CSE3021 Social and Information Networks
Special Summer Term V 2021-22
Digital Assignment

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PART 1: Recent Trends in Social Network Analysis

I'm going to write about the SNA of Terrorism and Counterterrorism.

The usefulness of social network analysis, both as a theoretical viewpoint and as a methodological toolkit, for understanding and assessing terror organisations as well as for developing counterterror policies and practices to detect and disrupt terror attacks, is a key issue in tracking transnational terror trends. There have been several studies done on this, which generally consist of case studies of specific organisations or operations, data extraction from news articles and court case records, and matrix file creation for social network software analysis.

Even before the September 11, 2001, attacks, the value of SNA in the battle against terrorism was understood. Before the 9/11 attacks, in 2001, John Arquilla and David Ronfeldt published Networks and Netwars, which explains the expanded network principles in contemporary criminal organisations. 9 The book's central thesis is that conflict no longer involves a direct conflict between two superpowers. The formal, hierarchically structured enemy that existed during the Cold War with the USSR is no longer. A lower-intensity conflict between terrorists, criminals, and extremists known as "netwar" is characterised by a networked organisational structure. These networked structures may launch attacks more swiftly and frequently lack leaders. A network-based criminal organisation requires novel, asymmetric strategies to be defeated.

Following the 9/11 attacks, social network analysis became a hot topic in academics, the US government, and even the mainstream media. The Washington Post and DM News, two mainstream media publications, published stories outlining the potential advantages of network science. On radio and television programmes, popular press network authors, like Al Barabasi (Linked), were extensively questioned about how we should use the expertise of social networks to combat terrorism. Additionally, when the NSA's warrantless eavesdropping programme made headlines in 2006, a New York Times article discussing the ability of network analysis to map and potentially interpret the millions of communications the NSA intercepts every day brought back the significance of social network analysis in combating terrorism.

Beyond the initial case studies of terrorist networks, mathematicians, game theorists, and computer scientists are drastically expanding their research. Most of their work focuses on developing tactics for anti-terrorist organisations to undermine covert organisations. They

create sophisticated and exact mathematical models and computer algorithms, and then methodically alter parameters to evaluate their effectiveness at spotting and stopping terrorist activity in various scenarios. An early attempt attempted to quantify the degree to which a terrorist group breaks down after some of its members are killed or caught using the mathematical theory of ordered sets. The model allows counterterror authorities to calculate the likelihood of disconnecting a network by deleting a given number of members under the assumption of a hierarchical cell structure comprising leaders and followers. Finding the network's cutset—the network players whose removal destroys all vertical chains of command connecting officers to soldiers—is the method's key step. Naturally, the mathematical model is irrelevant for actual terrorist organisations that lack hierarchical communication networks. Computer models of terrorist networks and the effects of different counterterrorism tactics on their resilience and ability to carry out future attacks are made possible by computational approaches.

The simulation of automated agent behaviours and interactions in the context of their environments, as well as the analysis of macro-level patterns deriving from micro-level agent interactions, are all part of agent-based modelling techniques. Researchers can get some understanding and insight into potentially viable counterterrorism measures against terrorist networks that adapt to their opponents' activities by running thousands of simulations under varied parameter assumptions. For instance, the Stochastic Opponent Modelling Agent (SOMA) set of computational and network tools generated rules for a terrorist group's behaviour using textual data that was automatically retrieved from document sources. Future network research must focus on a number of critical issues, such as: conducting thorough comparisons of four historical waves of modern terrorism for insights into current and upcoming waves; developing more thorough, cohesive, and integrated theoretical models that can explain the formation, structure, and effects of terrorist networks; creating new techniques for measuring network relations among terrorists; and conducting more laboratory experiments as an alternative to co-experimentation.

