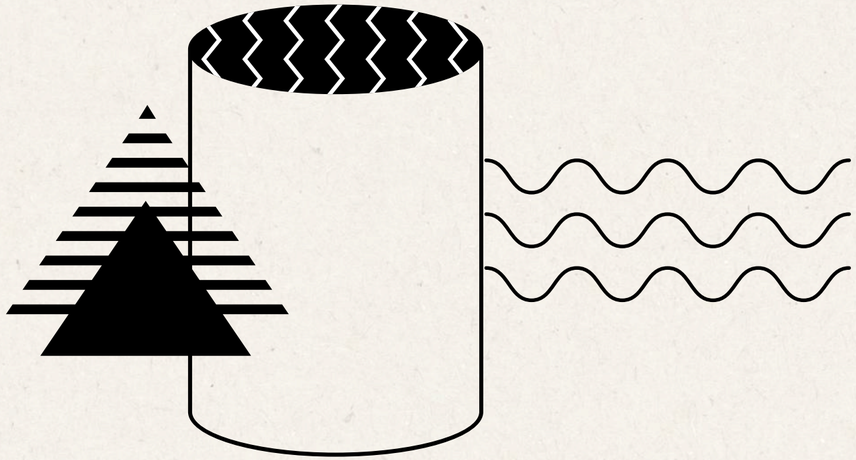
DÖNEMLERE GÖRE ŞARKI SÖZÜ ANALIZI

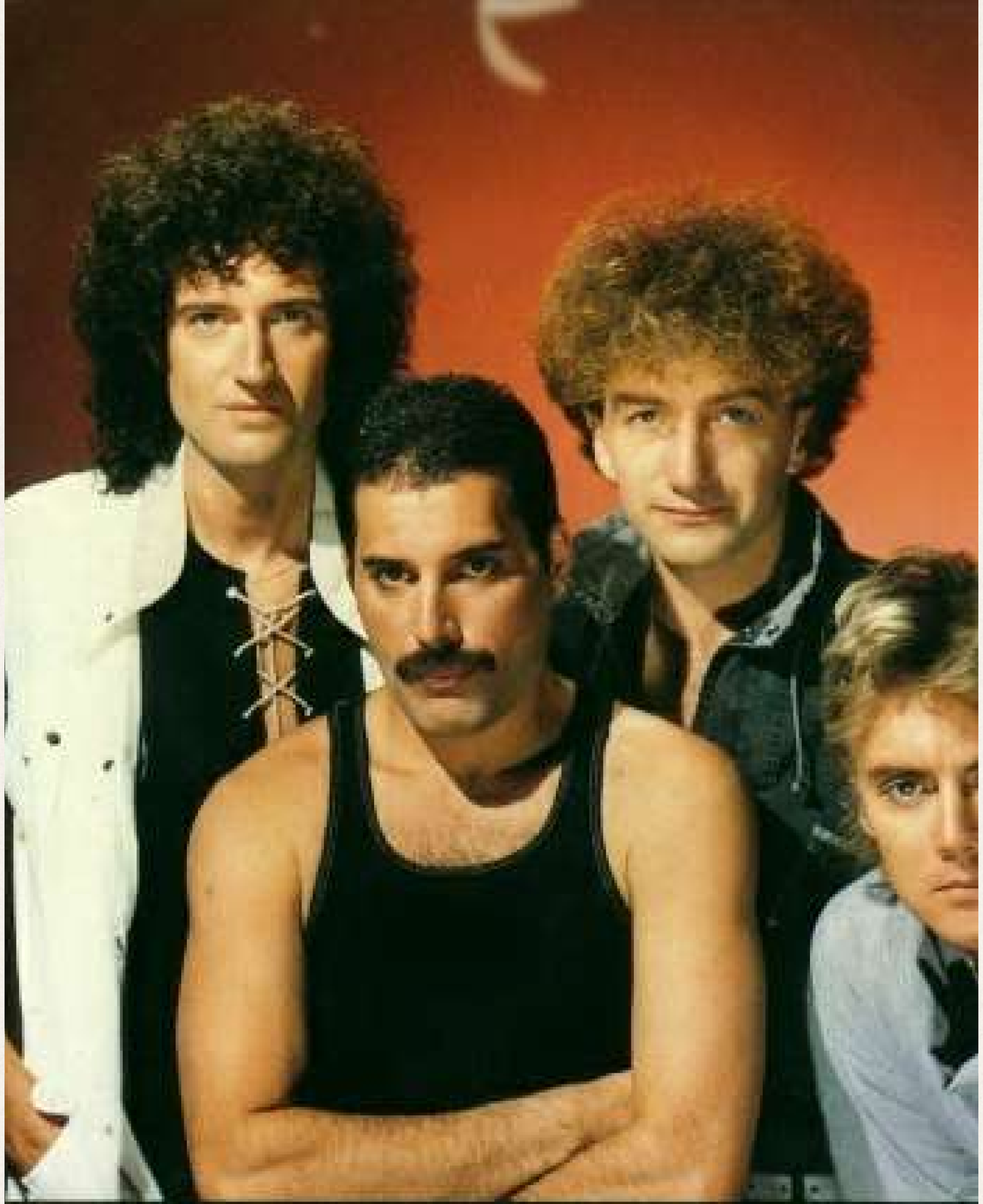
Beyda Bucak

İçerik



01 Projenin amacı, dönemlere göre değişen sözlerin duyguları nasıl etkilediğini açık bir şekilde göstermektir.

02 Aynı zamanda zamanla sözlerin nasıl değiştiğini ve en sık kullanılan kelimeleri görselleştirerek sunmaktır.



Genel Bakış

Proje, belli dönemlerde çıkan şarkıların sözlerinin duygu analizini içerir.

Proje Aşamaları

Proje başlangıcı

Veri Toplama

Veri Temizleme ve Manipülasyonu

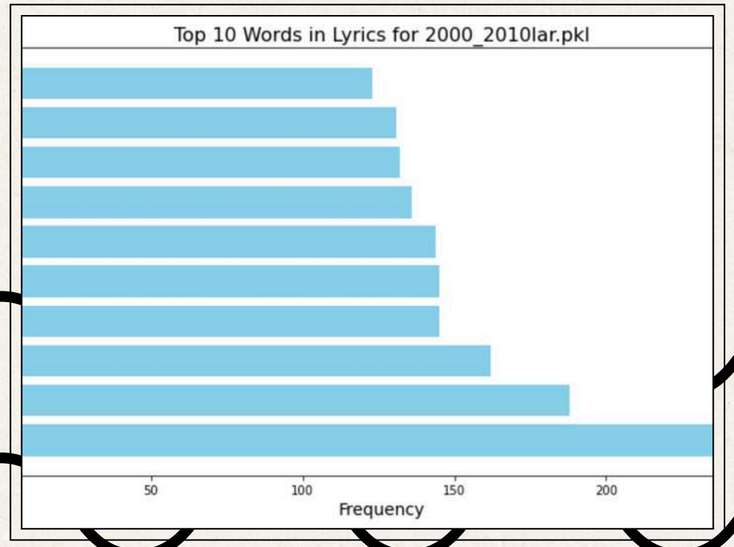
Model Seçimi

Analiz

Veri Görselleştirme

Proje Sunumu

Kullanılan Teknolojiler & Kütüphaneler



Programlama Dili:
Python

Kütüphaneler:

