```
In [64]: import pandas as pd
         data = pd.read_csv("D:\intership\cognoriseinfotech\TASK 7 SHOPPER SENTIMENTS\\Te
         data.head()
```

Out[64]:

	reviewer_id	store_location	latitude	longitude	date	month	year	
0	0.0	US	37.090240	-95.712891	2023	6	2015 00:00:00	Great hel
1	1.0	US	37.090240	-95.712891	2023	6	2024 00:00:00	I ordered si hadï
2	2.0	US	37.090240	-95.712891	2023	6	2017 00:00:00	These guy customerï
3	3.0	US	37.090240	-95.712891	2023	6	2024 00:00:00	
4	4.0	CA	56.130366	-106.346771	2023	6	2023 00:00:00	My order timelyï

```
In [4]: data.isna().sum()
```

```
Out[4]:  reviewer_id        1
         store_location     0
         latitude           0
         longitude          0
         date               0
         month              0
         year               0
         title             12
         review         30503
         review-label       0
         dtype: int64
```

```
In [14]:  data['title'].fillna("No Title", inplace=True)
          data['title'].isna().sum()
```

```
Out[14]:  0
```

```
In [15]:  data['review'].fillna("No Review", inplace=True)
          data['review'].isna().sum()
```

```
Out[15]:  0
```

```
In [16]:  data['reviewer_id'].fillna("0", inplace=True)
          data['reviewer_id'].isna().sum()
```

```
Out[16]:  0
```

```
In [17]:  data.isna().sum()
```

```
Out[17]:  reviewer_id       0
          store_location    0
          latitude          0
          longitude         0
          date              0
          month             0
          year              0
          title             0
          review            0
          review-label      0
          dtype: int64
```

```
In [27]:  import string
          from nltk.corpus import stopwords
          from nltk.tokenize import word_tokenize
          from nltk.stem import WordNetLemmatizer
          import nltk


          nltk.download('punkt')
          nltk.download('stopwords')
          nltk.download('wordnet')

          # Initialize stopwords and lemmatizer
          stop_words = set(stopwords.words('english'))
```

```python
lemmatizer = WordNetLemmatizer()

def preprocess_text(text):
    # Convert to lowercase
    text = text.lower()
    # Remove punctuation
    text = text.translate(str.maketrans('', '', string.punctuation))
    # Tokenize
    tokens = word_tokenize(text)
    # Remove stopwords and lemmatize
    tokens = [lemmatizer.lemmatize(word) for word in tokens if word not in stop_
    return ' '.join(tokens)

# Apply preprocessing to the review column
data['cleaned_review'] = data['review'].apply(preprocess_text)

# Display the first few rows of the cleaned reviews
data[['review', 'cleaned_review']].head()
```

```
[nltk_data] Downloading package punkt to
[nltk_data]     C:\Users\Admin\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\Admin\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
[nltk_data] Downloading package wordnet to
[nltk_data]     C:\Users\Admin\AppData\Roaming\nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
```

Out[27]:

	review	cleaned_review
0	I had an order that was lost in transit. When ...	order lost transit called help customer servic...
1	I ordered the wrong size tee and had difficult...	ordered wrong size tee difficulty returning we...
2	These guys offer the best customer service in ...	guy offer best customer service retail product...
3	Looked for an obscure phrase on a shirt. Teepu...	looked obscure phrase shirt teepublic process ...
4	My order arrived in a good timely fashion & th...	order arrived good timely fashion item receive...

