WhatsApp Chat Analysis

ASRIL MURDIAN TAHIR (2001010110)

In [1]:
```
import regex
import re
import pandas as pd
import numpy as np
import plotly.express as px
from collections import Counter
import matplotlib.pyplot as plt
from os import path
from PIL import Image
from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator
%matplotlib inline
```

In [2]:
```
def startsWithDateAndTime(s):
    pattern = '^([0-9]+)(\/)([0-9]+)(\/)([0-9]+), ([0-9]+):([0-9]+)?(AM|PM|am|
    result = re.match(pattern, s)
    if result:
        return True
    return False
```

In [3]:
```
def FindAuthor(s):
    s=s.split(":")
    if len(s)==2:
        return True
    else:
        return False
```

In [4]:
```
def getDataPoint(line):
    splitLine = line.split(' - ')
    dateTime = splitLine[0]
    date, time = dateTime.split(', ')
    message = ' '.join(splitLine[1:])
    if FindAuthor(message):
        splitMessage = message.split(': ')
        author = splitMessage[0]
        message = ' '.join(splitMessage[1:])
    else:
        author = None
    return date, time, author, message
```

In [5]:
```
parsedData=[]
conversation = 'WhatsApp Chat with Eka putri.txt'
with open(conversation, encoding="utf-8") as fp:
    fp.readline() # Skip BARIS pertama

    messageBuffer = []
    date, time, author = None, None, None
    while True:
        line = fp.readline()
        if not line:
            break
        line = line.strip()

        if startsWithDateAndTime(line):
            if len(messageBuffer) > 0:
                parsedData.append([date, time, author, ' '.join(messageBuffer)
            messageBuffer.clear()
            date, time, author, message = getDataPoint(line)
            messageBuffer.append(message)
        else:
            messageBuffer.append(line)
```

In [6]:
```
print(fp)
```

```
<_io.TextIOWrapper name='WhatsApp Chat with Eka putri.txt' mode='r' encoding
='utf-8'>
```

In [7]:
```
df = pd.DataFrame(parsedData, columns=['Date', 'Time', 'Author', 'Message']) #
df["Date"] = pd.to_datetime(df["Date"])
df.head(10)
```

```
C:\Users\MSI\AppData\Local\Temp\ipykernel_12480\2907646051.py:2: UserWarnin
g: Could not infer format, so each element will be parsed individually, fal
ling back to `dateutil`. To ensure parsing is consistent and as-expected, p
lease specify a format.
  df["Date"] = pd.to_datetime(df["Date"])
```

Out[7]:

	Date	Time	Author	Message
0	2022-06-30	7:07 PM	Asril Murdian	Ko
1	2022-06-30	8:28 PM	Eka putri	Iyaa
2	2022-06-30	8:28 PM	Eka putri	Kabar baik, kamu?
3	2022-06-30	8:29 PM	Asril Murdian	Kenapa
4	2022-06-30	8:45 PM	Eka putri	Kok beda
5	2022-06-30	8:47 PM	Asril Murdian	Apanya
6	2022-06-30	8:51 PM	Eka putri	Beda kenapa wa nya
7	[illegible]	[illegible]	[illegible]	[illegible]