Veri Depolama ve Manipülasyonu
pandas
pickle
os

Natural Language Processing
transformers
nltk
scikit-learn
hugging face

Görselleştirme
matplotlib
seaborn

Datasets

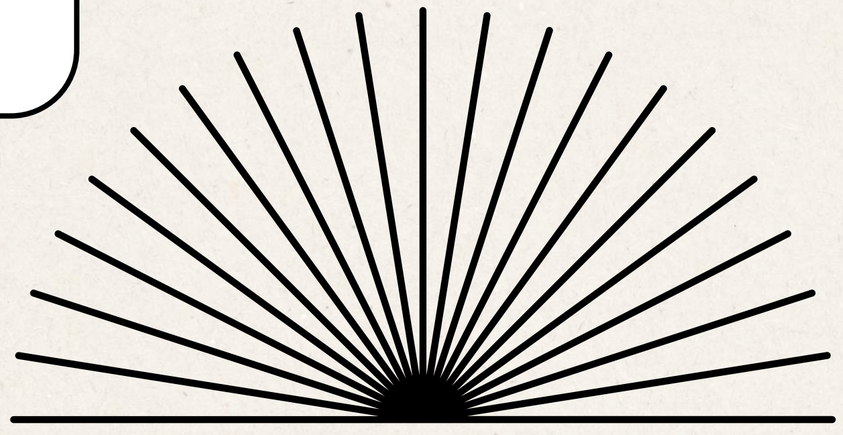
1960lar:
the beatles
elvis presley
aretha franklin
bob dylan

1980ler:
michael jackson
madonna
prince
U2

1990lar:
Nirvana
Radiohead
Tupac
Mariah Carey
Dr. Dre

2000-2010lar:
Eminem
Beyonce
Rihanna
Drake
Justin Bieber

2020'ler:
The Weeknd
Post Malone
Taylor Swift
Billie Eilish



1960lar.json
1980ler.json
1990lar.json
2000_2010lar.json
2020ler.json

Datasets

```python
import lyricsgenius

token = "_NLwHnz0CM2_6nONtl6A6bcsHSmV1KR_ynMrzBly54jcs0_ElN2Q1UW8a3E0GskR"
genius = lyricsgenius.Genius(token)

genius.verbose = False
genius.remove_section_headers = True
genius.timeout = 15

artists = [
    "Elvis Presley", "Aretha Franklin", "Bob Dylan",
    "Michael Jackson", "Madonna", "Prince", "U2",
    "Nirvana", "Radiohead", "Tupac", "Mariah Carey", "Dr. Dre",
    "Eminem", "Beyonce", "Rihanna", "Drake", "Justin Bieber",
    "The Weeknd", "Post Malone", "Taylor Swift"
]

for artist_name in artists:
    try:
        artist = genius.search_artist(artist_name, max_songs=20, sort="popularity")
        if artist:
            print(f"\nSanatçı: {artist.name}")
            for song in artist.songs:
                print(f"- {song.title}")

            filename = f"{artist.name.replace(' ', '_')}_Lyrics.json"
            artist.save_lyrics(filename)
            print(f"{artist.name} şarkı sözleri '{filename}' dosyasına kaydedildi.\n")
        else:
            print(f"{artist_name} için sonuç bulunamadı.\n")
    except Exception as e:
        print(f"{artist_name} için bir hata oluştu: {e}\n")
```

Sanatçıların Json Dosyalarını Oluşturma

- lyricsgenius
- genius API

Datasets

```
donem2000_2010lar = [
    "Eminem_Lyrics.json",
    "Beyonce_Lyrics.json",
    "Rihanna_Lyrics.json",
    "Justin_Bieber_Lyrics.json",
    "Drake_Lyrics.json"
]
donem2020ler = [
    "The_Weeknd_Lyrics.json",
    "Taylor_Swift_Lyrics.json",
    "Post_Malone_Lyrics.json"
]

donemler = {
    "1960lar.json": donem1960lar,
    "1980ler.json": donem1980ler,
    "1990lar.json": donem1990lar,
    "2000_2010lar.json": donem2000_2010lar,
    "2020ler.json": donem2020ler
}
```

Dönemlerin Json Dosyalarını Oluşturma

```
for donem_dosya, sanatci_dosyalar in donemler.items():
    combined_data = {"artists": []}

    for sanatci_dosya in sanatci_dosyalar:
        sanatci_dosya_path = os.path.join(json_folder, sanatci_dosya)
        try:
            with open(sanatci_dosya_path, "r", encoding="utf-8") as f:
                data = json.load(f)
                if "artists" in data:
                    combined_data["artists"].extend(data["artists"])
                else:
                    combined_data["artists"].append(data)
        except Exception as e:
            print(f"{sanatci_dosya} işlenirken hata oluştu: {e}")
            continue

    with open(donem_dosya, "w", encoding="utf-8") as f:
        json.dump(combined_data, f, ensure_ascii=False, indent=4)
    print(f"{donem_dosya.split('.')[0]} kaydedildi.")
```

Datasets

Dönem & Sanatçı Json Dosyaları

→

Dönem ve Sanatçı CSV Dosyaları

- **Daha kolay okunabilirlik**
- **Veri işleme için standartlaştırma**
- **Pandas ve diğer araçlarla uyumlu hale getirme**
- **İleride kullanım için esneklik sağlama**

Veri Temizleme

[238]:
```
print("Her bir DataFrame'deki eksik değerlerin sayısı:\n")
for name, df in dataframes.items():
    print(f"{name} için eksik veri durumu:")
    print(df.isnull().sum())
    print("-" * 50)
```

```
Her bir DataFrame'deki eksik değerlerin sayısı:

2000_2010lar.csv için eksik veri durumu:
artist_name     0
song_title      0
release_date    0
album           4
lyrics          0
dtype: int64
--------------------------------------------------
Drake_Lyrics.csv için eksik veri durumu:
title           0
release_date    0
album           2
lyrics          0
dtype: int64
--------------------------------------------------
Radiohead_Lyrics.csv için eksik veri durumu:
title           0
release_date    0
album           0
lyrics          0
dtype: int64
--------------------------------------------------
Post_Malone_Lyrics.csv için eksik veri durumu:
title           0
release_date    0
album           0
lyrics          0
dtype: int64
--------------------------------------------------
```

:
```
for name, df in dataframes.items():
    df.dropna(inplace=True)
    df.reset_index(drop=True, inplace=True)
    df['release_date'] = pd.to_datetime(df['release_date'], format='%Y-%m-%d')

    df["year"] = df["release_date"].dt.strftime('%Y')

df_60lar= dataframes.get('1960lar.csv')
df_60lar.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 73 entries, 0 to 72
Data columns (total 6 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   artist_name   73 non-null     object
 1   song_title    73 non-null     object
 2   release_date  73 non-null     datetime64[ns]
 3   album         73 non-null     object
 4   lyrics        73 non-null     object
 5   year          73 non-null     object
dtypes: datetime64[ns](1), object(5)
memory usage: 3.5+ KB
```

Veri Temizleme

Dönem & Sanatçı CSV Dosyaları

Dönem ve Sanatçı Pickle Dosyaları

- Daha hızlı yükleme
- Daha az disk alanı kullanımı
- Python ile uyumlu veri saklama
- Tekrar işlem yapmadan veri taşıma

Datasets

```python
import pickle
import os

pickle_folder = './pickled_data'

if not os.path.exists(pickle_folder):
    os.makedirs(pickle_folder)
    print(f"'{pickle_folder}' klasörü oluşturuldu.")

for name, df in dataframes.items():
    pickle_file_path = os.path.join(pickle_folder, f"{name.replace('.csv', '.pkl')}")

    try:
        with open(pickle_file_path, "wb") as pickle_file:
            pickle.dump(df, pickle_file)
        print(f"{name.replace('.csv', '.pkl')} dosyası başarıyla kaydedildi.")
    except Exception as e:
        print(f"{name.replace('.csv', '.pkl')} dosyasını kaydederken hata oluştu: {e}")
```

```
2000_2010lar.pkl dosyası başarıyla kaydedildi.
Drake_Lyrics.pkl dosyası başarıyla kaydedildi.
Radiohead_Lyrics.pkl dosyası başarıyla kaydedildi.
Post_Malone_Lyrics.pkl dosyası başarıyla kaydedildi.
1990lar.pkl dosyası başarıyla kaydedildi.
```

