The Perception of the Syrian Asylum Seekers in Turkey: Sentiment Analysis with Twitter Data

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Abstract

This study examines the perception of Syrian refugees who have migrated to Turkey within the Turkish public. For this purpose, the reasons for Syrian refugees' migration to Turkey, their population in Turkey, their distribution in Turkey, their education status and enrollment rates, their working lives, their impact on the economy, the aid provided to them, their impact on public services and security in Turkey were investigated. Subsequently, sentiment analyses were conducted based on machine learning approaches on Twitter to measure the perception of the Turkish public regarding Syrian refugees. Perception was examined in three different dimensions: general perception, the nature of perception, and the reasons behind perception. In this context, tweets related to Syrian refugees posted throughout the year 2021 were collected, pre-processed, and transformed into a format suitable for data mining algorithms. Some of the tweets were manually classified according to the machine learning technique, and the remaining tweets were automatically classified by algorithms determined, taking into account the manually made classifications. As a result, it was determined that the general perception of the Turkish public regarding Syrian refugees on Twitter is largely negative and characterized by 'discontent'. The main reasons behind this perception were found to be the perceived harm caused by Syrian refugees, their high numbers, and perceptions that they are better off than the locals, primarily due to their refugee and residency rights.

Keywords

Asylum Seekers; Turkey; Sentiment Analysis; Machine Learning; Twitter; Perception; Immigration; Economy; Public Services; Security

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Восприятие сирийских беженцев в Турции: анализ настроения с помощью данных из "Twitter"

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Аннотация

Эта статья исследует восприятие сирийских беженцев, прибывших в Турцию, турецкой общественностью. Для этой цели были проанализированы причины миграции сирийских беженцев в Турцию, их численность в Турции, их распределение в Турции, их образовательный статус и уровень поступления, их трудовая деятельность, их влияние на экономику, предоставляемая им помощь, их влияние на государственные службы и безопасность в Турции. Впоследствии проводились анализы настроений на основе методов машинного обучения в Twitter для оценки восприятия турецкой общественностью сирийских беженцев. Восприятие было рассмотрено в трех разных измерениях: общее восприятие, характер восприятия и причины восприятия. В этом контексте были собраны твиты, связанные с сирийскими беженцами, размещенные в течение 2021 года, затем была проведена предварительная обработка и преобразование в формат, подходящий для алгоритмов машинного обучения. Некоторые из твитов были классифицированы вручную с использованием методики машинного обучения, а остальные твиты были автоматически классифицированы алгоритмами, определенными с учетом ручной классификации. В результате было установлено, что общее восприятие турецкой общественности в Twitter относительно сирийских беженцев в значительной степени негативно и характеризуется «недовольством». Основными причинами такого восприятия были названы воспринимаемый ущерб, наносимый сирийскими беженцами, их большие численные показатели и впечатление, что они находятся в более выгодном положении по сравнению с местным населением, в первую очередь из-за их статуса беженцев и резидентов.

Ключевые слова

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Introduction

With the increasing opportunities of mass communication, the Arab geography, which had a better chance to observe the forms of government of developed civilizations, began to move one by one after 2010. The wave of rebellion, which was ignited by the self-immolation of a street vendor in Tunisia due to the bad treatment he received from the security forces, quickly spread to the entire Arab geography, and led to changes that still continue today and vary from country to country. The Arab uprisings, initiated by Arab peoples who had been ruled by monarchy throughout their history, demanding democracy, freedom, human rights, and a more prosperous life, were called the "Arab Spring". The Arab Spring led to the overthrow of governments in some countries, softer transitions in some, and ongoing civil wars in others.

One of the countries that suffered the most negative impact of the Arab Spring was Syria. After the uprisings, President Assad refused to leave office, and thus the fuse was lit for a bloody civil war that would last for many years. As a result of the war, more than 600,000 people lost their lives (SOHR, 2022), and 6.7 million people were forced to flee the country (UNHCR, 2020a). More than 80% of these external migrations were made to neighboring countries. Migration to Turkey accounted for more than 65% of the migrations to neighboring countries (UNHCR, 2020a). As of 2022, there are more than 3.8 million registered Syrian refugees in Turkey, and this number corresponds to 4.4% of the Turkish population (GIB, 2022a; 2022b; Türkiye İstatistik Kurumu, 2022a).