Emerging trends in the social network analysis of terrorism and counterterrorism will be influenced by the constantly evolving transnational terror networks. Although it is notoriously difficult to forecast a terrorist group's exact course of action, some broad trends can be seen. Global jihadism changed over the past 20 years as a result of pressure from anti-terror organisations, moving from centralised hierarchies to networked groupings to dispersed or isolated cells. Disconnected units are more challenging to identify and stop, especially during lone-wolf attacks like the Boston Marathon bombing on April 15, 2013, and the Fort Hood shooting on November 9, 2009. Assembling, training, planning, and launching terrorist attacks are increasingly possible in unstable and failed regimes, as was the case with the Westgate Mall incident in Nairobi, Kenya, on September 21, 2013, which was carried out by Al-Shabaab gunmen from Somalia.

Hypotheses predicting actor reactions and network structure changes will be put to the test through the controlled manipulation of parameters, such as information and prices. Researchers will examine how various scenarios affect individuals' behaviour and group outcomes such target selection, detection, deterrent, disruption, network resilience, security choice, and resource allocation. Experimental results will be applied to massively multiplayer online role-playing games that pit fictitious terrorists against anti-terrorist agents for more intricacy and realism.

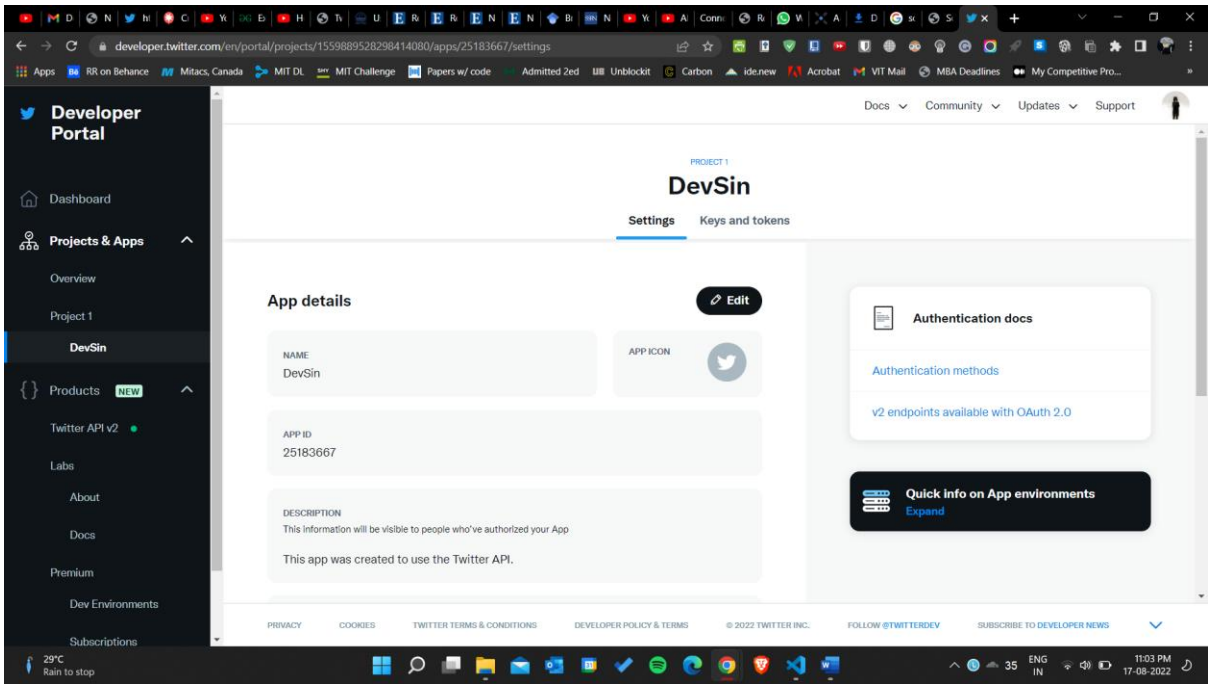
Researchers will start looking at systems of individuals, organisations, institutions, and events rather than just case studies of specific occurrences. To produce more realistic coevolving network dynamics, counterterrorism measures will be combined with terrorist behaviours. Many academics will continue to rely on gathering secondary data from public records because of the dearth of original material obtained from terrorists. For propaganda, radicalization, recruiting, and financial transactions, other researchers will stress the significance of the Internet and virtual communication networks connecting thousands of extremist Websites. Content-based pattern recognition will be improved by enormous data mining techniques that are significantly more advanced. However, quality control will require that these automated procedures be combined with painstaking manual repair of any gaps and inaccuracies. Regardless of specific future directions, social network researchers must unquestionably take on the challenge of figuring out how to apply network analytic theory and methods for a better understanding, identifying, and blocking of criminals engaging in terrorist actions.