- pickle
- os

Veri Temizleme

```python
import pickle
import os

pickle_folder = './pickled_data'
pickle_file_path = os.path.join(pickle_folder, "Madonna_Lyrics.pkl")

with open(pickle_file_path, "rb") as pickle_file:
    df = pickle.load(pickle_file)

print(df.lyrics[0])
```

```
77 ContributorsTranslationsPortuguêsItalianoEspañolLike a Prayer Lyrics
Life is a mystery
Everyone must stand alone
I hear you call my name
And it feels like home

When you call my name
It's like a little prayer
I'm down on my knees
I want to take you there
In the midnight hour
I can feel your power
Just like a prayer
You know I'll take you there
```

Veri Temizleme

```
import re
import pandas as pd
import nltk
from nltk.corpus import stopwords

nltk.download('stopwords')
stop_words = set(stopwords.words('english'))

custom_stop_words = ['oh', 'a', 'you','let', 'youre', 'get', 'aint', 'say','know', 'yeah', 'lyrics', 'ah
stop_words.update(custom_stop_words)

def clean_lyrics(lyrics):
    if not isinstance(lyrics, str):  # Ensure the input is a string
        return ''
    lyrics = re.sub(r'\[.*?\]|\(.*?\)', '', lyrics)
    lyrics = re.sub(r'\d+', '', lyrics)
    lyrics = re.sub(r'[^\w\s]', '', lyrics).replace('\n', ' ')
    lyrics = re.sub(r'\bcontrib\w*\b', '', lyrics, flags=re.IGNORECASE)
    lyrics = lyrics.lower()
    lyrics = ' '.join([word for word in lyrics.split() if word not in stop_words])
    lyrics = ' '.join([word.split('embed')[0] if 'embed' in word else word for word in lyrics.split()])
    return lyrics.strip()
```

Veri Temizleme

```python
import pickle

pickle_folder = './pickled_data'
pickle_file_path = os.path.join(pickle_folder, "Beatles_Lyrics.pkl")

with open(pickle_file_path, "rb") as pickle_file:
    df = pickle.load(pickle_file)

print(df['clean_lyrics'][0])
```

```
yesterday troubles seemed far away looks though theyre stay believe yesterday suddenly half man used
rday came suddenly go wouldnt said something wrong long yesterday yesterday love easy game play place
y go wouldnt said something wrong long yesterday might yesterday love easy game play place hide away
```

Model ve Analiz

```python
from transformers import AutoTokenizer, AutoModelForSequenceClassification

tokenizer = AutoTokenizer.from_pretrained("cardiffnlp/twitter-roberta-base-sentiment-latest")
model = AutoModelForSequenceClassification.from_pretrained("cardiffnlp/twitter-roberta-base-sentiment-latest")

pickle_folder = './pickled_data'

pickle_files = [f for f in os.listdir(pickle_folder) if f.endswith('.pkl')]

def get_sentiment(lyrics):
    inputs = tokenizer(lyrics, return_tensors="pt", truncation=True, padding=True, max_length=512)

    with torch.no_grad():
        outputs = model(**inputs)
        logits = outputs.logits

    probs = torch.nn.functional.softmax(logits, dim=-1)

    labels = ['negative', 'neutral', 'positive']

    sentiment_score, sentiment_label_idx = torch.max(probs, dim=-1)
    sentiment_label = labels[sentiment_label_idx.item()]

    return sentiment_label, sentiment_score.item()
```

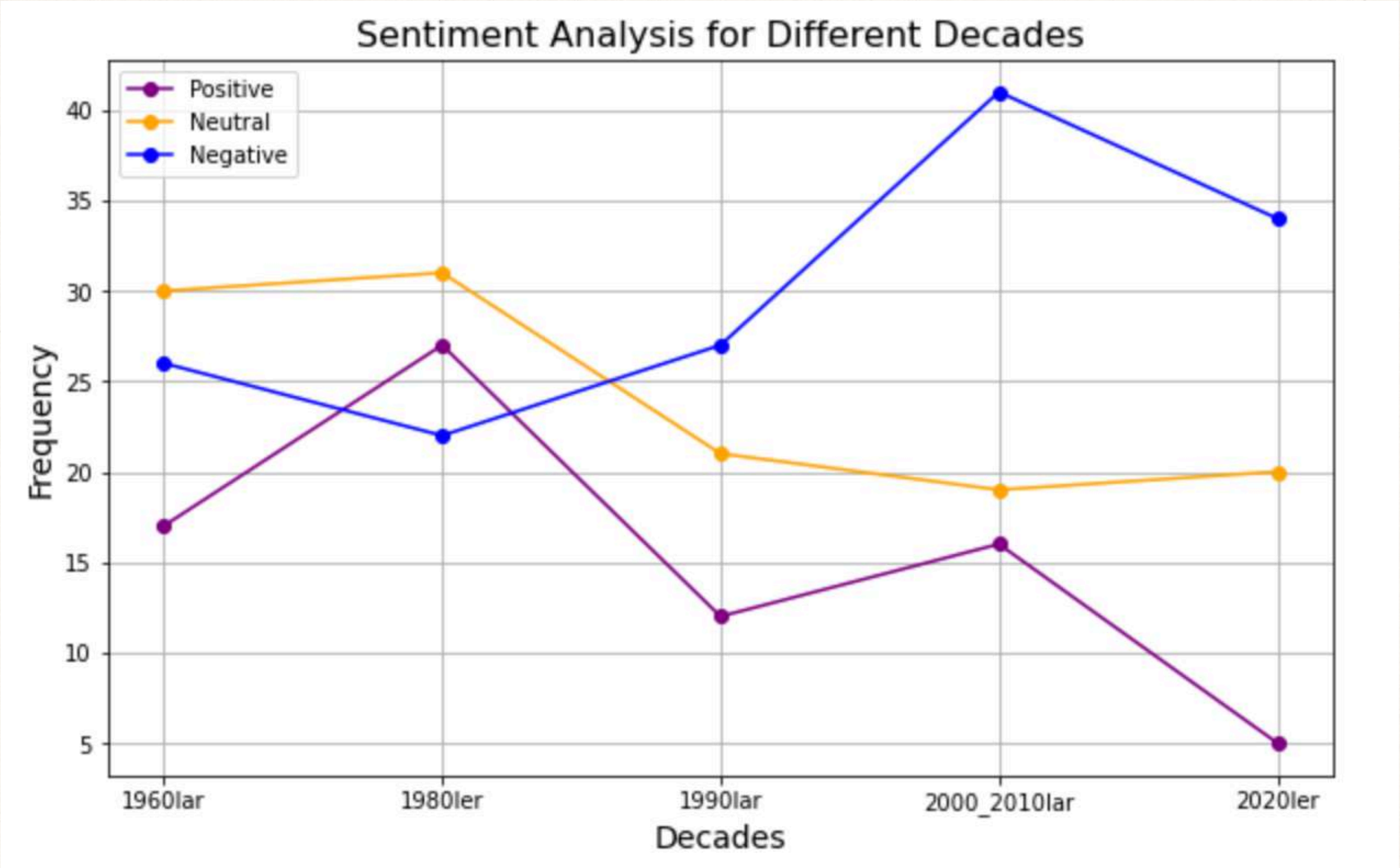
- **Hugging Face**
- **transformers**
- **twitter roberta base sentiment**