The opinion of the Turkish people regarding such an important issue for Turkey is undoubtedly of great importance. This research aims to measure the perception of the Turkish people regarding Syrian refugees, the nature of this perception, and the reasons behind it. Traditionally, such a public perception measurement can be conducted using methods such as face-to-face interviews, surveys, or phone calls. However, there is now a new and high-performance method used to conduct such mass perception measurements, which is called sentiment analysis.

Today, people mostly share their views on any topic on social media. The most commonly used platform for publicly shared written opinions both globally and in Turkey is Twitter. Sentiment analysis aims to analyze the text format data that is too large to be manually analyzed by humans and to uncover the meaning within it. This research is conducted using tweets related to Syrian refugees on Twitter to measure the perception of the Turkish people.

The Issue of Syrian Asylum Seekers in Turkey

The issue of Syrian asylum seekers affects many areas in Turkey, such as population density, education, economy, public services, and security. As a result of the civil war, more than half of the Syrian population (13.5 million people) has been

forced to leave their homes, including internal displacement. Approximately half of these displacements (6.8 million people) consist of emigration to other countries, and over 80% of these emigrations have been to neighboring countries. Of the emigrations to neighboring countries, 65% have been to Turkey (UNHCR, 2020a). As of April 2022, it is observed that 3,762,686 Syrians are under "temporary protection" in Turkey (GIB, 2022a). Turkey only grants refugee status to asylum seekers coming from Europe. Therefore, Syrian asylum seekers in Turkey have not been granted refugee status, and they have been defined as "foreigners under temporary protection status" through a general directive issued in 2012 (Erdogan, 2020, p. 8). For this reason, the term "asylum seeker" will be used in this study to refer to Syrian refugee who has sought refuge in Turkey as a person who has taken refuge in a country.

In addition to Syrians under temporary protection, there are also 109,388 Syrians residing in Turkey with a residence permit. When combined, the registered Syrian population in Turkey exceeds 3.8 million (GIB, 2022b). This figure does not include the 200,000 Syrians who have acquired Turkish citizenship (Karadağ, 2022). Therefore, the proportion of registered Syrian refugees to the population of Turkey is calculated as 4.4% (Türkiye İstatistik Kurumu, 2022a; GIB, 2022a). Taking into account the number of registered refugees, Turkey is currently the country hosting the highest number of refugees in the world. Colombia, the second highest hosting country, hosts 1.7 million refugees (UNHCR, 2020a). Furthermore, Turkey also has a significant problem with undocumented migration in addition to registered refugees. Given all of these data, it is clear that the significant influx of refugees into Turkey since 2011, when there were only 58,000 refugees, will have serious effects (Erdoğan, 2019, p. 3-4).

The total fertility rate refers to the total number of children a woman will have during her reproductive years if age-specific fertility rates remain valid. According to a research conducted by Hacettepe University Institute of Population Studies through a sample survey on Syrian refugees in 2018, the fertility rate of Syrian refugees was found to be 5.3. In the same year, the average fertility rate in Turkey was calculated as 2.3 by the same institution (HUNEE, 2019b). According to the 2021 TUIK data, Turkey's average fertility rate has decreased to 1.7 (Türkiye İstatistik Kurumu, 2022b). These data indicate that the Syrian refugee population in Turkey is increasing much faster than the Turkish average. As of March 2022, it was stated by the Minister of Health Fahrettin Koca that 754,000 Syrian babies were born in Turkey (Rakipoğlu and Kara, 2022).

The distribution of Syrian refugees in Turkey is quite uneven, with refugees mainly concentrated along the Syrian border and in some major cities. Research shows that the education level of Syrian refugees in Turkey is significantly lower than the Turkish average. According to a study conducted by AFAD in 2017, 23% of Syrian refugees are illiterate, 14.5% are literate but have not completed any school, and 26% have completed only primary school. This results in a literacy rate of 63.5% for primary school and below (AFAD, 2017).

