... US factory and services activity quicken in No...
2 Exclusive: Tesla expects global shortage of el... Exclusive Tesla expects global shortage of ele...
    World stocks climb on China trade relief, whil... World stocks climb on China trade relief while...
4 Boeing, J&J, dismal China data drag Wall Stree... Boeing JJ dismal China data drag Wall Street L.
```

Lower Casing

```
#netting lower case
text['sentence_lower'] = text['sentence_clean'].str.lower().
text.head()
```

	sentence	santance_clean	sentence_lower
0	Apple supplier AMS cuts forecast, indicating p	Apple supplier AMS cuts forecast indicating po	apple supplier arm outs forecast indicating po-
1	U.S. factory and services activity quickers in	US factory and services activity guideer in No	un factory and services activity quicken in no
2	Exclusive: Testa expects global shortage of et	Exchanive Testa expects: global shortage of ele	exclusive testa expects global shortage of ele
3	World stocks climb on China trade relief, while.	World stocks climb on Directrade relief while	world stocks of mb on thing trade rollef white
	Boeing, Ifici, dismal China data drag Wall Stree	Boring II disnul China data drag Wall Street L.	ticeing § dismal chine data drag wall street i

Tokenization

```
Parking function for interdiction

def tokenization(test):
   tokens = resolition; toket;
   return tokens

require function to the colors

test[ introde_tokenize] = boot[ intimin_lower ].apply(banks x: tokenization(x))

test_bood()
```

	tertence	seriesce, close	sectorics, lever	persona infamina
	Apple supplier AMS construences, indicating $\mathfrak{p}_{\mathrm{c}}$	Apple supplier AMS rate foresait Indicating pro-	apple supplier area cuts forecast indicating par-	Septim supplier and outs hoscost indicating p.
	U.S. factory and emicos satisfy quicken in	IX factory and renvisor activity quicken in No	se factory and services serivity quicken in no.	(set betterp and services activity quickers in tu-
	Exclusive: Tesla expects global shortage of et	Exclude Take reports global sharings of els	α chains to be expected plotted shortupe of elements of the α	(anchoive lesis expects global shortage of el.,
	World stocks clieds on China tracks relief, wild	World stocks direls on Othe trade relief white	world model affects on plant trade value while	healt stock dinb to this trade wild will.
4	Species (M.) charact Characteristic date (Mail Street,	Street, S. Street, Print date that Well Street L.	Service of the state of the format creek to	Annual Charles Ship Ship Stay and Stay

Removal Stopwords

	sertence	sertence clean	sentence (sees)	sentence tokenled	ne stopword
۰	Appin outpiler AMI cuts borours.	Apple supplier AND cuts forecast	apple supplier and cuts forecast	tippis supples are out forecast	Japole rupplier was cuts forecast
	indicating p	indicating pa-	indicating po-	indicating p	indicating p.
ŕ	U.S. factory and services and/vity quickers in	US factory and services activity quicken in ter-	us flattery and services activity quicken in no	(us factory and survivou activity quicken in K.	jus factory and services with the quicken in ru-
	Debutive: Yeaks impacts global	Exchance Yorks expents plotted	outliebe toda experte global	(inclusive tests reports global	Josehonne helle engelich global
	electrogs of al	phortage of els	electors of els	shortegs of al.,	shartege of eL.
*	World stocks climb on China heats	World stocks clients on Online backs	world productions on this trade	leofd sooks diets on dres trade	(world plocks climb on chiru trade
	refer, while.	relief white.	until white	relief whit	solial whit-
*	Booking 1811 offered China disks straig Well Street.	Scoring Lindson of China charaching Well- Street L.	Breezing & distract of the data straig well as	(Brocking & Bornal china tists shop well shoot	Excess 3 stored store data drap well stoot

Stemming

```
minifixing the adject for streeting
portor, street a Portorishment()
addriving a function for streeting
def streeting(text):
    store text = [portor_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_streeter_street
```

services stemmend	m_repeard	services tokerlad	serteror, level	seriesce claim	tentance	
Depth supplies are not belong to	Japan supplier area outs formust indicating p	Jappie supplies one curt francard inclinating p.	apple supplier arm outs formast referating pro-	Apple suppler (MI), rids brecord indicating pro-	Apple supplier EMS rule formant indicating p	
Selfactory and services artistry quicker in n	jus factory and recolors activity quicker in s	be Sectory and services activity quickets in ru-	or factory and reprises activity quickers in ea	16 history and remices activity cycles in No.	III. factory and services activity quicker in	ä
(exchaive insia expense global phortage of al	jestletve imla espesti global shartage of ni	Josepholive tests capacity global phontages of el.,	enchasive lends superits global shortage of ols	Sections bein experts ploted phortage of plot.	Exclusive Testa respects global shortage of all.	2
[world stocks clinib on chiral scale relief whit	(world stocks climb on chine track relief whit	Jeorid stocks direk on china made select white	world stocks client on china made relief while	World mosts slimb on Chies track relief white.	Warfet stocks diety on China trade relief, whit	
Storing 2 claims china class Shap wall share		(housing § shored other state othing well street	toxing) disner chine data ship well shreet L.	Beeing of Grend China Balls along Well Street L.	Rockey, MLI, closeuf Clinia deta drop Well Stree	4

Lemmatizing