In [26]:
```python
pip install  geopandas
```

```
Collecting geopandas
  Downloading geopandas-0.14.4-py3-none-any.whl.metadata (1.5 kB)
Collecting fiona>=1.8.21 (from geopandas)
  Downloading fiona-1.9.6-cp311-cp311-win_amd64.whl.metadata (51 kB)
     ---------------------------------------- 0.0/51.5 kB ? eta -:--:--
     -------------- --------------------- 20.5/51.5 kB 330.3 kB/s eta 0:00:01
     ------------------------------------- 51.5/51.5 kB 529.4 kB/s eta 0:00:00
Requirement already satisfied: numpy>=1.22 in c:\users\admin\anaconda3\lib\site-p
ackages (from geopandas) (1.26.4)
Requirement already satisfied: packaging in c:\users\admin\anaconda3\lib\site-pac
kages (from geopandas) (23.1)
Requirement already satisfied: pandas>=1.4.0 in c:\users\admin\anaconda3\lib\site
-packages (from geopandas) (2.1.4)
Collecting pyproj>=3.3.0 (from geopandas)
  Downloading pyproj-3.6.1-cp311-cp311-win_amd64.whl.metadata (31 kB)
Collecting shapely>=1.8.0 (from geopandas)
  Downloading shapely-2.0.4-cp311-cp311-win_amd64.whl.metadata (7.2 kB)
Requirement already satisfied: attrs>=19.2.0 in c:\users\admin\anaconda3\lib\site
-packages (from fiona>=1.8.21->geopandas) (23.1.0)
Requirement already satisfied: certifi in c:\users\admin\anaconda3\lib\site-packa
ges (from fiona>=1.8.21->geopandas) (2024.2.2)
Requirement already satisfied: click~=8.0 in c:\users\admin\anaconda3\lib\site-pa
ckages (from fiona>=1.8.21->geopandas) (8.1.7)
Collecting click-plugins>=1.0 (from fiona>=1.8.21->geopandas)
  Downloading click_plugins-1.1.1-py2.py3-none-any.whl.metadata (6.4 kB)
Collecting cligj>=0.5 (from fiona>=1.8.21->geopandas)
  Downloading cligj-0.7.2-py3-none-any.whl.metadata (5.0 kB)
Requirement already satisfied: six in c:\users\admin\anaconda3\lib\site-packages
(from fiona>=1.8.21->geopandas) (1.16.0)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\admin\anaconda3
\lib\site-packages (from pandas>=1.4.0->geopandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\admin\anaconda3\lib\site-
packages (from pandas>=1.4.0->geopandas) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\users\admin\anaconda3\lib\sit
e-packages (from pandas>=1.4.0->geopandas) (2023.3)
Requirement already satisfied: colorama in c:\users\admin\anaconda3\lib\site-pack
ages (from click~=8.0->fiona>=1.8.21->geopandas) (0.4.6)
Downloading geopandas-0.14.4-py3-none-any.whl (1.1 MB)
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Downloading fiona-1.9.6-cp311-cp311-win_amd64.whl (22.9 MB)
     ---------------------------------------- 0.0/22.9 MB ? eta -:--:--
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     ---------- ----------------------------- 6.5/22.9 MB 10.1 MB/s eta 0:00:02
     ---------- ----------------------------- 6.8/22.9 MB 10.1 MB/s eta 0:00:02
```

```
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-------------- ---------------------- 8.6/22.9 MB 10.0 MB/s eta 0:00:02
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---------------- -------------------- 9.8/22.9 MB 10.0 MB/s eta 0:00:02
---------------- -------------------- 10.3/22.9 MB 9.8 MB/s eta 0:00:02
----------------- ------------------- 10.7/22.9 MB 9.6 MB/s eta 0:00:02
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------------------ ------------------ 11.8/22.9 MB 9.5 MB/s eta 0:00:02
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---------------------------- ------- 17.9/22.9 MB 8.8 MB/s eta 0:00:01
---------------------------- ------- 18.5/22.9 MB 8.7 MB/s eta 0:00:01
----------------------------- ------ 18.9/22.9 MB 8.7 MB/s eta 0:00:01
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------------------------------- ---- 20.5/22.9 MB 9.0 MB/s eta 0:00:01
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------------------------------------ 22.9/22.9 MB 9.1 MB/s eta 0:00:01
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------------------------------------ 22.9/22.9 MB 9.1 MB/s eta 0:00:01
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-------------- ---------------------- 2.3/6.1 MB 11.2 MB/s eta 0:00:01
--------------- --------------------- 2.6/6.1 MB 10.4 MB/s eta 0:00:01
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```