In Erdogan's (2020) "Syrians Barometer 2019" study, which was conducted through sampling, it was found that 8.2% of Syrian refugees are illiterate, 16.7% are literate but have not completed any school, 31.7% have completed only primary school, 22% have completed elementary/middle school, 11.4% have completed high school or equivalent, 2.7% have completed associate degree, 7% have completed bachelor's degree, and 0.3% have completed graduate or doctoral degree. There-fore, the proportion of Syrian refugees who have completed primary school and below is 56.6% (Erdoğan, 2020, p. 34).

As of the 2021-2022 academic year, out of the 1,124,353 Syrian refugees between the ages of 5 and 17 who are of school age, 730,806 are attending school. This indicates that 393,547 Syrian refugee children who should be attending school, are not. The enrollment rates of Syrian refugee students by education level are 34.34% for preschool, 75.13% for primary school, 80% for middle school, and 42.65% for high school (MEB, 2022b). In higher education, Syrian students with a total of 47,482 are ranked first among foreign students (YBYS, 2022).

A study titled "Syrian Refugees in the Turkish Labor Market" conducted by the International Labour Organization (ILO) and Caro (2020) discusses all aspects of Syrian refugees in the Turkish labor market in detail. As of 2017, it is estimated that a total of 940,921 Syrian refugees, including child laborers under the age of 15, are working in Turkey. 91.6% of these refugees work in the informal sector. The number of Syrian child laborers under the age of 15 is estimated to be 127,140. 71% of Syrian male refugees between the ages of 15 and 65 are employed, while the rate for women is 11.2%. It is also estimated that 58% of employed Syrian refugees work outside the province in which they are registered (Caro, 2020).

The proportion of Syrian refugees among all employees in Turkey is 2.9%. Although this rate seems small, it has had significant effects, especially in the sectors where refugees work intensively. The most significant impacts of this situation include an increase in profitability for employers due to the lower wages paid to refugees – who mostly work informally – and an increase in the unemploy-ment rate of Turkish citizens who also work informally in the same sectors (Caro, 2020, p. 14; Del Carpio and Wagner, 2015).

According to the United Nations High Commissioner for Refugees (UNHCR) report in 2020, the number of Syrian refugees granted work permits in Turkey is 132,497 (UNHCR, 2020b). As of 2017, it is estimated that 657,385 (age 15 and above) Syrian workers in Turkey do not have work permits. This corresponds to 4.2% of the total registered workforce in Turkey (Caro, 2020).

Half of the income distribution of Syrian refugees is between $250 and $499. In terms of the 2017 dollar exchange rate, this corresponds to an income of between 955 and 1906 Turkish Lira. Syrian refugees have been observed to have lower incomes than Turkish citizens and to concentrate in low-skilled and low-paying jobs (Gençler, 2020, p. 132).

According to the Turkish Commercial Code, Syrian refugees have the right to establish their own businesses in Turkey. As of February 26, 2019, the number of companies with at least one partner of Syrian origin was 15,159, according to a statement made by the Ministry of Commerce (CNN Türk, 2019). It is estimated that the actual number is higher when considering unregistered companies.

The impact of Syrian refugees on the Turkish economy is primarily reflected in public spending. The latest official announcements regarding Turkey's total spending on Syrian refugees indicate that as of 2019, total spending has exceeded $40 billion, and this spending is aimed at meeting education, health, and housing needs (Burun and Kanlı, 2019; TRT News, 2019). Syrian refugee children receive free education in schools affiliated with the Ministry of National Education. In 2013, a decision was taken by the Council of Ministers to exempt Syrian university students from all kinds of fees in state universities (Resmi Gazete, 2013). The health expenses of Syrian refugees are covered by the Disaster and Emergency Management Presidency (AFAD), and they are not required to pay any co-payments for their basic and emergency healthcare services or medications (Gençler, 2020, p. 126-127).

It is observed that the aid provided to Turkey regarding Syrian refugees is relatively small compared to the calculated costs. For instance, in 2019, despite the announced cost of 40 billion dollars, it was stated that only 3 billion euros of support, which constituted a significant portion of the aid, had been provided by the European Union since 2016 (Burun and Kanlı, 2019). As of 2022, the total amount of resources transferred to Turkey by European Union countries for refugees is seen as 4.3 billion euros. When considering the 6 billion euros promised to be sent by European Union countries in exchange for projects as of 2016, Turkey still has an additional 1.7 billion euros it can provide for refugees through projects. Furthermore, it was announced by the President of the European Commission, Ursula von der Leyen, that an additional budget of 3 billion euros would be allocated to Turkey for refugees by 2024, also depending on projects.

