

# A MOBILE APPLICATION TO EVALUATE THE RELATIONSHIP BETWEEN COUNTRIES OR AREAS BASED ON TWITTER

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## **ABSTRACT**

*In recent years, there has been a noticeable deterioration in international relations between various countries around the world. This has led to an increase in misunderstandings, cultural clashes, and even conflicts between different nations. Many people are feeling the effects of this breakdown in relations, especially those who are trying to navigate interactions with individuals from different countries. To address this problem, an app, which aims to help people understand the relationship between different countries, is designed. The app is called Country Relations and is designed to provide users with a comprehensive understanding of the financial and social relationship between different countries. Country Relations uses an algorithm that automatically collects news keywords to analyze a large database of economic or social information from around the world. By entering two countries into the application, users can obtain an accurate assessment of the relationship between these two countries. It might be useful for those who are planning to travel or work abroad, as well as for individuals who are interested in learning more about different cultures. In conclusion, the breakdown in international relations in recent years has created a need for new tools that can help people understand the relationship between different countries. This app is designed to fill this gap, providing users with a comprehensive understanding of the financial and social relationship between different nations.*

## **KEYWORDS**

*Country Relationship, Twitter, Thinkable, Mobile Application*

## **1. INTRODUCTION**

In the contemporary world, the issue of worsening relations among nations has gained significant attention. The escalating conflicts and disputes between various countries have become a subject of great concern for the international community. The geopolitical landscape of the world is constantly changing, and the complexities of global issues have become more intricate than ever before. One of the primary reasons for the deterioration of relations among countries is the struggle for power and dominance. The quest for control over resources, territory, and influence has led to numerous conflicts and tensions. In addition, economic factors have also played a significant role in worsening international relations. Trade disputes, tariffs, and protectionist policies have led to frictions among nations, disrupting global supply chains and economic growth [17]. Moreover, the rise of nationalism and populism in many countries has also contributed to the worsening of international relations. The narrow-minded policies of some governments have led to the adoption of protectionist measures, creating a sense of isolationism

and mistrust among nations. To those who are planning to travel or work abroad, as well as for individuals who are interested in learning more about different cultures. An application has been planned for development to offer users a comprehensive understanding of the financial and social connections between different nations. In summary, the app aims to cater to the need for improved tools to aid individuals in comprehending the relationships between various nations.

One of the approaches we use is Natural Language Processing (NLP) is a branch of artificial intelligence that involves the interaction between computers and human language. NLP allows computers to understand and analyze human language, which is crucial in today's world because of the huge amount of unstructured data generated every day. One of the most popular applications of NLP is in social media analysis, especially in analyzing Twitter data [4]. One way to analyze Twitter data is to use NLP techniques to extract keywords from tweets [4]. Keywords are important because they allow us to categorize and filter the data based on specific topics or themes. We need to collect data from Twitter that is relevant to the topics we are interested in [9]. This can be done by using Twitter's API or third-party tools that allow us to scrape data from Twitter [10].

Twitter's API (Application Programming Interface) is a set of protocols and tools that allow developers to interact with Twitter's platform and access its data [7]. It provides a way for developers to programmatically retrieve and send data to Twitter, which enables them to build applications that integrate with Twitter [9]. Using the Twitter API, developers can build a wide range of applications, including social media monitoring tools, sentiment analysis applications, and chatbots [1]. The API provides a powerful set of tools that enable developers to analyze and extract insights from Twitter's vast amount of data [10].

Our application was developed with a special focus on leveraging the power of the Python programming language. This allowed us to efficiently sift through the vast amount of global news shared on Twitter and identify keywords [7]. By analyzing these keywords, our application was able to streamline the process of filtering news items, making it faster and more efficient. The decision to use Twitter as our primary news source was based on its reputation as a social media platform that delivers a large number of breaking news stories. With millions of users sharing information on the platform, Twitter is often the first place important news items are reported [7]. This makes it an ideal source for our application, as we are able to provide users with real-time updates on the latest developments. However, there are some challenges to using Twitter as a news source [10]. One of the biggest drawbacks is the lack of ability to discern the accuracy of news stories. Inaccurate information can spread quickly across social media, leading to misleading or incorrect results in our ratings. To mitigate this risk, we developed a sophisticated system that analyzes keywords associated with each country. By doing so, our application is able to provide users with an approximate status of the relationship between countries, which helps filter out inaccurate news items.