membuat file csv untuk data chat

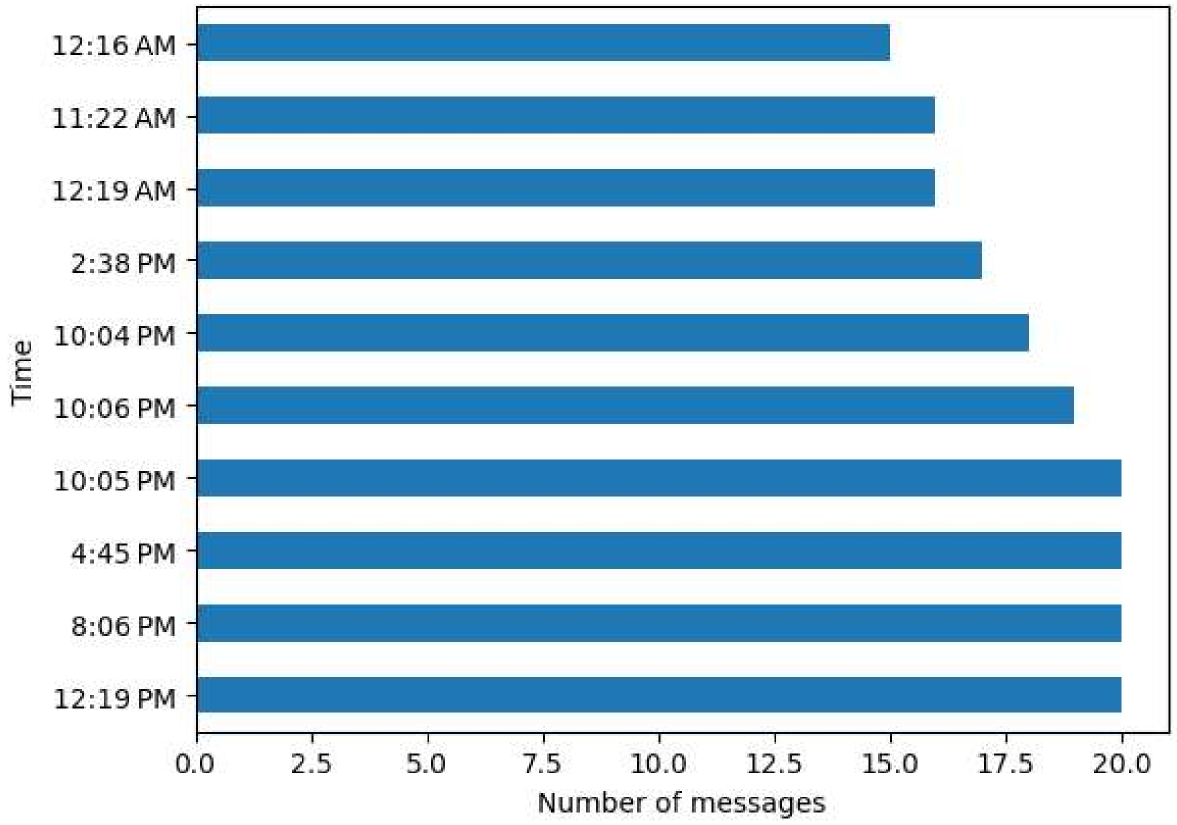
In [8]:
```
df.shape
```
Out[8]:
```
(4039, 4)
```

In [9]:
```
output_file = 'output.csv'
df.to_csv(output_file, index=False)
print(f"DataFrame has been saved to '{output_file}' as a CSV file.")
```
```
DataFrame has been saved to 'output.csv' as a CSV file.
```

In [10]:
```
print(messageBuffer)
```
```
['<Media omitted>']
```

menampilkan data 10 waktu tersering saat chating

In [11]:
```
df['Time'].value_counts().head(10).plot.barh()
plt.xlabel('Number of messages')
plt.ylabel('Time')
```
Out[11]:
```
Text(0, 0.5, 'Time')
```