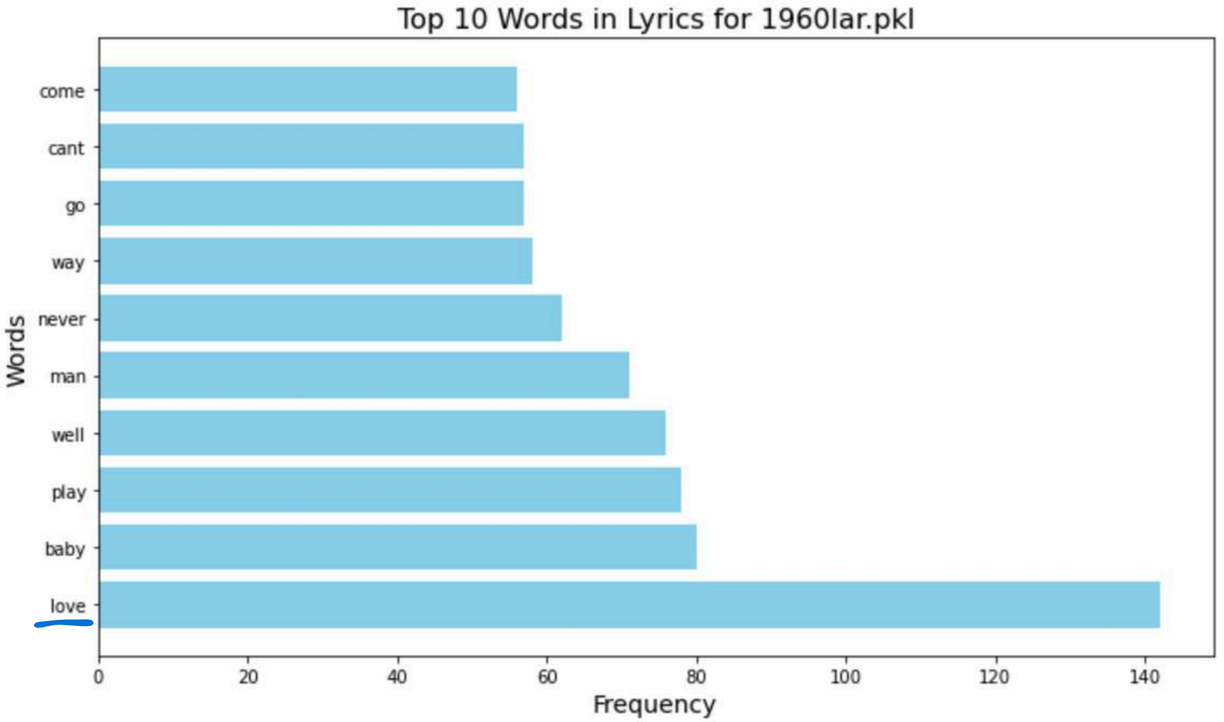
Model ve Analiz

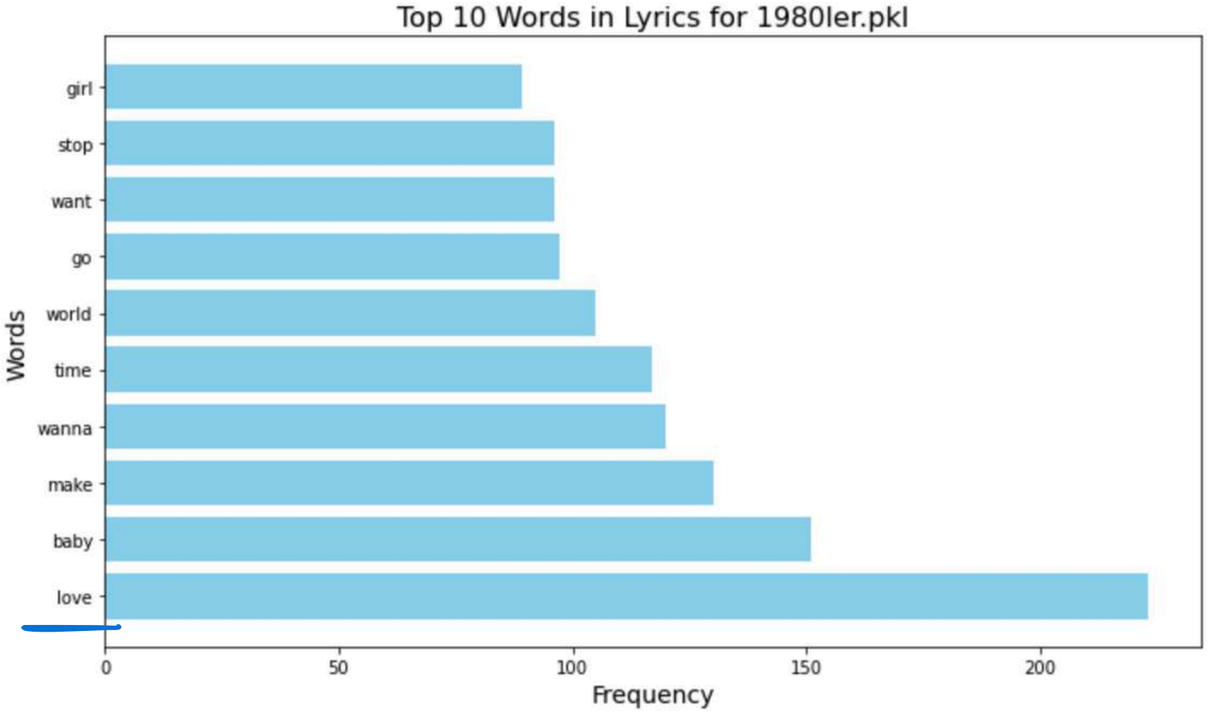
```
Sentiment analysis for 1960lar.pkl:
neutral     30
negative    26
positive    17
dtype: int64

Sentiment analysis for 1980ler.pkl:
neutral     31
positive    27
negative    22
dtype: int64

Sentiment analysis for 1990lar.pkl:
negative    27
neutral     21
positive    12
dtype: int64

Sentiment analysis for 2000_2010lar.pkl:
negative    41
neutral     19
positive    16
dtype: int64

Sentiment analysis for 2020ler.pkl:
negative    34
neutral     20
positive     5
dtype: int64
```

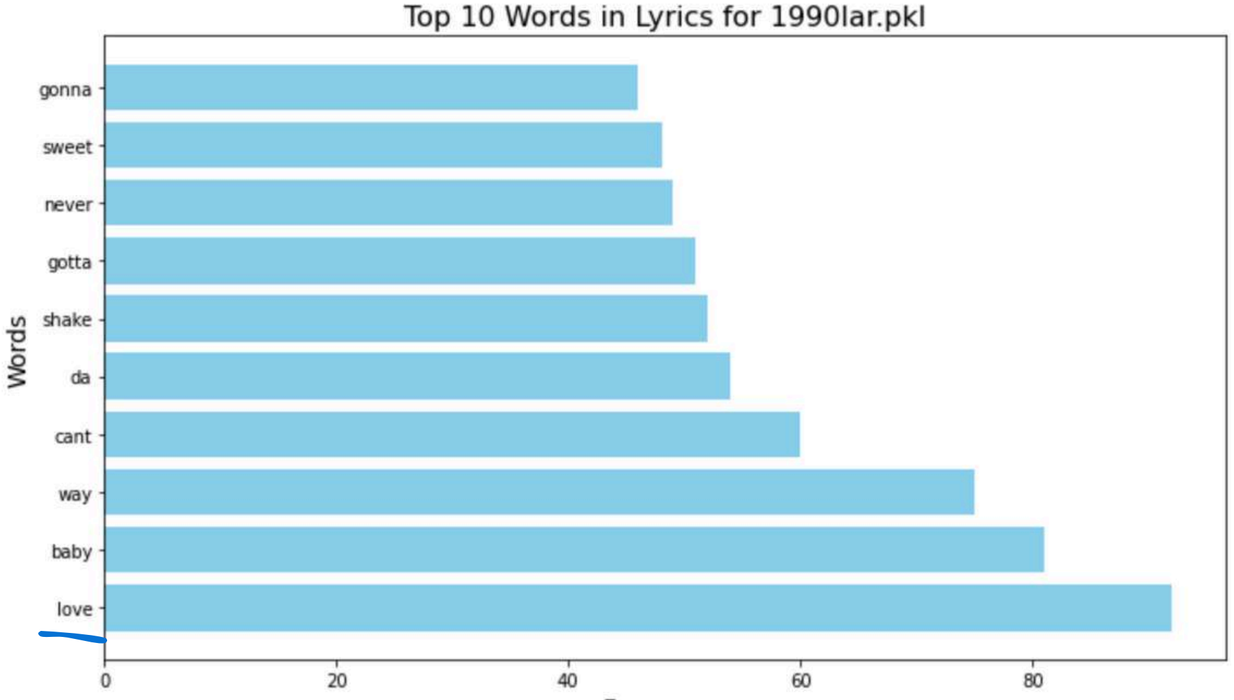
```python
import matplotlib.pyplot as plt
import pandas as pd

sentiment_data = {
    "1960lar": {"positive": 17, "neutral": 30, "negative": 26},
    "1980ler": {"positive": 27, "neutral": 31, "negative": 22},
    "1990lar": {"positive": 12, "neutral": 21, "negative": 27},
    "2000_2010lar": {"positive": 16, "neutral": 19, "negative": 41},
    "2020ler": {"positive": 5, "neutral": 20, "negative": 34},
}

sentiment_df = pd.DataFrame(sentiment_data).T

plt.figure(figsize=(10, 6))

plt.plot(sentiment_df.index, sentiment_df['positive'], label='Positive', marker='o', color="purple")
plt.plot(sentiment_df.index, sentiment_df['neutral'], label='Neutral', marker='o', color="orange")
plt.plot(sentiment_df.index, sentiment_df['negative'], label='Negative', marker='o', color="blue")
```