The app allows users to input the names of two countries, and then rate the relationship between them based on a range of factors such as economic ties, political relations, cultural exchange, diplomatic ties, and more. The app aggregates these ratings and generates an overall rating for the relationship between the two countries. This app may be helpful for individuals and organizations with an interest in international relations, global affairs, and cross-cultural communication. This could include students, researchers, diplomats, business leaders, journalists, and anyone who wants to gain a better understanding of the relationship between different countries. The app provides several benefits to its users. Firstly, it allows them to access information about the relationship between two countries quickly and easily. Users can access the app from anywhere in the world and gain insight into the current state of the relationship between the two countries of their choice. Secondly, the app encourages users to think critically about the factors that

influence international relationships, which can help them develop a deeper understanding of global affairs. Finally, the app allows users to engage in a constructive and collaborative dialogue about international relations, which can lead to increased cross-cultural understanding and cooperation.

The subsequent sections of the paper are structured as follows: Section 2 is the obstacles we encountered while experimenting and creating the sample. In Section 3, we provide a comprehensive account of the approaches we used to resolve the issues highlighted in Section 2. Section 4 provides further insights into the project by providing additional details on our methodology, results, and analysis. Additionally, Section 5 presents related works to our project, which offer additional perspectives and insights into the problem space. Finally, in Section 6, we conclude the paper by summarizing our findings, highlighting the implications of our work, and providing avenues for future research.

## **2. CHALLENGES**

In order to build the project, a few challenges have been identified as follows.

### **2.1. Developing an application**

Developing an application can be a challenging task, and developers often face many obstacles that they must overcome to create a functional and efficient application. One of the main challenges I faced during the application development process was acquiring data efficiently. This can be a particularly big problem when dealing with large amounts of data, as analyzing and making sense of the data can be a challenge. This is because, for example, the amount of data stored on top of Twitter is huge and I need to be able to use this data effectively in order to create a functional and efficient application [10].

### **2.2. Handling the data**

Another major challenge I faced during the application development process was handling the data. With so much data to sift through, I needed to find ways to effectively organize, filter, and manage the data. I needed to ensure that the data was secure and only accessible to authorized users. This can be a particular problem when dealing with sensitive data or data that needs to be accessed by multiple users at the same time.

### **2.3. Ensuring the ratings**

The third challenge I encountered was ensuring that the ratings given by the application were accurate. This can be a tricky issue because there is a lot of fake news and inaccurate news on social media platforms like Twitter [8].

### 3. SOLUTION

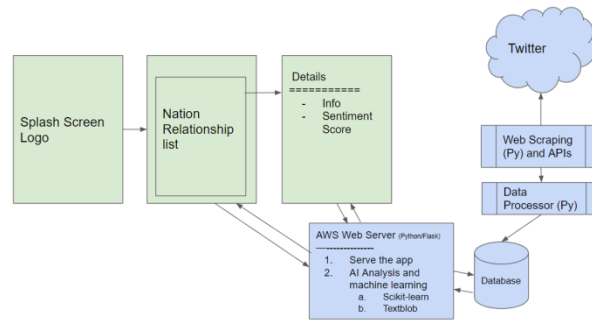


Figure 1. Overview of the solution

The “Country Relationship” application focuses on analyzing information from various users on the world given a set of keywords connecting two or more nation’s together. Said tweets are then stored with tags indicating the nation’s they correspond to. We then use our program to evaluate the sentimentality of the most recent tweets, categorizing them into one of 3 main feelings: positive, negative or neutral. Given this information we get the average score between them to see the mathematical sentiment that said nations share between each other. The app was created in Thunkable using coding blocks in tandem with a Flask Server setup with Python on repl.it.

The "Country Relations" app is a powerful tool that provides users with a comprehensive and up-to-date view of international relations. By providing access to a wealth of data and visualizations, the app enables users to explore and learn about the complex dynamics that shape country relations, and gain a deeper understanding of the political, economic, and social forces that shape the world we live in. Whether you are a student, researcher, journalist, or simply curious about the world around you, the "Country Relations" app is an invaluable resource that can help you stay informed and engaged with the latest developments in international relations.

```

when Search Results Opens
do
  wait 1 seconds
  set Text Label % Text -> app variable CountryName
  set Web API % URL -> join https://beta.larimodern.zimejians.appl.co
  set CountriesLabel % Text -> app variable CountryName
  call Web API % GET -> with outputs
  then do
    set labeled variable Response % get object from JSON -> response
    set % stored variable Response % null
    do
      navigate to % Error
    set % Average % join % Average %
    set % Positive LBL % join % Positive %
    set % Negative LBL % join % Negative %
    set % Neutral LBL % join % Neutral %
    set % Score label % join % Score %
    set % News label % join % News %
  