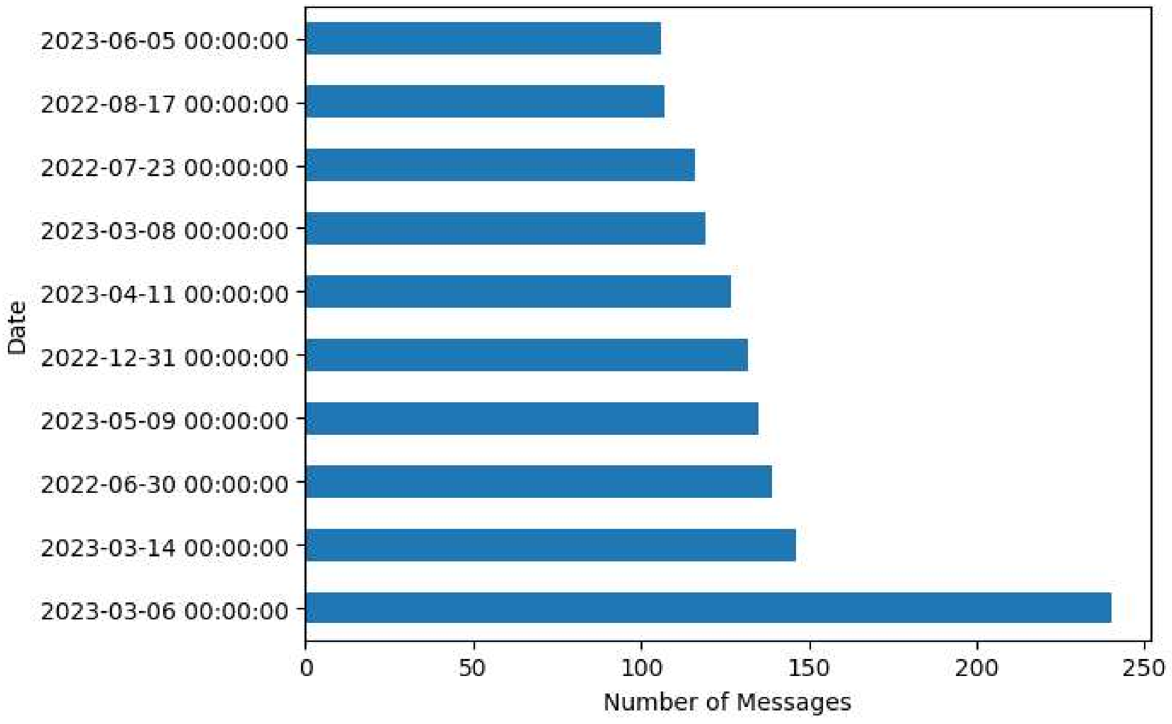


menampilkan 10 hari dengan intensitas chating terbanyak

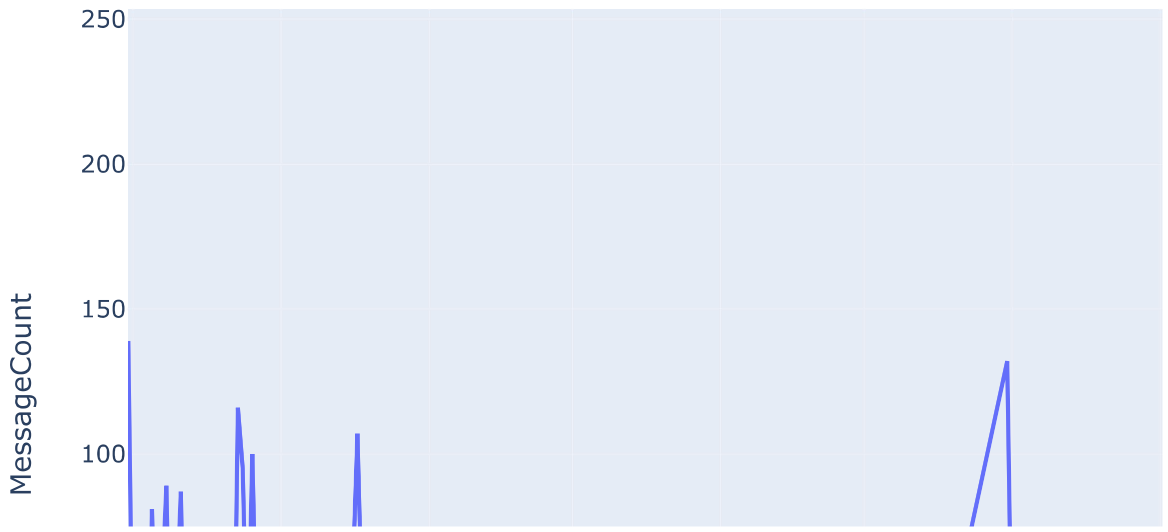
In [12]:
```
df['Date'].value_counts().head(10).plot.barh()
print(df['Date'].value_counts())
plt.xlabel('Number of Messages')
plt.ylabel('Date')
```

```
Date
2023-03-06    240
2023-03-14    146
2022-06-30    139
2023-05-09    135
2022-12-31    132
             ...
2022-12-07      2
2022-09-08      2
2023-03-28      1
2022-07-09      1
2023-06-10      1
Name: count, Length: 106, dtype: int64
```

Out[12]:
```
Text(0, 0.5, 'Date')
```



In [13]:
```
df['MessageCount'] = 1
date_df = df.groupby("Date").sum()
date_df.reset_index(inplace=True)
fig = px.line(date_df, x="Date", y="MessageCount")
fig.update_xaxes(nticks=20)
fig.show()
```



In [14]:
```
df['Message']
```

Out[14]:
```
0                                                  Ko
1                                                Iyaa
2                                   Kabar baik, kamu?
3                                             Kenapa
4                                            Kok beda
                             ...
4034                                      owh iyadah
4035                                  skrg sy coba coba
4036    Saya mau buat laporan akhir saya dulu bentar
4037                                     iya mangats
4038                                          Bakpao
Name: Message, Length: 4039, dtype: object
```

menampilkan siapa saja pengirim pesan

```
In [15]: df.Author.unique()
```

```
Out[15]: array(['Asril Murdian', 'Eka putri', None], dtype=object)
```

menampilkan

```
In [16]: media_messages = df[df['Message'] == '<Media omitted>'].shape[0]
URLPATTERN = r'(https?://\S+)'
df['urlcount'] = df.Message.apply(lambda x: re.findall(URLPATTERN, x)).str.len

links = np.sum(df.urlcount)
print("data pesan")
print("Messages:",len(df))
print("Media:",media_messages)
print("Links:",links)
```

```
data pesan
Messages: 4039
Media: 119
Links: 7
```