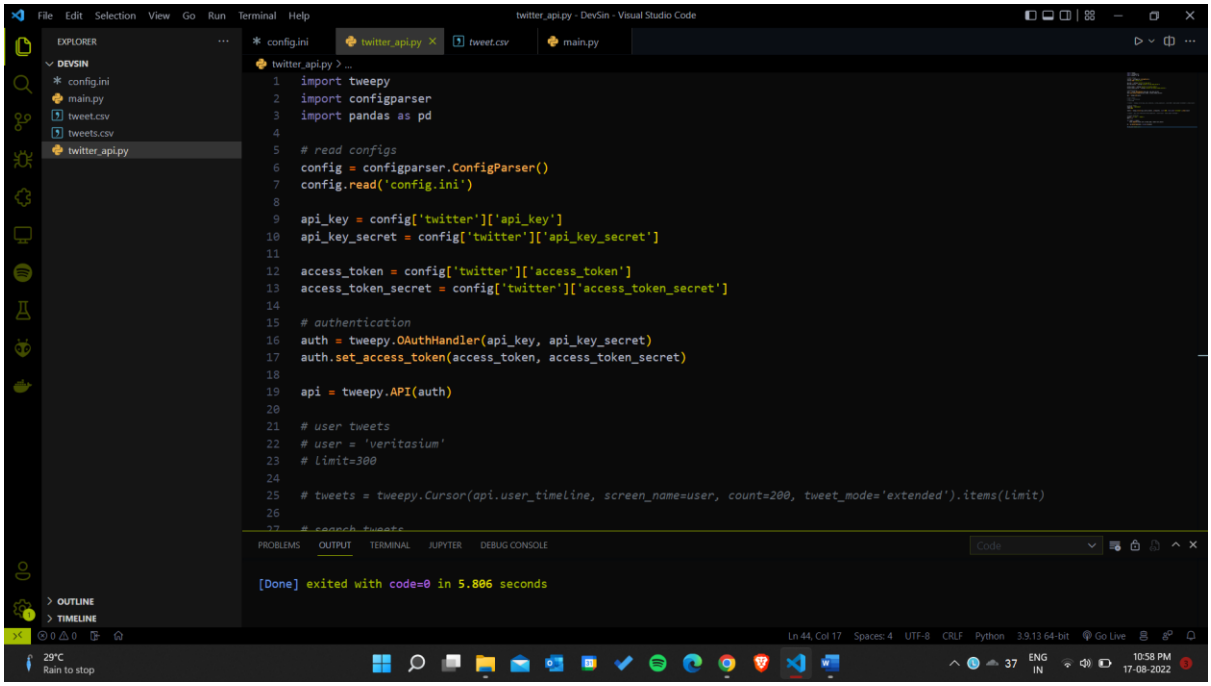
PART 2: 5%6=5 ⇒ Q.5
Write a program/script to print the recent 100 tweets by a user.

Using the twitter api, and a python module 'tweepy', I'm going to extract the most recent 100 tweets of Elon Musk.