```

Figure 2. Screenshot of code 1

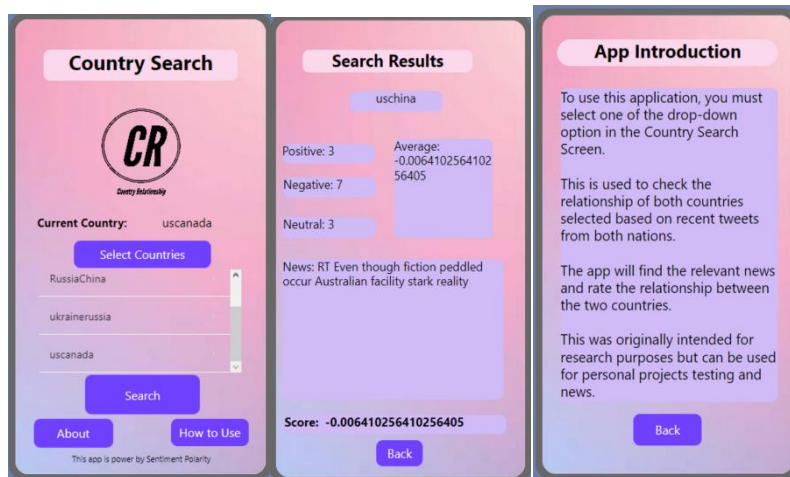


Figure 3. Screenshot of the app

At its core, the "Country Relations" app is a database that contains information on different countries and their relationships with each other. This information is presented in the form of interactive visualizations, maps, and tables that allow users to gain a deeper understanding of the political, economic, and social dynamics that shape international relations.

The app is divided into several sections, each of which provides a different perspective on country relations. The first section is the "Country's" tab, which allows users to browse and search for information on individual countries. Here, users can access country profiles that contain data on a range of indicators, including population, GDP, military strength, and more. Users can also view a map that shows the location of the selected country and its borders, as well as its neighbors and key trading partners.

The second section of the app is the "Relations" tab, which provides an overview of the relationships between different countries. Here, users can explore interactive maps that show the trade relationships, military alliances, and diplomatic ties between countries. Users can also filter the data by different indicators, such as trade volume, military spending, and political alignment, to gain a more nuanced understanding of the relationships between countries.

The third section of the app is the "Trends" tab, which allows users to track changes and developments in country relations over time. Here, users can access historical data on a range of indicators, such as trade volume, military spending, and political alignment, and view how these indicators have changed over time. Users can also view interactive visualizations that show trends and patterns in international relations, such as the rise and fall of military alliances or the growth of global trade networks.

The fourth section of the app is the "News" tab, which provides users with real-time updates on the latest developments in country relations. Here, users can access news articles and analysis from a range of sources, including international news agencies, think tanks, and academic institutions. Users can also set up personalized alerts that notify them of important developments in the countries and regions they are interested in.

## 4. EXPERIMENT

### 4.1. Experiment 1

In our first experiment, we investigated the accuracy of the sentiment calculator given a set of prompts. The application is capable of finding the connection between 2 or more nations, but we would like to indicate its precision. We decided to feed it with a specific data set based on 3 sentiments: positive and negative. Focused on keywords that are considered fitting of each feeling such as: “happy”, “jolly”, and “enjoy” for positive or “sorrow”, “sad” and “distasteful” for negative. Given that the sentiment prediction model can correlate data based on data fed on a support vector machine (svm), we decided to include textual excerpts of 100 words each to feed onto it. Said prompts would be composed of set percentages of randomly extracted words from a list of 1000 positive and negative words respectively. Each test execution will run with a mixture of these words in sets of 10% (e.g. 0% positive / 100% negative, 10% positive / 90% negative).