In [17]:
```
media_messages_df = df[df['Message'] == '<Media omitted>']
messages_df = df.drop(media_messages_df.index)
messages_df.info()
messages_df['Letter_Count'] = messages_df['Message'].apply(lambda s : len(s))
messages_df['Word_Count'] = messages_df['Message'].apply(lambda s : len(s.spli
messages_df["MessageCount"]=1

l = ["Asril Murdian", "Eka putri"]
for i in range(len(l)):
  # Filtering out messages of particular user
  req_df= messages_df[messages_df["Author"] == l[i]]
  # req_df will contain messages of only one particular user
  print(f'Stats of {l[i]} -')
  # shape will print number of rows which indirectly means the number of messag
  print('Messages Sent', req_df.shape[0])
  #Word_Count contains of total words in one message. Sum of all words/ Total M
  words_per_message = (np.sum(req_df['Word_Count']))/req_df.shape[0]
  print('Words per message', words_per_message)
  #media conists of media messages
  media = media_messages_df[media_messages_df['Author'] == l[i]].shape[0]
  print('Media Messages Sent', media)
  print()
```

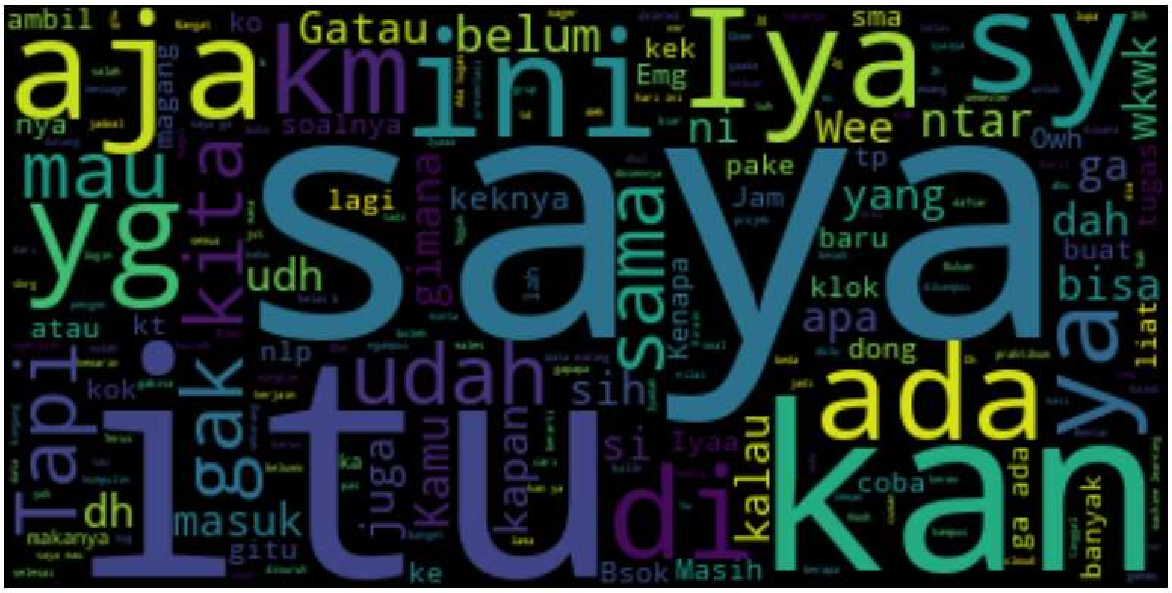
```
<class 'pandas.core.frame.DataFrame'>
Index: 3920 entries, 0 to 4038
Data columns (total 6 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Date          3920 non-null   datetime64[ns]
 1   Time          3920 non-null   object
 2   Author        3908 non-null   object
 3   Message       3920 non-null   object
 4   MessageCount  3920 non-null   int64
 5   urlcount      3920 non-null   int64
dtypes: datetime64[ns](1), int64(2), object(3)
memory usage: 214.4+ KB
Stats of Asril Murdian -
Messages Sent 1963
Words per message 3.1711665817626082
Media Messages Sent 58

Stats of Eka putri -
Messages Sent 1945
Words per message 3.7753213367609253
Media Messages Sent 61
```