```
                    --------------------------------------- 6.1/6.1 MB 9.1 MB/s eta 0:00:00
      Downloading shapely-2.0.4-cp311-cp311-win_amd64.whl (1.4 MB)
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                    ----------------- ------------------ 0.7/1.4 MB 8.8 MB/s eta 0:00:01
                    ----------------------------- ------- 1.1/1.4 MB 7.9 MB/s eta 0:00:01
                    --------------------------------------- 1.4/1.4 MB 8.3 MB/s eta 0:00:00
      Downloading click_plugins-1.1.1-py2.py3-none-any.whl (7.5 kB)
      Downloading cligj-0.7.2-py3-none-any.whl (7.1 kB)
      Installing collected packages: shapely, pyproj, cligj, click-plugins, fiona, geop
      andas
      Successfully installed click-plugins-1.1.1 cligj-0.7.2 fiona-1.9.6 geopandas-0.1
      4.4 pyproj-3.6.1 shapely-2.0.4
      Note: you may need to restart the kernel to use updated packages.
```

In [28]:
```python
import geopandas as gpd

# Convert the dataframe to a GeoDataFrame
gdf = gpd.GeoDataFrame(data, geometry=gpd.points_from_xy(data.longitude, data.la

# Verify the GeoDataFrame
gdf.head()
```

	reviewer_id	store_location	latitude	longitude	date	month	year	
0	0.0	US	37.090240	-95.712891	2023	6	2015 00:00:00	Great hel
1	1.0	US	37.090240	-95.712891	2023	6	2024 00:00:00	I ordered si hadï
2	2.0	US	37.090240	-95.712891	2023	6	2017 00:00:00	These guy customerï
3	3.0	US	37.090240	-95.712891	2023	6	2024 00:00:00	(
4	4.0	CA	56.130366	-106.346771	2023	6	2023 00:00:00	My order timelyï

In [33]:
```python
from sklearn.feature_extraction.text import TfidfVectorizer

# Initialize the TF-IDF vectorizer
vectorizer = TfidfVectorizer()

# Fit and transform the cleaned review text
tfidf_matrix = vectorizer.fit_transform(data['cleaned_review'])
print(tfidf_matrix)
# Display the shape of the TF-IDF matrix
print(tfidf_matrix.shape)
```

```
(0, 68550)      0.10822834414008975
(0, 100003)     0.15698893199336114
(0, 100132)     0.7068607939800713
(0, 44734)      0.1284136153022964
(0, 9359)       0.16115268143071207
(0, 71162)      0.13046834684243114
(0, 62069)      0.16923917230957372
(0, 54726)      0.2643863618010808
(0, 36445)      0.10915477858954839
(0, 70009)      0.2211741851869513
(0, 74024)      0.09025129024357859
(0, 20937)      0.09964953878975828
(0, 39311)      0.17150800346374082
(0, 14180)      0.21823511239924742
(0, 88693)      0.2285302317873252
(0, 48763)      0.17546140807131583
(0, 57842)      0.25884782427467457
(1, 28964)      0.15075279975790737
(1, 63167)      0.3476347779716208
(1, 39782)      0.18731408618279524
(1, 75437)      0.07468179658961509
(1, 73842)      0.16476012122894193
(1, 43650)      0.16812866412220415
(1, 70296)      0.24238828546980723
(1, 41792)      0.20517287495753816
  :       :
(278098, 36088)         0.19259558784674996
(278098, 71162)         0.28144817117136917
(278099, 57659)         0.30384514626962644
(278099, 85438)         0.28744585561288105
(278099, 72765)         0.25058143894462476
(278099, 5594)          0.23125754403355886
(278099, 96062)         0.15951663076991182
(278099, 30672)         0.13675951640679748
(278099, 21991)         0.20818988755851103
(278099, 15002)         0.16336793631627103
(278099, 52123)         0.1557712406113355
(278099, 7348)          0.17779198999112208
(278099, 91739)         0.14924390282658798
(278099, 14992)         0.16393654199505034
(278099, 12298)         0.15013680786238665
(278099, 48527)         0.09074261864867765
(278099, 59251)         0.1315491545179948
(278099, 64016)         0.0946364167121712
(278099, 99833)         0.10278199502259579
(278099, 78153)         0.11521501825782585
(278099, 94583)         0.09635113799287348
(278099, 38537)         0.09403079782445133
(278099, 37133)         0.057687792419871986
(278099, 75437)         0.191949640950626
(278099, 100132)        0.5919496843056041
(278100, 100224)
```

In [40]: `l=['date','month', 'year', 'title']`
`data[l]`

	date	month	year	title
0	2023	6	2015 00:00:00	Great help with lost order
1	2023	6	2024 00:00:00	I ordered the wrong size tee and hadï¿½ï¿½ï¿½
2	2023	6	2017 00:00:00	These guys offer the best customerï¿½ï¿½ï¿½
3	2023	6	2024 00:00:00	Good Stuff
4	2023	6	2023 00:00:00	My order arrived in a good timelyï¿½ï¿½ï¿½
...	...	...	...	...
278095	2018	4	2027 00:00:00	Highly recommend!
278096	2018	4	2027 00:00:00	Great quality
278097	2018	4	2027 00:00:00	Dudes rock.
278098	2018	4	2027 00:00:00	Shipping was fast the T-shirt was justï¿½ï¿½ï¿½
278099	2018	4	2027 00:00:00	Not great quality

278100 rows × 4 columns