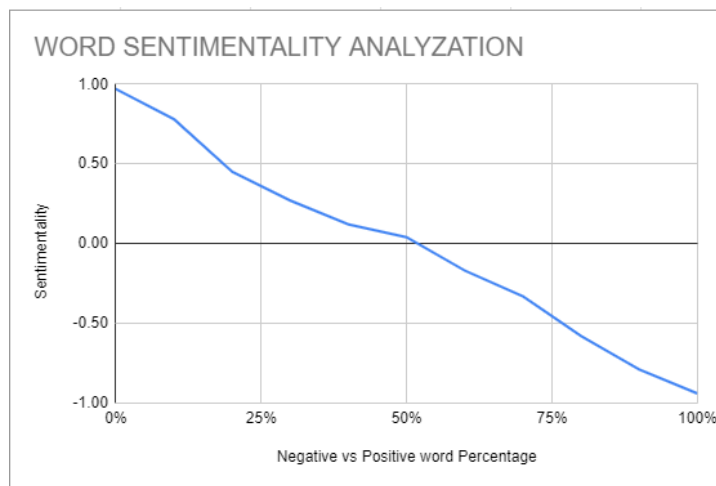


Figure 4. World sentimentality analyzation

The graph above represents the word sentimentality analysis. The horizontal axis represents the percentage of negative to positive percentages with the left having an input dataset composed of randomly added 0% negative words as well as 100% positive words. The opposite is true on the right side (100% negative and 0% positive words). The vertical axis represents the sentimentality of the input words where 1.00 is equal to 100% positive and -1.00 for a 100% negative response. Results skewed towards 0.0 represent neutrality or indifference from the data given. Surprisingly there was little margin of error which can be identified with the mean of -0.02 and the median of 0.04. We expected a larger margin given the large dataset and how some words can be given a different connotation based on sentence structure. However, this result indicates a high level of reliability on the sentiment verifying program which helps support the validity of the application as well as other experiments dependent upon this system.

### 4.2. Experiment 2

In our second experiment, we searched for the average sentiment between influential nations of the world such as the United States and China [11]. We also took into consideration recent events as of 2023, such as the conflict Ukraine is facing [12]. With that in mind, we selected the relationship between the following nations: us - canada, russia - china, us - china and ukraine - russia. Sentiment changes given interactions between nations, it can be hard to measure. To get a

clear picture, we investigated and found that in a span of a month, we can collect enough data to make a good guess of the potential sentimentality for the following week [13]. We used the sentiment calculator to measure the sentimentality over a span of 30 consecutive days.

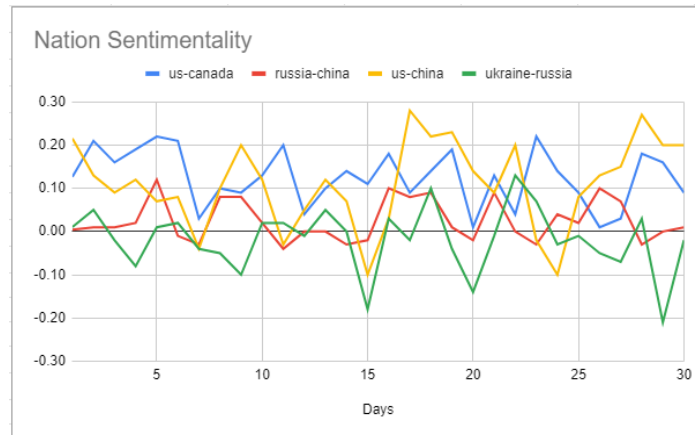


Figure 5. Nation sentimentality

The table above represents the sentimentality scores for each of the 4 aforementioned nation relationships. The horizontal axis shows the span of 30 days over which the data was collected where the left starts at day 1 and the right goes towards day 30. On the vertical axis we appreciate the sentimentality relationship scores, with positive sentiment going upwards and negative downwards. The data visual was surprising as the line graph shares trends at certain points of time. An example of this is the case of russia-china and us-china, they have similar movement patterns, which suggests a possible similar relationship that russia-us might have. The median and average of the sentimentality of each nation pair was 0.13, 0.13 for us-canada, 0.01, 0.02 for russia-china, 0.12, 0.11 for us-china and -0.01, -0.02 for ukraine-russia. The result for ukraine-russia is within our prediction due to recent world events between both nations, although it was lower than expected. All other nations have a positive outlook towards each other, but russia-china is a bit more average, which is surprising since they are neighbors.

Handling data and fake news on twitter [4]. The previous experiments were conducted to aid in some of our major challenges, namely data handling and verifying the veracity of sentiment based on twitter posts [5]. The first experiment allows us to test the accuracy of the sentiment calculator, which in this case simplifies the app development process. We planned to improve the calculator if needed, but the current version demonstrated it handles well with a small margin of error. Therefore the app would focus on other sections of its programming, which leads to our second experiment. Since our information is retrieved from Twitter, we were worried the results might be skewed since they are user based which means there is a high level of variability [10]. Collecting the sentimental analysis of 4 nation relationships over a 30 day span allowed us to collect enough data to verify the sentimentality collection is effective. Even if there is some fake news that may skew the information, the overall sentimentality score still gravitates towards a given average.