In [18]:
```
df.iloc[messages_df['Word_Count'].argmax()]
```

Out[18]:
```
Date                  2022-07-08 00:00:00
Time                             10:51 PM
Author                          Eka putri
Message        Kalau bisa dh gas daftar ni
MessageCount                            1
urlcount                                0
Name: 350, dtype: object
```

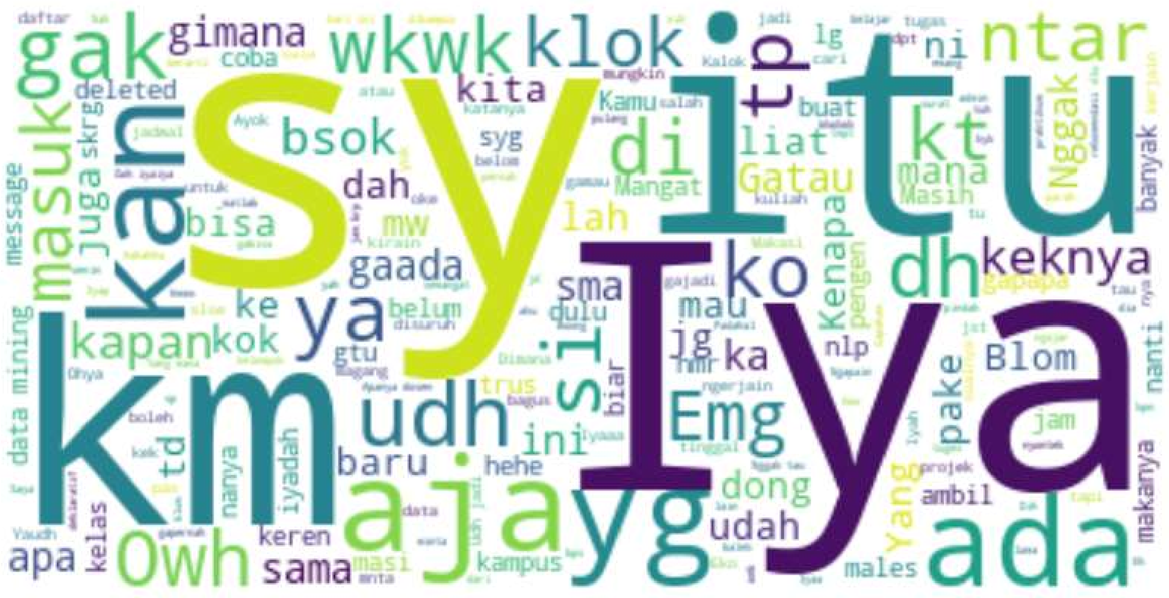
In [19]:
```
text = " ".join(review for review in messages_df.Message)
print ("ada {} kata pada pesan ini.".format(len(text)))
stopwords = set(STOPWORDS)
# Generate a word cloud image
wordcloud = WordCloud(stopwords=stopwords, background_color="black").generate(
# Display the generated image:
# the matplotlib way:
plt.figure( figsize=(10,5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis("off")
plt.show()
```

```
ada 75995 kata pada pesan ini.
```