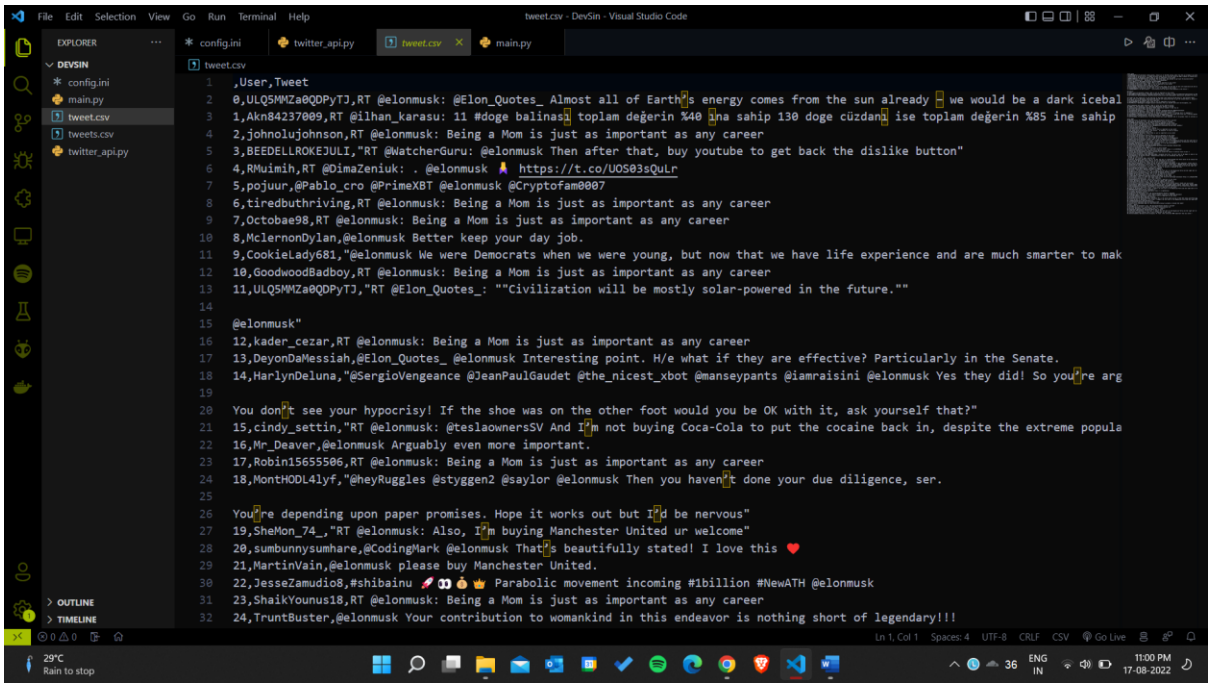
```
import tweepy
import configparser
import pandas as pd

# read configs
config = configparser.ConfigParser()
config.read('config.ini')

api_key = config['twitter']['api_key']
api_key_secret = config['twitter']['api_key_secret']

access_token = config['twitter']['access_token']
access_token_secret = config['twitter']['access_token_secret']

# authentication
auth = tweepy.OAuthHandler(api_key, api_key_secret)
auth.set_access_token(access_token, access_token_secret)

api = tweepy.API(auth)
# user tweets
# user = 'elonmusk'
```