Another aspect that needs to be examined from an economic perspective, beyond the economic cost of Syrian refugees in Turkey and the aid provided, is the economic contribution of Syrian refugees to Turkey. According to the Turkish Economic Policy Research Foundation's (TEPAV) end-of-year report for 2018, 7,906 companies with a total Syrian partnership capital of 1.2 billion Turkish liras were established between 2013 and 2018 (TEPAV, 2019a, p. 1). The United Nations Refugee Agency also confirms that the number of companies established with at least one Syrian partner was over 7,000 at the end of 2018 and that Syrian refugees' entrepreneurial capital in Turkey exceeded 400 million dollars at the end of 2018 (UNHCR, 2019). Syrian deposits in Turkish banks, according to Banking Regulation and Supervision Agency (BDDK) data, were over 408 million dollars as of 2016 (Kuyumcu and Kösematoğlu, 2017, p. 80).

The impact of Syrian refugees on public services is primarily evident in the education and health services they receive for free. 730,806 Syrian refugee students aged 5-17 attend schools under the Ministry of National Education, and

47,482 Syrian university students attend higher education institutions. The sudden and rapid entry of such a large and non-Turkish-speaking student population into the system has caused classes to suddenly become overcrowded, exceeded school capacities in areas where refugees are concentrated, and led to a decline in the quality of education.

A similar situation to education services has also occurred in healthcare services. Just like in education, the sudden influx of such a large population into the healthcare system has caused overcrowding in healthcare facilities, especially in the regions where refugees live densely, leading to a decrease in the quality of healthcare services. According to a January 2015 report by the Center for Middle Eastern Strategic Studies (ORSAM), serious problems have been experienced in healthcare services in areas where Syrian refugees are concentrated, and the local population has developed negative reactions to this situation. Another issue that negatively affects public health, in addition to overcrowding of healthcare facilities and the decrease in the quality of healthcare services, is the re-emergence of some diseases such as polio, smallpox, and measles, which are no longer a problem in Turkey and even have been eradicated. Therefore, in the border provinces, all children aged 0-5 have been vaccinated against polio (Orhan and Gündoğar, 2015, p. 20).

According to the latest official announcement regarding the healthcare services provided to Syrian refugees, as of 2022, 185 Migrant Health Centers have been established in 29 provinces. About 4,000 Syrian healthcare workers, including 787 physicians, 34 dentists, and 1,149 nurses, are working in these centers. In addition to the migrant health centers, healthcare services are provided directly when needed. Within this framework, approximately 97 million outpatient services and more than 3 million inpatient services have been provided to Syrians to date; 2.6 million surgeries have been performed, and 754,000 Syrian babies have been born in healthcare facilities (Rakipoğlu and Kara, 2022).

Another issue affected by Syrian refugees is the issue of security. Security can be considered both domestic and foreign. Regarding domestic security, the first place to look is crime records. According to a statement by the Ministry of Interior, the ratio of incidents involving Syrians to total public order incidents in Turkey between 2014 and 2017 was an average of 1.32% per year. The statement also emphasized that a significant portion of these incidents were disagreements among Syrians (Ministry of Interior, 2017). This ratio was updated to 1.46 in 2018, and the clearance and capture rate of incidents involving Syrians was stated as 91.4% (Bulur, 2018). As of April 2022, the crime rate of Syrian refugees was stated as 1.3%, while the rate of Turkish citizens involved in crime was stated as 2.2% (Aykırı, 2022). Additionally, as of April 2022, the number of Syrians deported due to public order issues since 2016 was announced as 19,336 (DHA, 2022).