```python
data.columns
```

```
Index(['reviewer_id', 'store_location', 'latitude', 'longitude', 'date',
       'month', 'year', 'title', 'review', 'review-label', 'cleaned_review'],
      dtype='object')
```

```python
# data['date'] = pd.to_datetime(data['date'].astype(str) + '0101', format='%Y%m%
# Extract additional time features
data['day_of_week'] = data['date'].dt.dayofweek
data['quarter'] = data['date'].dt.quarter

# Display the first few rows with the new features
print(data[['date', 'day_of_week', 'quarter']].head())
```

```
        date  day_of_week  quarter
0 2023-01-01            6        1
1 2023-01-01            6        1
2 2023-01-01            6        1
3 2023-01-01            6        1
4 2023-01-01            6        1
```

```python
# import pandas as pd
import matplotlib.pyplot as plt
# Plot histogram of review ratings
plt.figure(figsize=(8, 6))
plt.hist(data['review-label'], bins=5, color='skyblue', edgecolor='black', alpha
plt.xlabel('Review Rating')
plt.ylabel('Frequency')
plt.title('Distribution of Review Ratings')
plt.xticks(range(1, 6))
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()
```

Distribution of Review Ratings
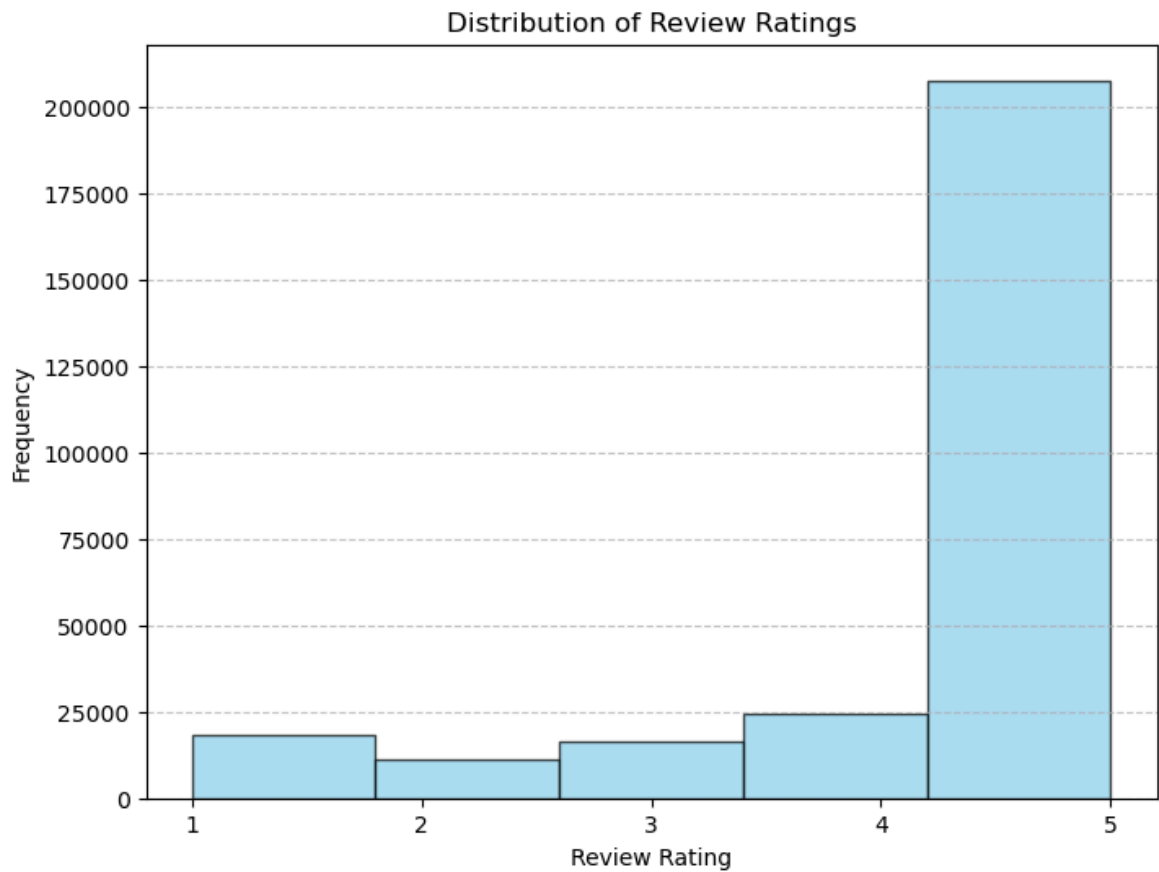
```python
import seaborn as sns