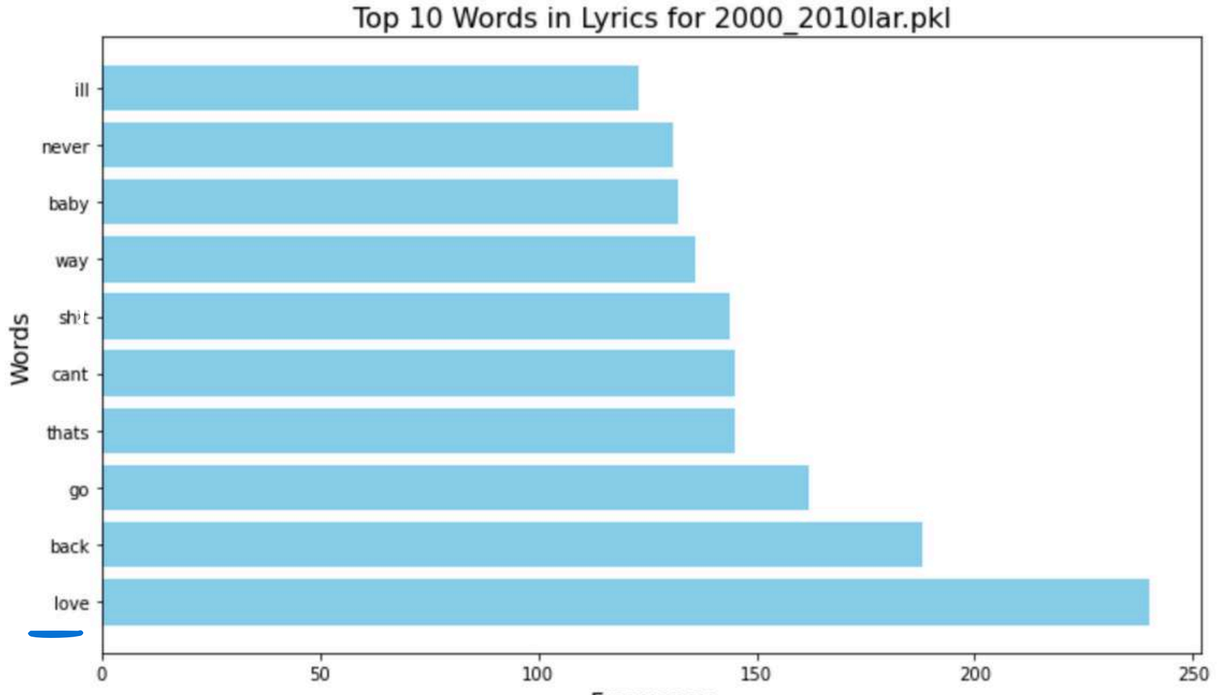
Veri Görselleştirme

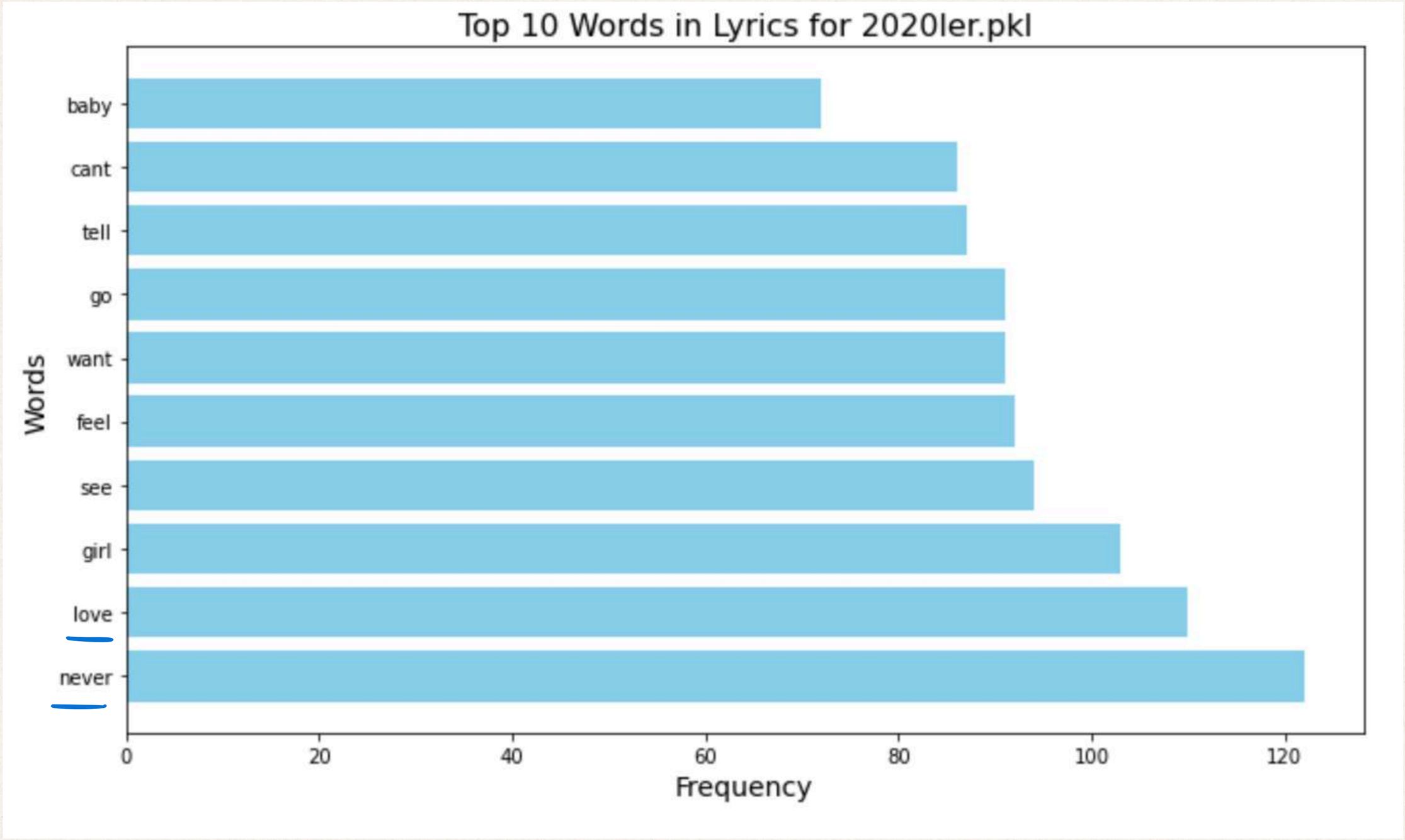



Top 10 Words in Lyrics for 1960lar.pkl
Words
come
cant
go
way
never
man
well
play
baby
love
0
20
40
60
80
100
120
140
Frequency