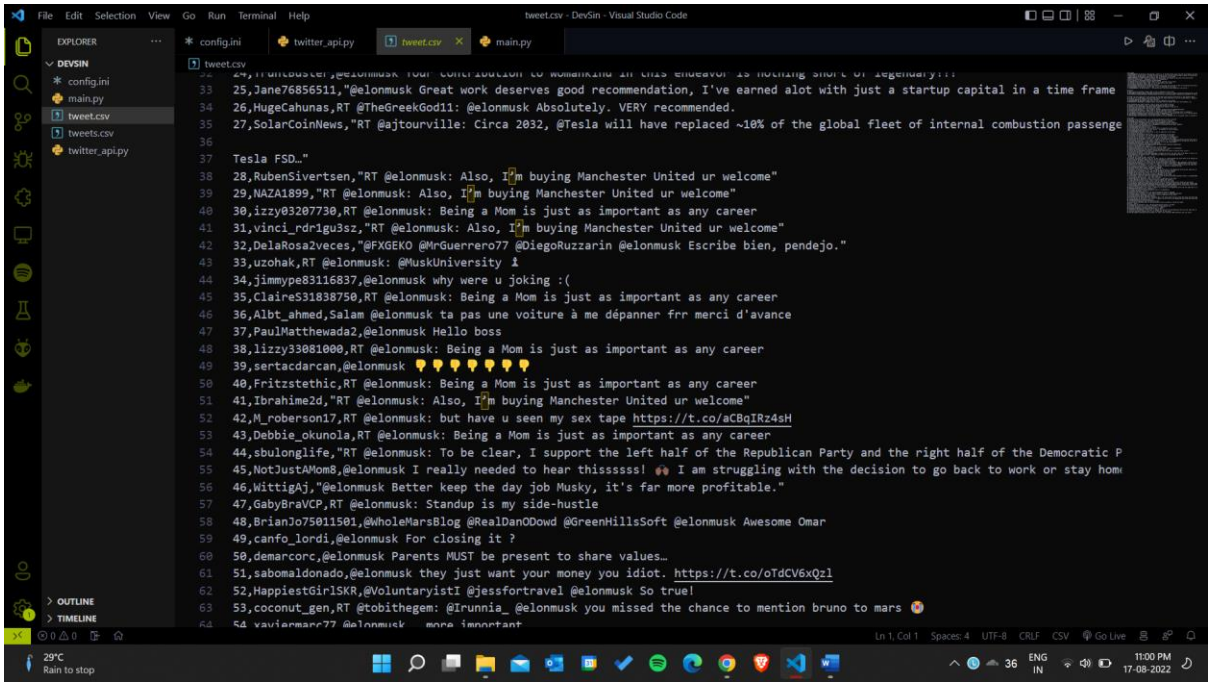
```
# limit=300

# tweets = tweepy.Cursor(api.user_timeline, screen_name=user, count=200,
tweet_mode='extended').items(limit)

# search tweets
keywords = '@elonmusk'
limit=100

tweets = tweepy.Cursor(api.search_tweets, q=keywords, count=100,
tweet_mode='extended').items(limit)

# tweets = api.user_timeline(screen_name=user, count=limit,
tweet_mode='extended')

# create DataFrame
columns = ['User', 'Tweet']
data = []

for tweet in tweets:
    data.append([tweet.user.screen_name, tweet.full_text])

df = pd.DataFrame(data, columns=columns)

df.to_csv('tweet.csv')
```





Tweets in csv:

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tweet.csv - DevSin - Visual Studio Code
EXPLORER
DEVSIN
config.ini
main.py
tweet.csv
tweets.csv
twitter_api.py
OUTLINE
TIMELINE
25,Jane76856511,"@elonmusk Great work deserves good recommendation, I've earned alot with just a startup capital in a time frame
26,HugeCahunas,RT @TheGreekGod11: @elonmusk Absolutely. VERY recommended.
27,SolarCoinNews,"RT @ajtourville: Circa 2032, @Tesla will have replaced ~10% of the global fleet of internal combustion passenge
Tesla FSD…"
28,RubenSivertsen,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
29,NAZA1899,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
30,izzy03207730,RT @elonmusk: Being a Mom is just as important as any career
31,vinci_rdr1gu3sz,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
32,DelaRosa2veces,"@FXGEKO @MrGuerrero77 @DiegoRuzzarin @elonmusk Escribe bien, pendejo."
33,uzohak,RT @elonmusk: @MuskUniversity
34,jimmype83116837,@elonmusk why were u joking :(
35,ClaireS31838750,RT @elonmusk: Being a Mom is just as important as any career
36,Albt_ahmed,Salam @elonmusk ta pas une voiture à me dépanner frr merci d'avance
37,PaulMatthewada2,@elonmusk Hello boss
38,lizzy33081000,RT @elonmusk: Being a Mom is just as important as any career
39,sertacdarcan,@elonmusk
40,Fritzstethic,RT @elonmusk: Being a Mom is just as important as any career
41,Ibrahime2d,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
42,M_roberson17,RT @elonmusk: but have u seen my sex tape https://t.co/aCBqIRz4sH
43,Debbie_okunola,RT @elonmusk: Being a Mom is just as important as any career
44,sbulonglife,"RT @elonmusk: To be clear, I support the left half of the Republican Party and the right half of the Democratic P
45,NotJustAMom8,@elonmusk I really needed to hear thisssssss! I am struggling with the decision to go back to work or stay hom
46,WittigAj,"@elonmusk Better keep the day job Musky, it's far more profitable."
47,GabyBraVCP,RT @elonmusk: Standup is my side-hustle
48,BrianJo75011501,@WholeMarsBlog @RealDanODowd @GreenHillsSoft @elonmusk Awesome Omar
49,canfo_lordi,@elonmusk For closing it ?
50,demarcorc,@elonmusk Parents MUST be present to share values…
51,sabomaldonado,@elonmusk they just want your money you idiot. https://t.co/oTdCV6xQz1
52,HappiestGirlSKR,@VoluntaryistI @jessfortravel @elonmusk So true!