# Plot boxplot of review ratings by quarter
plt.figure(figsize=(10, 6))
sns.boxplot(x='quarter', y='review-label', data=data, palette='Set3')
plt.xlabel('Quarter')
plt.ylabel('Review Rating')
plt.title('Review Ratings by Quarter')
plt.show()
```

Review Ratings by Quarter
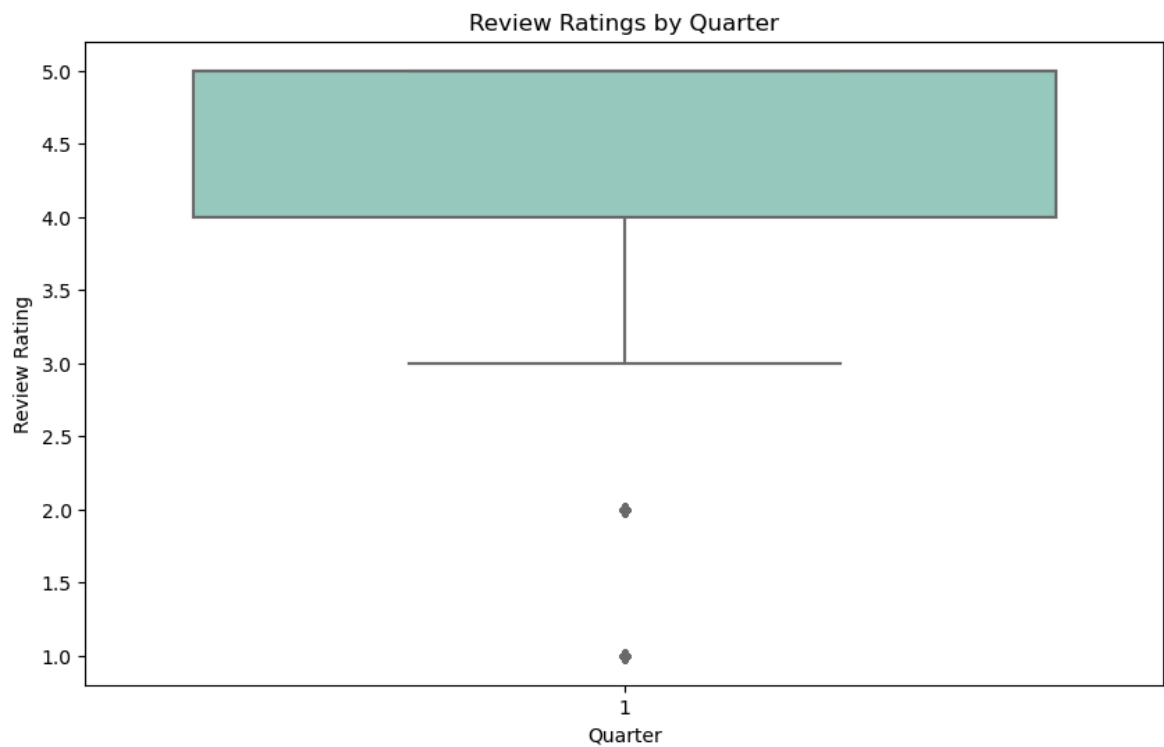
In [52]:
```python
import matplotlib.pyplot as plt
import geopandas as gpd
from shapely.geometry import Point