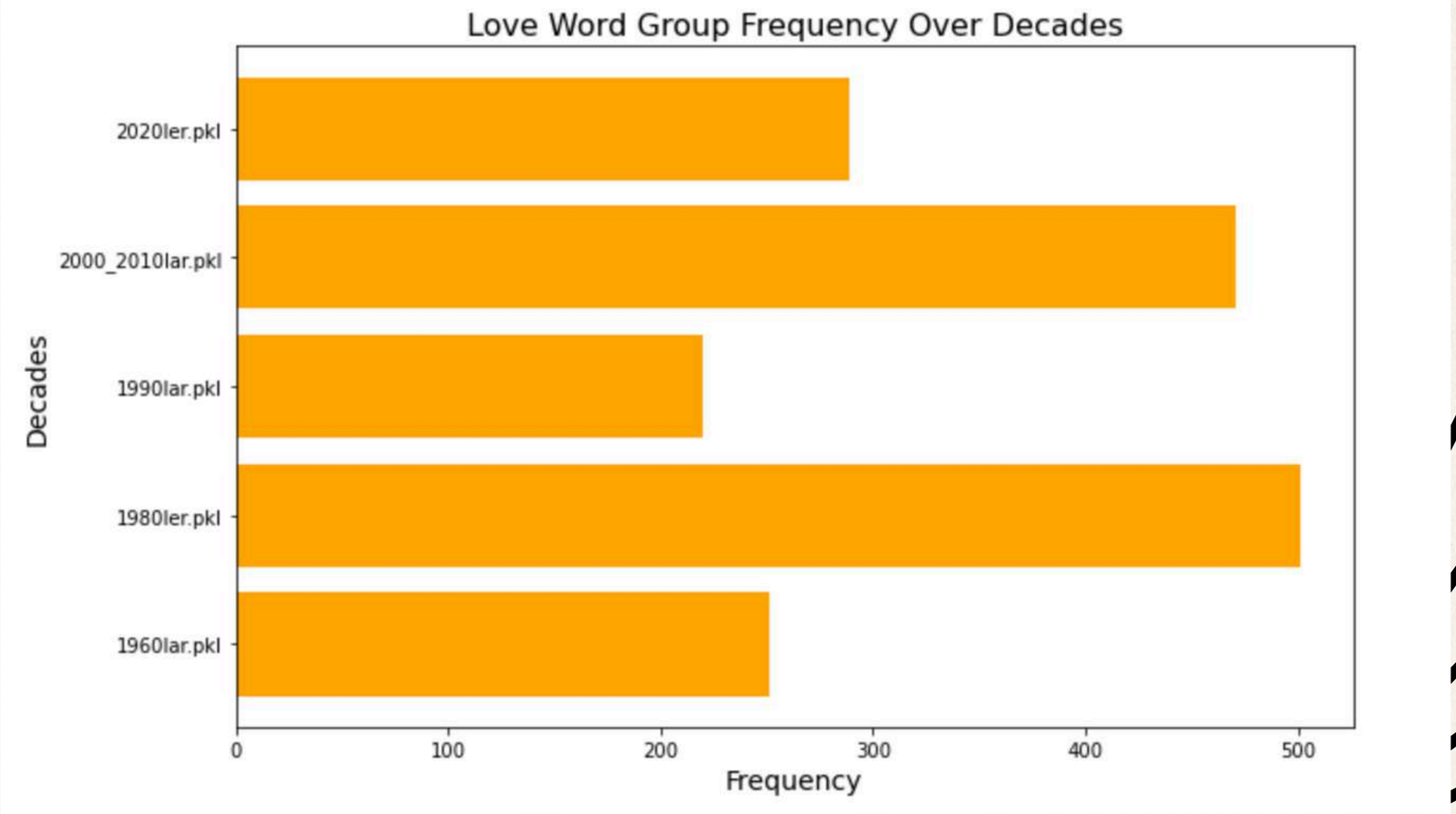

Top 10 Words in Lyrics for 1980ler.pkl
Words
girl
stop
want
go
world
time
wanna
make
baby
love
0
50
100
150
200
Frequency


Top 10 Words in Lyrics for 1990lar.pkl
Words
gonna
sweet
never
gotta
shake
da
cant
way
baby
love
0
20
40
60
80


Top 10 Words in Lyrics for 2000_2010lar.pkl
Words
ill
never
baby
way
shit
cant
thats
go
back
love
0
50
100
150
200
250

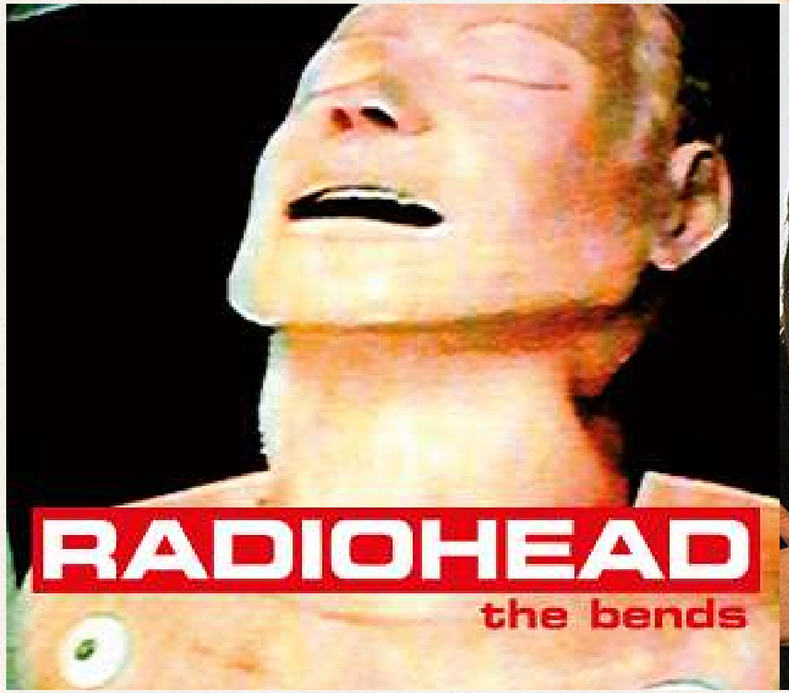

Top 10 Words in Lyrics for 2020ler.pkl
Words
baby
cant
tell
go
want
feel
see
girl
love
never
0
20
40
60
80
100
120
Frequency

```
keywords = {
    'love': ['love', 'girl', 'baby','beautiful','pretty'],
    'curse': [      ,       ,      , '      ],
    'war': ['fight', 'war', 'sword', 'scream']
}
```