```
saction to object for immunities
|resultion = wordestrementiate()
saction a faction for immunities
set bomotion wordestest;
| least bot ( leastion immunities(word) for word in text) |
| return least tot ( leastion immunities(word) for word in text) |
| saction immunities() = text[ bottomo_strement() apply(leaste text) | leasting_words(text)) |
| text family.
```

	sentence	sentence_class	sentance lower	sensors tolkerled	no steptered	settence, stemmend	sentence, Sentreetized
	Apple supplies AMS sold ferenast. indicating p	Apple supplier SMS cuts forecast inclinating pair.	again agailer and late formal indicating po-	Sagar sagatar are colo forces indicating p.	Depote supplies are rate forecast indicating (0-)	lagate sagalise area colo fermad tedesating p.	Japole regulier area cots forceast indicating p.
	U.S. factory and services activity quithers in	US factory and services activity quickers in Ma.	or lesson and sentent withing quickers in so	(as factory and sendon activity spokker in s.	(unlikely) and precion activity quickers in in	(as heavy and services activity quicker in n.	(as factory and services activity species in n.,
,	Inclusive: Itela expects global obsolute of el	Kallaine Feda reports plokel shortage of ele-	eschalus testa repecta global also tago pi pin-	postulier tests reports plokel stockage of st.	(mobalise to the expects) plotted about supe of M.	prediction to be reporch placed shortage of Al-	previous tricks repeats global shortage of el-
ŝ	Westrande dies on Chine trade wird, with	World stocks clinis on Clinis trade relief while	world stude cliefs on shins trade collect white.	jeurid stocks dinth on strins trade relief whit.	jacoki mošu zlimb ov china trade stilet atil	jworld stocks direk on china trade refer and.	Jean's stocks clinic on chine trans refer and.
*	Seniory, M.A. clomal China chesi drug Wall Street.	Rosing It stiered China date those Malf Street L.	booing § tilemal china. Sate strag and street L.	Booing 2 diamei shina data drag wall street	(bosing § dienal chine data dog voll court	Booing j donal think date day will devel	Boxing j danst this dea day will taver

1

Sentiment Analysis

```
df_new = text[['sentence_clean']]
df_new.head()
```

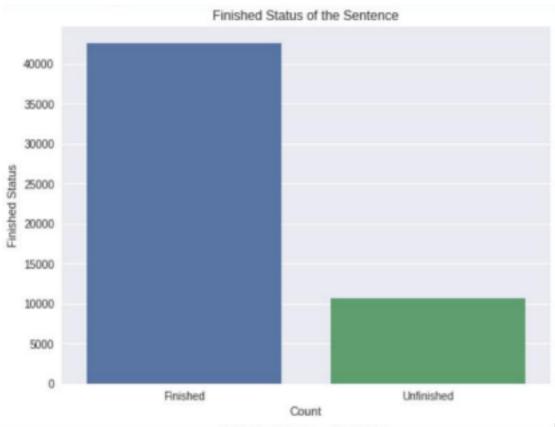
sentence clean

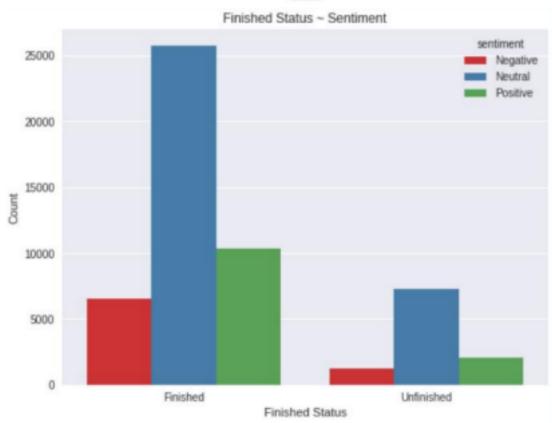
- Apple supplier AMS cuts forecast indicating po...
- 1 US factory and services activity quicken in No...
- 2 Exclusive Tesla expects global shortage of ele...
- 3 World stocks climb on China trade relief while...
- 4 Boeing JI dismal China data drag Wall Street L.

```
#create function to get subjectivity
def getSubjectivity(text):
    return TextBlob(text).sentiment.subjectivity

#create function to get po(arity
def getPolarity(text):
    return TextBlob(text).sentiment.polarity

#apply function to data
df_new['subjectivity'] = df_new['sentence_clean'].apply(getSubjectivity)
df_new['polarity'] = df_new['sentence_clean'].apply(getPolarity)
df_new.head()
```



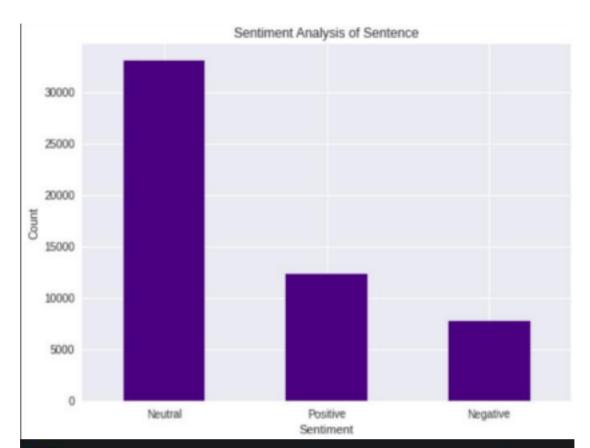






Wordcloud of Negative Sentence





/

Reccurent Neural Network Model

#handling categorical data
df['is_finished'] = df['is_finished'].astype('category').cat.codes
df.head()

	sentence	is_finished
0	Apple supplier AMS cuts forecast, indicating p	0
1	U.S. factory and services activity quicken in	0
2	Exclusive: Tesla expects global shortage of el	-1
3	World stocks climb on China trade relief, whil	0
4	Boeing, J&J, dismal China data drag Wall Stree	0

Conclusion: Therefore the incomplete sentences are analysed with 91% accuracy and segmented properly.