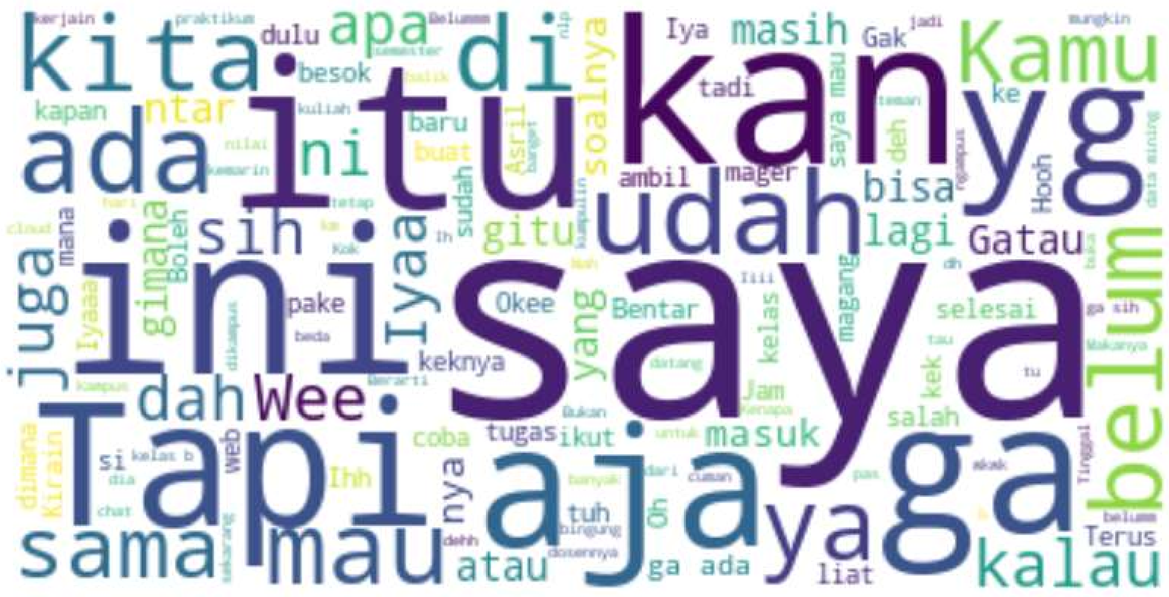


In [20]:
```python
l = ["Asril Murdian", "Eka putri"]
for i in range(len(l)):
    dummy_df = messages_df[messages_df['Author'] == l[i]]
    text = " ".join(review for review in dummy_df.Message)
    stopwords = set(STOPWORDS)
  #Generate a word cloud image
    print('Nama Pengirim :',l[i])
    wordcloud = WordCloud(stopwords=stopwords, background_color="white").genera
  #Display the generated image
    plt.figure( figsize=(10,5))
    plt.imshow(wordcloud, interpolation='bilinear')
    plt.axis("off")
    plt.show()
```

```
Nama Pengirim : Asril Murdian
```



```
Nama Pengirim : Eka putri
```



In [21]:
```
import nltk
from nltk.tokenize import word_tokenize
from nltk.corpus import stopwords

# Persiapkan dataset kata-kata kotor (contoh sederhana)
hated_words = ["buta", "anjing", "babi", "setan", "alay","botak"]

# Fungsi untuk mendeteksi kata-kata kotor dalam teks
def detect_hated_words(text):
    # Tokenisasi kata-kata dalam teks
    tokens = word_tokenize(text.lower())
    # Hapus stop words
    stop_words = set(stopwords.words("indonesian"))
    filtered_tokens = [word for word in tokens if word.isalpha() and word not 
    # Deteksi kata-kata romantis
    detected_hated_words = [word for word in filtered_tokens if word in hated_

    return detected_hated_words

# Memproses chat satu per satu
detected_words_count = 0
detected_words_list = []  # Daftar kata-kata kotor yang dideteksi

# Memisahkan chat menjadi baris-baris
chat_lines = df['Message']
for line in chat_lines:
    detected_words = detect_hated_words(line)
    detected_words_count += len(detected_words)
    detected_words_list.extend(detected_words)  # Menambahkan kata-kata romant

# Menampilkan hasil
if detected_words_count > 0:
    print("Terdapat", detected_words_count, "kata-kata kotor dalam chat.")

else:
    print("Tidak ada kata-kata kotor dalam chat.")
```

```
Terdapat 5 kata-kata kotor dalam chat.
```

In [22]:
```
print("Kata-kata kotor yang dideteksi:")
for i, word in enumerate(detected_words_list, start=1):
    print(f"{i}. {word}")
```

```
Kata-kata kotor yang dideteksi:
1. alay
2. setan
3. buta
4. alay
5. alay
```

Sentiment analysis

In [23]:
```
import pandas as pd
from textblob import TextBlob
from Sastrawi.StopWordRemover.StopWordRemoverFactory import StopWordRemoverFac
from Sastrawi.Stemmer.StemmerFactory import StemmerFactory
import string


stopword_factory = StopWordRemoverFactory()
stemmer_factory = StemmerFactory()
stopword_remover = stopword_factory.create_stop_word_remover()
stemmer = stemmer_factory.create_stemmer()

# Fungsi preprocessing teks
def preprocess_text(text):
    # Menghapus tanda baca
    text = text.translate(str.maketrans("", "", string.punctuation))
    # Tokenisasi
    tokens = text.split()
    # Menghapus stopwords
    tokens = [token for token in tokens if not stopword_remover.remove(token)]
    # Stemming
    stemmed_tokens = [stemmer.stem(token) for token in tokens]
    # Menggabungkan kembali token-token yang telah dipreprocessing menjadi teks
    preprocessed_text = ' '.join(stemmed_tokens)
    return text

# Analisis sentimen menggunakan pustaka TextBlob
def analyze_sentiment(text):
    blob = TextBlob(text)
    sentiment = blob.sentiment.polarity
    return sentiment

# Menambahkan kolom 'Sentiment' ke dataframe
df['Sentiment'] = df['Message'].apply(lambda x: analyze_sentiment(preprocess_t

# Menampilkan dataframe dengan kolom Sentiment
data=pd.DataFrame(df)
data
```