1980ler

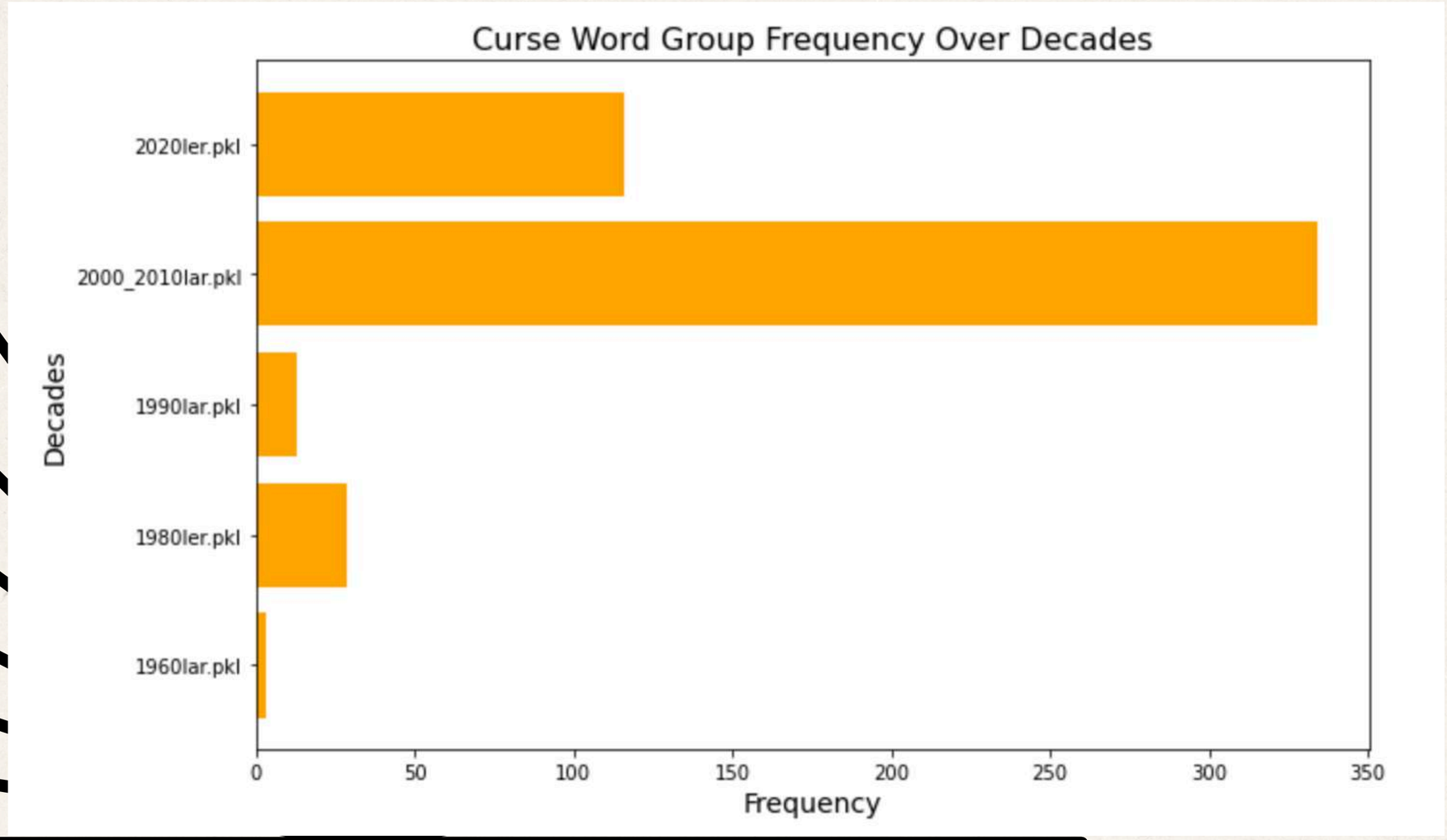
- Pop
- Romantik Ballad



1990lar

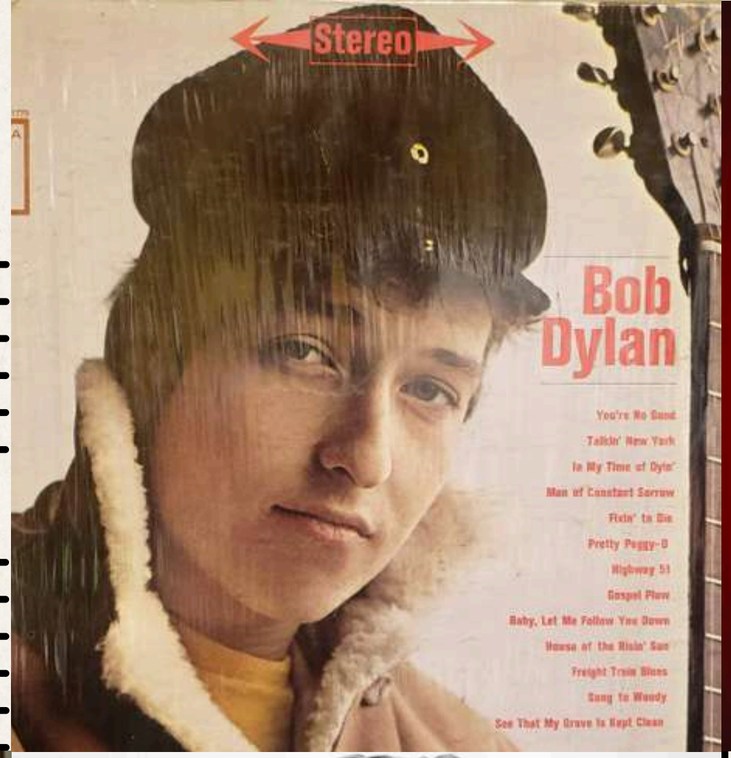
- Grunge
- Alternatif
- İsyan Teması

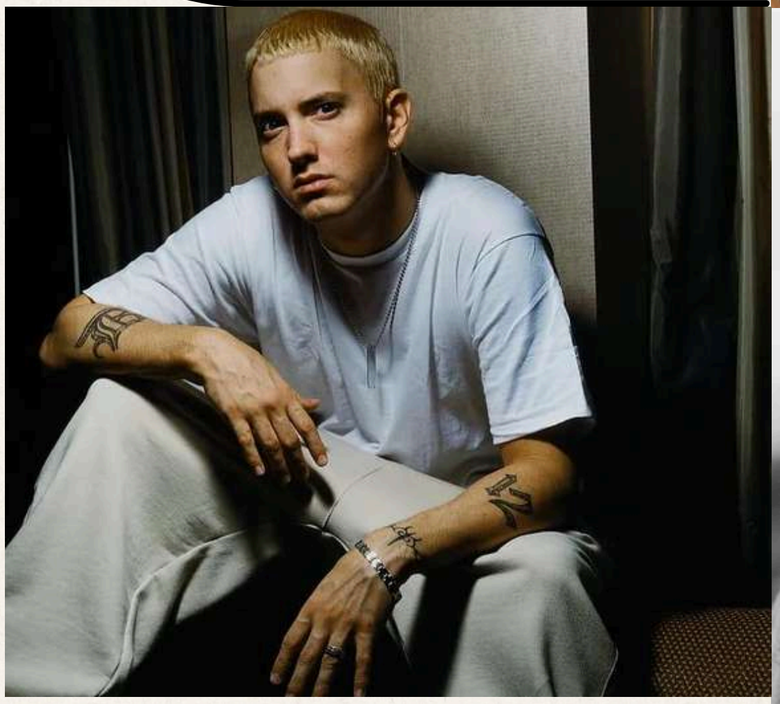
```
keywords = {
    'love': ['love', 'girl', 'baby','beautiful','pretty'],
    'curse': [      ,       ,       , '       ],
    'war': ['fight', 'war', 'sword', 'scream']
}
```