# Convert to GeoDataFrame
gdf = gpd.GeoDataFrame(data, geometry=gpd.points_from_xy(data.longitude, data.la

# Plotting the map
world = gpd.read_file(gpd.datasets.get_path('naturalearth_lowres'))
fig, ax = plt.subplots(figsize=(12, 8))
world.plot(ax=ax, color='lightgrey')

# Plot points
gdf.plot(ax=ax, markersize=5, color='blue', alpha=0.5)

plt.title('Geographic Distribution of Reviews')
plt.xlabel('Longitude')
plt.ylabel('Latitude')
plt.show()
```

```
C:\Users\Admin\AppData\Local\Temp\ipykernel_15732\3223844924.py:10: FutureWarnin
g: The geopandas.dataset module is deprecated and will be removed in GeoPandas 1.
0. You can get the original 'naturalearth_lowres' data from https://www.naturalea
rthdata.com/downloads/110m-cultural-vectors/.
  world = gpd.read_file(gpd.datasets.get_path('naturalearth_lowres'))
```

Geographic Distribution of Reviews
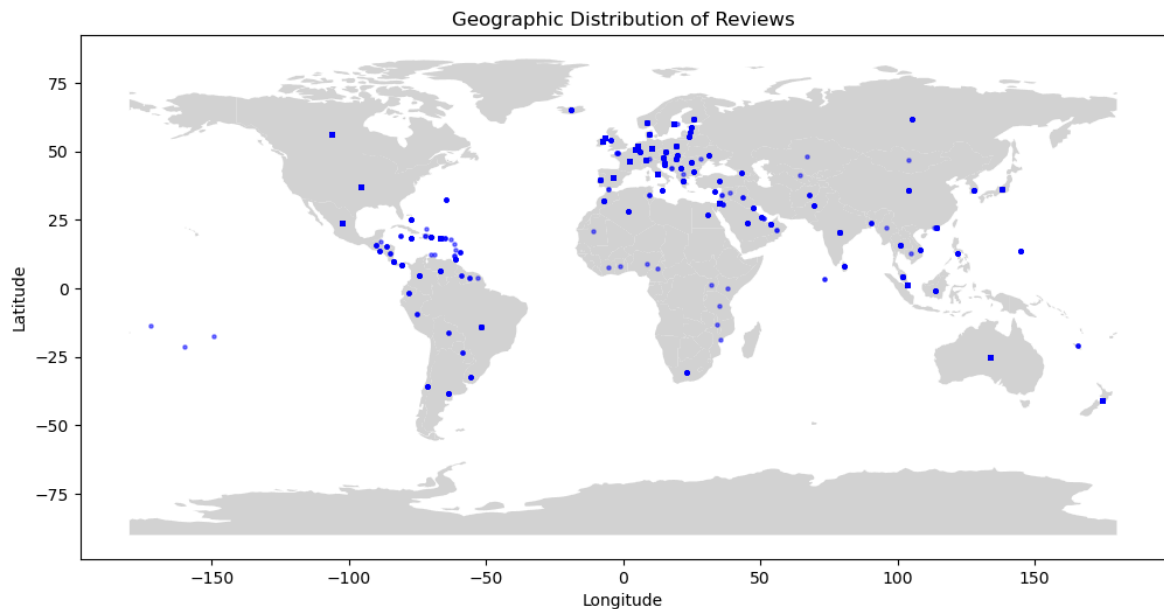
In [53]:
```
pip install plotly geopandas
```

Requirement already satisfied: plotly in c:\users\admin\anaconda3\lib\site-packages (5.9.0)
Requirement already satisfied: geopandas in c:\users\admin\anaconda3\lib\site-packages (0.14.4)
Requirement already satisfied: tenacity>=6.2.0 in c:\users\admin\anaconda3\lib\site-packages (from plotly) (8.2.2)
Requirement already satisfied: fiona>=1.8.21 in c:\users\admin\anaconda3\lib\site-packages (from geopandas) (1.9.6)
Requirement already satisfied: numpy>=1.22 in c:\users\admin\anaconda3\lib\site-packages (from geopandas) (1.26.4)
Requirement already satisfied: packaging in c:\users\admin\anaconda3\lib\site-packages (from geopandas) (23.1)
Requirement already satisfied: pandas>=1.4.0 in c:\users\admin\anaconda3\lib\site-packages (from geopandas) (2.1.4)
Requirement already satisfied: pyproj>=3.3.0 in c:\users\admin\anaconda3\lib\site-packages (from geopandas) (3.6.1)
Requirement already satisfied: shapely>=1.8.0 in c:\users\admin\anaconda3\lib\site-packages (from geopandas) (2.0.4)
Requirement already satisfied: attrs>=19.2.0 in c:\users\admin\anaconda3\lib\site-packages (from fiona>=1.8.21->geopandas) (23.1.0)
Requirement already satisfied: certifi in c:\users\admin\anaconda3\lib\site-packages (from fiona>=1.8.21->geopandas) (2024.2.2)
Requirement already satisfied: click~=8.0 in c:\users\admin\anaconda3\lib\site-packages (from fiona>=1.8.21->geopandas) (8.1.7)
Requirement already satisfied: click-plugins>=1.0 in c:\users\admin\anaconda3\lib\site-packages (from fiona>=1.8.21->geopandas) (1.1.1)
Requirement already satisfied: cligj>=0.5 in c:\users\admin\anaconda3\lib\site-packages (from fiona>=1.8.21->geopandas) (0.7.2)
Requirement already satisfied: six in c:\users\admin\anaconda3\lib\site-packages (from fiona>=1.8.21->geopandas) (1.16.0)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\admin\anaconda3\lib\site-packages (from pandas>=1.4.0->geopandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\admin\anaconda3\lib\site-packages (from pandas>=1.4.0->geopandas) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\users\admin\anaconda3\lib\site-packages (from pandas>=1.4.0->geopandas) (2023.3)
Requirement already satisfied: colorama in c:\users\admin\anaconda3\lib\site-packages (from click~=8.0->fiona>=1.8.21->geopandas) (0.4.6)
Note: you may need to restart the kernel to use updated packages.