## 5. RELATED WORK

In the paper "Globalization and International Relations Theory" Mayall, J, it discusses the relationship between globalization and international relations theory [14]. It argues that globalization has challenged many of the key assumptions of traditional international relations theory, such as the primacy of the state and the importance of military power. The paper suggests that a new approach to international relations theory is needed that takes into account the complex and dynamic nature of globalization. While this paper discusses the broader topic of international relations theory and the impact of globalization on it, our app focuses on country relations.

In a paper named "The Evolution of International Relations Theory: A Critical Overview" by John A. Vasquez (2010), it provides a critical overview of the evolution of international relations theory over time [15]. It discusses the major schools of thought in the field, such as realism, liberalism, and constructivism, and analyzes their strengths and weaknesses. The paper also identifies some of the key challenges facing the field of international relations today. While this paper provides a critical analysis of the theories that underpin the study of international relations, our app provides a platform for users to explore country relations.

In a book named "The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000" by Paul Kennedy, it examines the relationship between economic power and military conflict over the course of five centuries [16]. It argues that the rise and fall of great powers throughout history has been closely linked to their economic strength and ability to maintain military dominance. The book also discusses the role of technology, ideology, and geography in shaping the course of international relations. While this book takes a historical perspective and examines the broader patterns of international relations over a much longer time frame, our app focuses on country relations in the present day.

## 6. CONCLUSIONS

In this project, a new mobile application to analyze the country relationships was proposed. The data sources are from Twitter posts [4]. The "Country Relations" app demonstrates how modern technology and data analysis can be applied to track and analyze sentiment towards nations on social media platforms. The app serves as a tool to help users keep track of current events and understand the general public's perception of their country's relationships with others. By analyzing Twitter data, the app provides valuable insights into the sentiment of people towards different nations [7]. The experiments conducted on the app have shown that the sentiment calculator is accurate and effective. Additionally, collecting data on the sentimentality of four nation relationships over a 30-day span has shown that the sentimentality collection is effective, even with the variability and potential for fake news on social media. However, the app has limitations that need to be addressed in future work, such as improving data handling and verifying the accuracy of the news sources used. The "Country Relations" app is an excellent example of how technology can be used to provide insights into public sentiment and help individuals stay informed on current events. In an increasingly globalized world, understanding public sentiment towards other nations is essential for promoting peace and cooperation. This app provides a new and innovative way of tracking sentiment towards nations, which can aid in foreign policy decisions and diplomatic relationships. Overall, the "Country Relations" app is a promising tool for anyone interested in tracking sentiment towards different nations. The app's potential for future development and improvements makes it a valuable addition to the field of sentiment analysis and data visualization [1]. With further refinement and development, the



"Country Relations" app could become an invaluable resource for diplomats, policymakers, and anyone interested in global affairs.

There are several limitations to the "Country Relations" app. Firstly, it relies on data obtained from Twitter, which means that the app is susceptible to fake news and biased opinions. Although the sentiment analysis helps to filter out some of the noise, there is still a risk of skewed results [1]. Additionally, the app only analyzes the sentiment towards four specific countries, which may not provide a comprehensive view of the global sentiment towards those countries. Another limitation of the app is its current lack of interactivity. The user can only view the sentiment analysis of the selected countries and cannot interact with the data in any meaningful way [2]. It would be beneficial to have additional features such as the ability to view specific tweets or a breakdown of sentiment analysis by location or demographic [6]. Finally, the app is limited by its programming language and platform. While the app is currently functional, it is built using Thunkable, which is a no-code platform. This limits the ability to customize the app and add more complex features. Additionally, the app is only available on the Thunkable platform and is not available as a standalone application on app stores. This may limit the app's reach and user base.

Based on the current limitations and challenges, there are several potential areas for future work:

**Improve data collection and processing:** In order to mitigate the impact of fake news and improve the accuracy of sentiment analysis, future work could focus on developing more robust methods for data collection and processing [3]. This could include using machine learning algorithms to filter out fake news and bias, or developing new techniques for sentiment analysis that are more effective in identifying nuanced emotions and opinions [6].

**Expand the scope of the app:** While the current app focuses on sentiment analysis for a limited set of country relations, future work could expand the scope of the app to cover more countries and regions [6]. This would require collecting and processing larger amounts of data, but could provide a more comprehensive view of global sentiment trends.

Overall, there are many potential avenues for future work in developing and improving the Country Relations app. By addressing the current limitations and challenges, and incorporating additional features and functionality, the app has the potential to become a valuable tool for tracking and analyzing global sentiment trends.

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