1960lar

- Muhafazakarlık
- Sansür

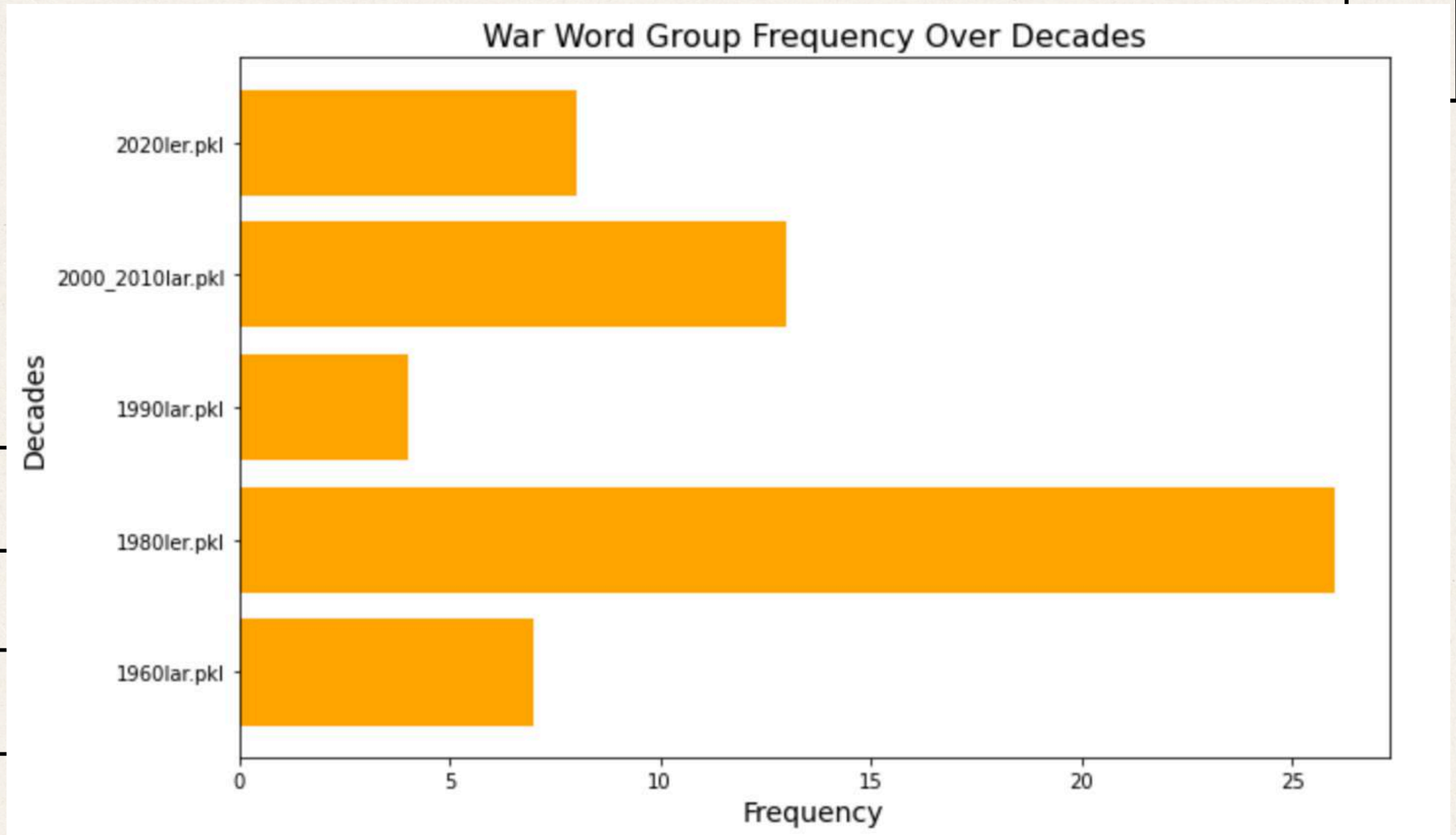




2000ler

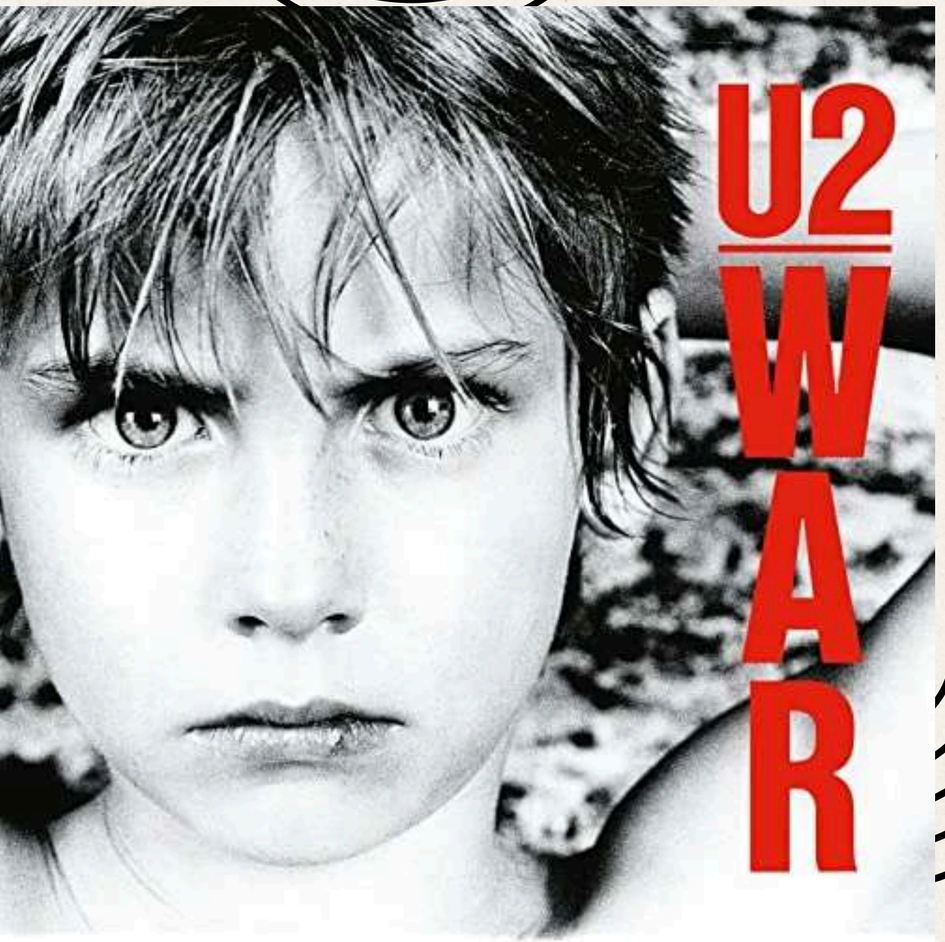
- Gangsta Kültürü
- Rap ve Hiphop
- Sansürsüz Dil

```
keywords = {
    'love': ['love', 'girl', 'baby','beautiful','pretty'],
    'curse': [      ,       ,       , '       ],
    'war': ['fight', 'war', 'sword', 'scream']
}
```



1980ler

- Soğuk Savaşın Sonları
- Protest Müzik



Sonuç

Bu proje, müzik sözlerindeki duygusal ve tematik değişimleri zaman içinde inceledi. Analizler, özellikle negatif duyguların ve küfürlü dilin artışını, aynı zamanda savaş gibi toplumsal olayların şarkı sözlerine daha belirgin şekilde yansıdığını gösterdi. Bu bulgular, müziğin toplumun ruh halini ve dönemin sosyo-politik yapısını yansıtan güçlü bir araç olduğunu ortaya koymaktadır.

Teşekkürler

Kaynak

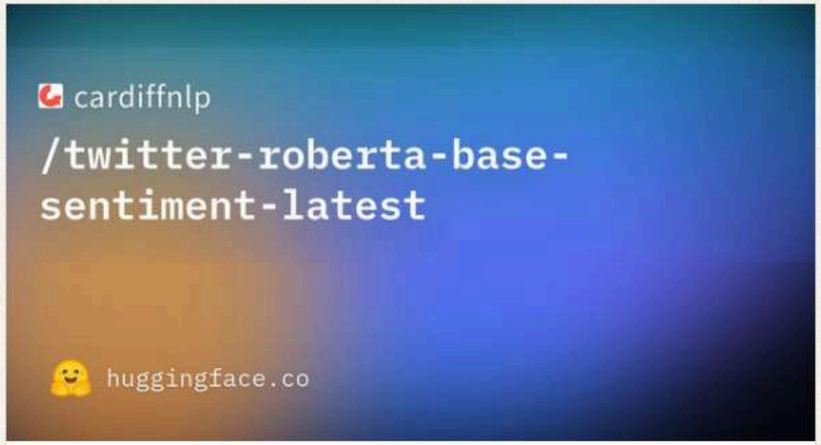
https://chartmasters.org/most-successful-artists-by-decade/

https://huggingface.co/cardiffnlp/twitter-roberta-base-sentiment-latest

https://lyricsgenius.readthedocs.io/en/master/

https://genius.com/api-clients

https://medium.com/@cd_24/lyrics-analysis-with-nlp-techniques-4-sentiment-analysis-on-albums-88363eac33fb



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Most successful artists by decade

This article will tell you which artists are among the most successful ones for each decade since the 50s to the 20s. Who are the winners?

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Lyrics Analysis with NLP Techniques (4): Sentiment Analysis on Albums

Previously, we made some word clouds on the albums made by John Mayer. Today, we will deep dive into content analysis to figure out what...

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