```
In [57]: import pandas as pd
         import geopandas as gpd
         import plotly.express as px

         # Load the dataset
         # data = pd.read_csv('shopper_sentiments.csv')

         # Convert to GeoDataFrame
         gdf = gpd.GeoDataFrame(data, geometry=gpd.points_from_xy(data.longitude, data.la

         # Load world map data
         world = gpd.read_file(gpd.datasets.get_path('naturalearth_lowres'))

         # Check column names to ensure compatibility
         print("Columns in 'world' GeoDataFrame:", world.columns)
         print("Columns in 'gdf' GeoDataFrame:", gdf.columns)
```

```
Columns in 'world' GeoDataFrame: Index(['pop_est', 'continent', 'name', 'iso_a3',
'gdp_md_est', 'geometry'], dtype='object')
Columns in 'gdf' GeoDataFrame: Index(['reviewer_id', 'store_location', 'latitud
e', 'longitude', 'date',
       'month', 'year', 'title', 'review', 'review-label', 'cleaned_review',
       'day_of_week', 'quarter', 'geometry'],
     dtype='object')
```

```
C:\Users\Admin\AppData\Local\Temp\ipykernel_15732\3801850089.py:12: FutureWarnin
g: The geopandas.dataset module is deprecated and will be removed in GeoPandas 1.
0. You can get the original 'naturalearth_lowres' data from https://www.naturalea
rthdata.com/downloads/110m-cultural-vectors/.
  world = gpd.read_file(gpd.datasets.get_path('naturalearth_lowres'))
```

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In [ ]:
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In [ ]:
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In [ ]:
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