53,coconut_gen,RT @tobithegem: @Irunnia_ @elonmusk you missed the chance to mention bruno to mars
54,xaviermarc77,@elonmusk more important
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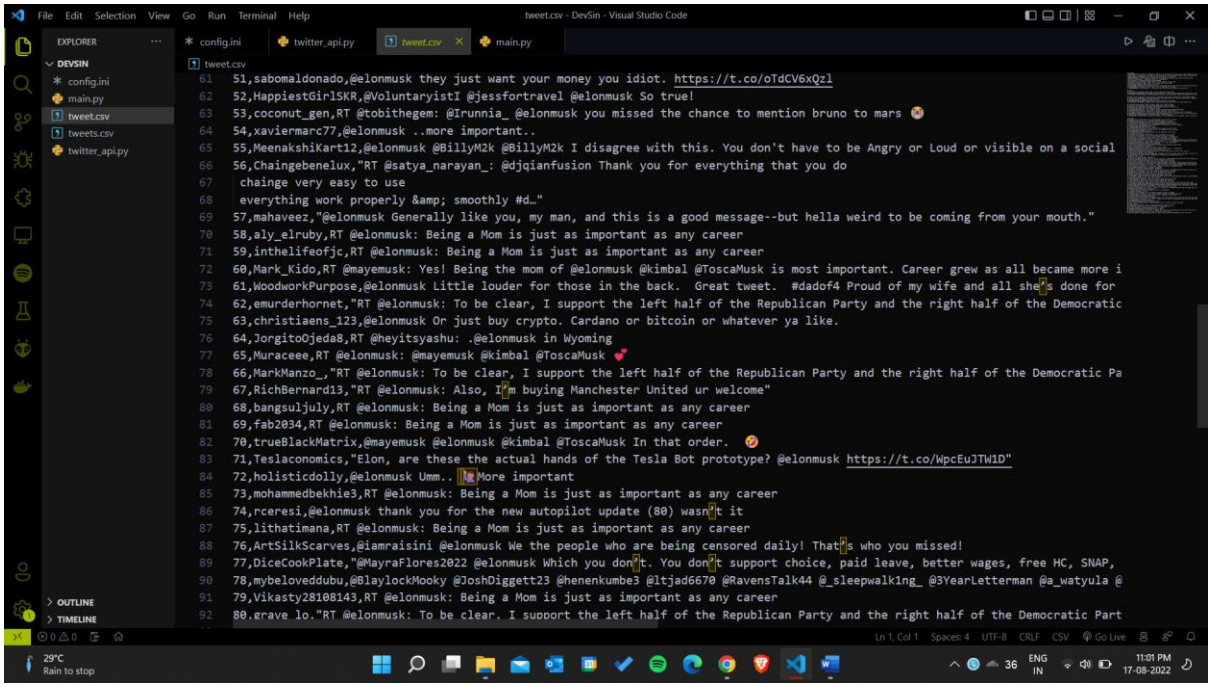
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tweets.csv
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OUTLINE
TIMELINE
51,sabomaldonado,@elonmusk they just want your money you idiot. https://t.co/oTdCV6xQz1
52,HappiestGirlSKR,@VoluntaryistI @jessfortravel @elonmusk So true!
53,coconut_gen,RT @tobithegem: @Irunnia_ @elonmusk you missed the chance to mention bruno to mars
54,xaviermarc77,@elonmusk ..more important..
55,MeenakshiKart12,@elonmusk @BillyM2k @BillyM2k I disagree with this. You don't have to be Angry or Loud or visible on a social
56,Chaingebenelux,"RT @satya_narayan_: @djqianfusion Thank you for everything that you do
chainge very easy to use
everything work properly & smoothly #d…"
57,mahaveez,"@elonmusk Generally like you, my man, and this is a good message--but hella weird to be coming from your mouth."
58,aly_elruby,RT @elonmusk: Being a Mom is just as important as any career
59,inthelifeofjc,RT @elonmusk: Being a Mom is just as important as any career
60,Mark_Kido,RT @mayemusk: Yes! Being the mom of @elonmusk @kimbal @ToscaMusk is most important. Career grew as all became more i
61,WoodworkPurpose,@elonmusk Little louder for those in the back. Great tweet. #dadof4 Proud of my wife and all she's done for
62,emurderhornet,"RT @elonmusk: To be clear, I support the left half of the Republican Party and the right half of the Democratic
63,christiaens_123,@elonmusk Or just buy crypto. Cardano or bitcoin or whatever ya like.
64,JorgitoOjeda8,RT @heyitsyashu: .@elonmusk in Wyoming
65,Muraceee,RT @elonmusk: @mayemusk @kimbal @ToscaMusk
66,MarkManzo_,"RT @elonmusk: To be clear, I support the left half of the Republican Party and the right half of the Democratic Pa
67,RichBernard13,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
68,bangsuljuly,RT @elonmusk: Being a Mom is just as important as any career
69,fab2034,RT @elonmusk: Being a Mom is just as important as any career
70,trueBlackMatrix,@mayemusk @elonmusk @kimbal @ToscaMusk In that order.
71,Teslaconomics,"Elon, are these the actual hands of the Tesla Bot prototype? @elonmusk https://t.co/WpcEuJTW1D"
72,holisticdolly,@elonmusk Umm.. More important