Out[23]:

	Date	Time	Author	Message	MessageCount	urlcount	Sentiment
0	2022-06-30	7:07 PM	Asril Murdian	Ko	1	0	0.0
1	2022-06-30	8:28 PM	Eka putri	Iyaa	1	0	0.0
2	2022-06-30	8:28 PM	Eka putri	Kabar baik, kamu?	1	0	0.0
3	2022-06-30	8:29 PM	Asril Murdian	Kenapa	1	0	0.0
4	2022-06-30	8:45 PM	Eka putri	Kok beda	1	0	0.0
...	...	...	...	...	...	...	...
4034	2023-06-08	11:22 PM	Asril Murdian	owh iyadah	1	0	0.0
4035	2023-	11:23 PM	Asril	skrg sy coba coba	1	0	0.0

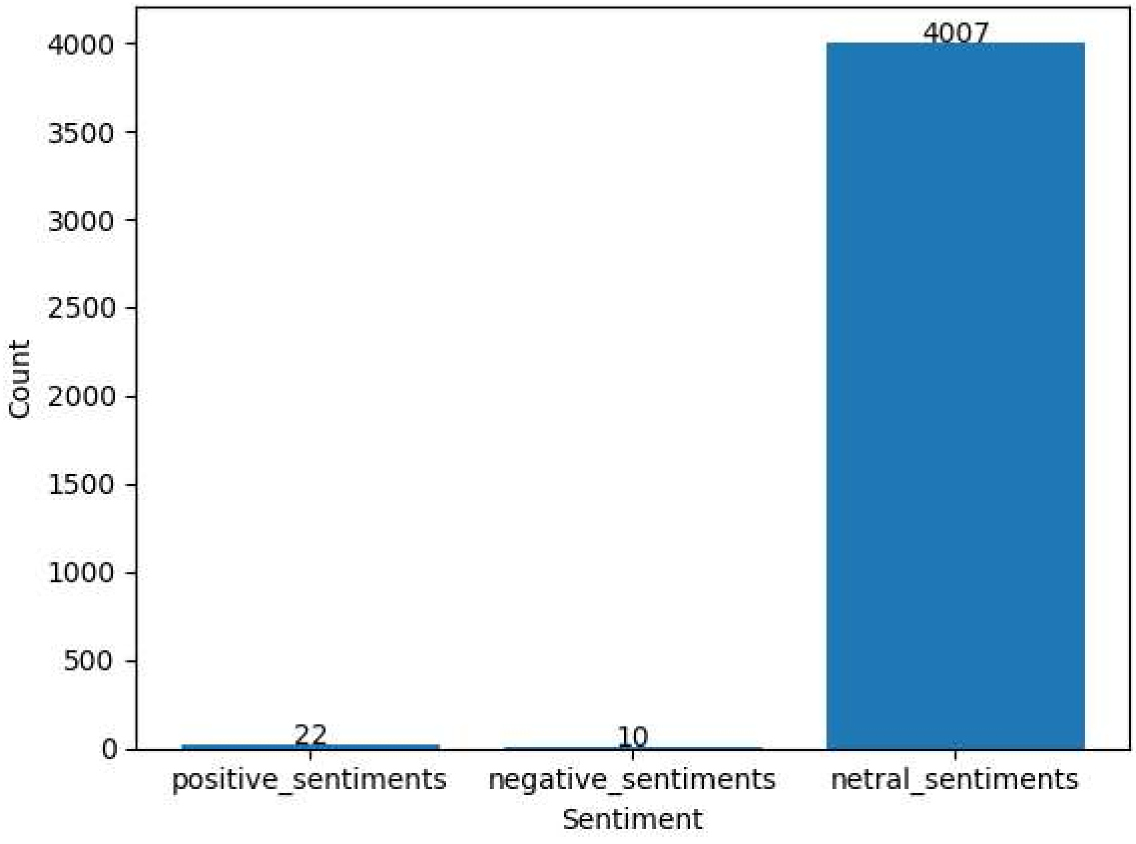
In [24]:
```
df['positive_sentiments'] = df['Sentiment'] > 0.0
df['negative_sentiments'] = df['Sentiment'] < 0.0
df['netral_sentiments'] = df['Sentiment'] == 0.0
```