73,mohammedbekhie3,RT @elonmusk: Being a Mom is just as important as any career
74,rceresi,@elonmusk thank you for the new autopilot update (80) wasn't it
75,lithatimana,RT @elonmusk: Being a Mom is just as important as any career
76,ArtSilkScarves,@iamraisini @elonmusk We the people who are being censored daily! That's who you missed!
77,DiceCookPlate,"@MayraFlores2022 @elonmusk Which you don't. You don't support choice, paid leave, better wages, free HC, SNAP,
78,mybeloveddubu,@BlaylockMooky @JoshDiggett23 @henenkumbe3 @ltjad6670 @RavensTalk44 @_sleepwalk1ng_ @3YearLetterman @a_watyula @
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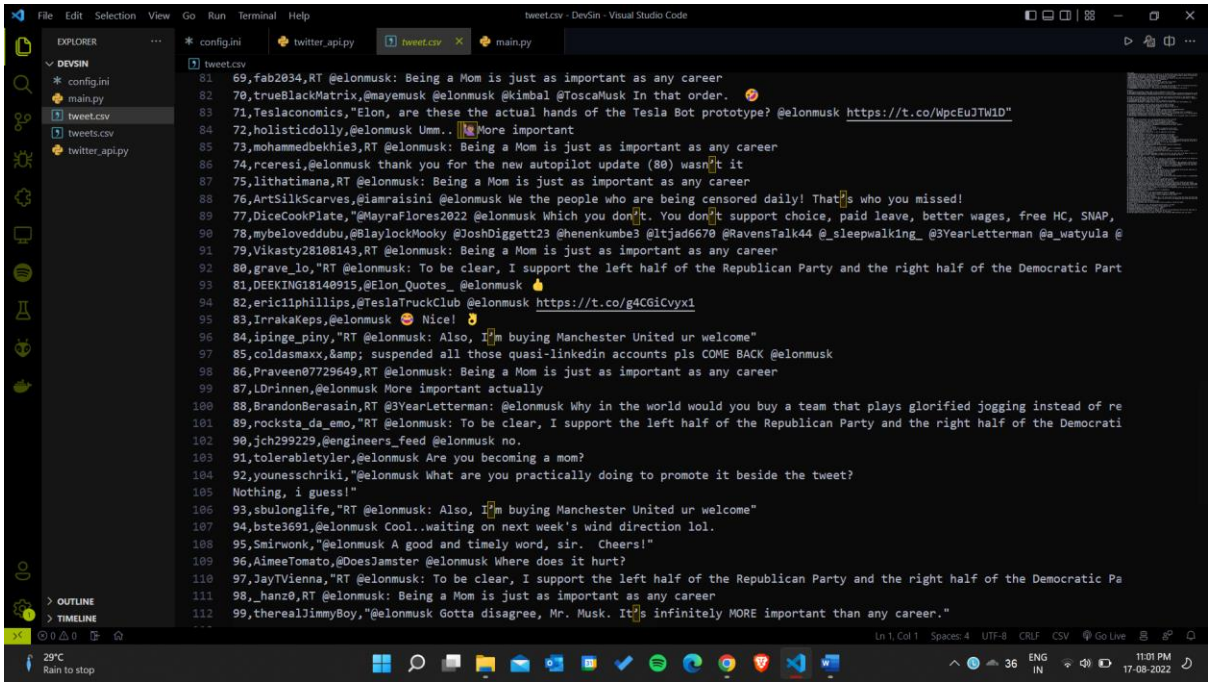
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80,grave_lo,"RT @elonmusk: To be clear, I support the left half of the Republican Party and the right half of the Democratic Part
81,DEEKING18140915,@Elon_Quotes_ @elonmusk
82,eric11phillips,@TeslaTruckClub @elonmusk https://t.co/g4CGiCvyx1
83,IrrakaKeps,@elonmusk Nice!
84,ipinge_piny,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
85,coldasmaxx,& suspended all those quasi-linkedin accounts pls COME BACK @elonmusk
86,Praveen07729649,RT @elonmusk: Being a Mom is just as important as any career
87,LDrinnen,@elonmusk More important actually
88,BrandonBerasain,RT @3YearLetterman: @elonmusk Why in the world would you buy a team that plays glorified jogging instead of re
89,rocksta_da_emo,"RT @elonmusk: To be clear, I support the left half of the Republican Party and the right half of the Democrati
90,jch299229,@engineers_feed @elonmusk no.
91,tolerabletyler,@elonmusk Are you becoming a mom?
92,younesschriki,"@elonmusk What are you practically doing to promote it beside the tweet?
Nothing, i guess!"
93,sbulonglife,"RT @elonmusk: Also, I'm buying Manchester United ur welcome"
94,bste3691,@elonmusk Cool..waiting on next week's wind direction lol.
95,Smirwonk,"@elonmusk A good and timely word, sir. Cheers!"
96,AimeeTomato,@DoesJamster @elonmusk Where does it hurt?
97,JayTVienna,"RT @elonmusk: To be clear, I support the left half of the Republican Party and the right half of the Democratic Pa
98,_hanz0,RT @elonmusk: Being a Mom is just as important as any career
99,therealJimmyBoy,"@elonmusk Gotta disagree, Mr. Musk. It's infinitely MORE important than any career."
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