In [25]:
```
# Filter sentimen
sentiments = df[df['Sentiment'] > 0.0]
# Menampilkan DataFrame hasil analisis sentiment
sent=pd.DataFrame(sentiments)
sent.head(5)
```

Out[25]:

	Date	Time	Author	Message	MessageCount	urlcount	Sentiment	positive_sentiment
484	2022-07-13	5:48 PM	Asril Murdian	Okay	1	0	0.5	Tru
910	2022-07-25	11:58 AM	Asril Murdian	Okay	1	0	0.5	Tru
1275	2022-08-17	11:22 PM	Eka putri	Lupa saya udah verif ktp atau belum, soalnya j...	1	0	0.5	Tru
1439	2022-12-14	6:44 PM	Asril Murdian	Welcome	1	0	0.8	Tru
1567	2022-12-31	4:18 PM	Asril Murdian	Td bahasa acehnya i love you apa?	1	0	0.5	Tru

In [26]:
```
import pandas as pd
import matplotlib.pyplot as plt

# Hitung jumlah sentimen positif, negatif, dan netral
sentiment_counts = df[['positive_sentiments', 'negative_sentiments', 'netral_s

# Buat bar plot
plt.bar(sentiment_counts.index, sentiment_counts.values)

for i, value in enumerate(sentiment_counts.values):
    plt.text(i, value, str(value), ha='center')

# Atur label sumbu x dan y
plt.xlabel('Sentiment')
plt.ylabel('Count')

# Tampilkan bar plot
plt.show()
```



Autocomplete

```
In [27]: import pandas as pd
         import nltk
         from nltk.util import ngrams
         from collections import defaultdict

         class WhatsAppAutocomplete:
             def __init__(self):
                 self.ngram_model = defaultdict(lambda: defaultdict(int))

             def train(self, data):
                 # Tokenisasi data menjadi kata-kata
                 tokens = nltk.word_tokenize(data)

                 # Membangun model n-gram
                 for n in range(1, 6):  # Membangun model unigram, bigram, dan trigram
                     ngrams_data = ngrams(tokens, n, pad_left=True, pad_right=True)
                     for ngram in ngrams_data:
                         prefix = tuple(ngram[:-1])
                         suffix = ngram[-1]
                         self.ngram_model[prefix][suffix] += 1

             def get_suggestions(self, text):
                 # Membagi teks menjadi kata-kata
                 tokens = nltk.word_tokenize(text)
                 # Mengambil prefix terakhir untuk memprediksi kata berikutnya
                 prefix = tuple(tokens[-2:])
                 # Memilih kata berikutnya berdasarkan probabilitas
                 suggestions = sorted(self.ngram_model[prefix], key=self.ngram_model[pr
                 return suggestions



         # Membaca data dari file CSV
         data = pd.read_csv('output.csv')
         data['Message'] = data['Message'].astype(str)
         data['Message'] = data['Message'].str.lower()
         texts = data['Message'].tolist()
         combined_text = ' '.join(texts)

         # Melatih model autocomplete
         model = WhatsAppAutocomplete()
         model.train(combined_text)
```

In [28]:
```
#menghitung persentase setiap sugesstion
def calculate_percentages(suggestions):
    total_count = sum(suggestions.values())
    percentages = {k: v / total_count * 100 for k, v in suggestions.items()}
    return percentages

# Contoh penggunaan
input_text = "machine learning"
suggestions = model.get_suggestions(input_text)
percentage = calculate_percentages(model.ngram_model[tuple(input_text.split()[
print("Persentase kata yang paling direkomendasikan:")
print("Rekomendasi autocomplete:", suggestions)
for word, percent in percentage.items():
    print(f"{word}: {percent:.2f}%")
```

```
Persentase kata yang paling direkomendasikan:
Rekomendasi autocomplete: ['?', 'saya', 'juga', 'iya', 'tu']
?: 40.00%
saya: 13.33%
iya: 6.67%
tu: 6.67%
sama: 6.67%
dong: 6.67%
juga: 13.33%
atau: 6.67%
```

In [ ]:
```
```