When it comes to the issue of external security, it is necessary to take a brief look at the recent history of Syria, especially Northern Syria. The Democratic Union

Party (PYD), recognized by Turkey as the Syrian branch of the terrorist organization PKK, and its armed wing, the People's Protection Units (YPG), which had completed its organization until 2011 when the effects of the Arab Spring began to be felt in Syria, took control of areas such as Afrin, Ayn al-Arab (Kobani), and Hasakah, which are located in the north of Syria, after the withdrawal of the Assad regime to withstand the opposition more strongly. This period is also a time when ISIS, another organization recognized by Turkey as a terrorist group, took control of a significant part of Syria, relying on the northern regions controlled by the YPG. After ISIS besieged Ayn al-Arab, YPG, supported by the US, managed to defeat ISIS. From that point on, with the support of the US, YPG began to take control of the territories ISIS had seized, including cities with significant Arab populations such as Tel Abyad and Manbij. YPG aimed to unite the north of Syria in a single line by displacing Arabs and Turkmen who opposed them in the territories they had taken control of (Acun and Keskin, 2016, p. 12). However, this plan was thwarted by the Fırat Kalkanı, Zeytin Dalı, and Barış Pınarı operations carried out together with the Free Syrian Army, which was established as an opponent to the Assad regime, and cities such as Afrin, El-Bab, Tel Abyad, and Rasulayn were taken back.

As can be seen, the issue of Syria presents itself to Turkey not only as a matter of refugees but also as a matter of national security. The aspect of foreign security that concerns refugees is the fact that some refugees have migrated from areas captured by the YPG, and as a government policy, there is an intention to make northern Syria a safe place and relocate some refugees to those areas. In this way, the aim is to make the northern part of Syria safer for Turkey as well.

Methodology

In today's world, it can be said that the primary source used to measure the emotions and thoughts of the masses on any subject in research is the internet, especially social media. When it comes to the expression of common opinions on issues that concern societies, Twitter holds a special place among social media platforms (Atılgan and Yoğurtcu, 2021, p. 32). With the widespread use of social media, particularly Twitter, and the increase in its users, the volume of data has reached terabytes levels, which has increased the importance of sentiment analysis.

Sentiment analysis involves analyzing texts in which individuals express their opinions about a subject or situation through applications from natural language processing, artificial intelligence, or statistics (Ekim and İnner, 2021, p. 93). Sentiment analysis is fundamentally a text processing process that aims to determine the class of emotions that a given text intends to express. The initial studies of sentiment analysis are referred to as sentimental polarity, and their goal is to classify a given text as positive, negative, or neutral (Seker, 2010, p. 26). Opinion and sentiment mining in social media is among the important problems mentioned in the literature. Sentiment analysis is the study conducted to semantically demonstrate the intellectual content conveyed by social media data (such as messages,

posts, wall posts, news, etc.). For example, one of the first and simplest methods is to classify comments as positive or negative based on the separation of words and the number of words in comments (Seker, 2016, p. 22).

As of 2022, the number of Twitter users worldwide has reached 436.4 million. Turkey, with 16.1 million users, ranks 7th in the world (We Are Social & Hootsuite, 2022). Considering Turkey's total population and the population of those of an age to use Twitter (defined by Twitter as +13), it can be seen that the rate of Twitter users in Turkey is quite high. For all these reasons, Twitter is the preferred data source for sentiment analysis studies, both globally and in Turkey.

The perception about Syrian refugees living in Turkey will be analyzed through the sentiment analysis method using Turkish tweets on the Twitter social media platform. The research will be conducted in three different dimensions:

1. General Perception Analysis: Sentiment analysis that will reveal the general perception about Syrian refugees as positive, negative, or neutral.

2. Perception Quality Analysis: Sentiment analysis that will reveal the individual qualities of positive and negative perceptions about Syrian refugees.

3. Perception Cause Analysis: Sentiment analysis that will reveal the individual causes of positive and negative perceptions about Syrian refugees.

Data Collection

The data used in the research consists of tweets posted on the Twitter social media platform related to Syrian refugees. For this purpose, a code written in the Python programming language was used to randomly collect tweets containing the keyword "suriyeli" (which means "Syrian" in Turkish) using the "stream" method between 04/04/2021 to 11/12/2021. As of the end of 2021, it was observed that 220,418 tweets had been collected.

Considering that tweets containing the word "suriyeli" may not necessarily refer to Syrian refugees, a modeling was carried out in the sentiment analysis section to separate tweets containing the word "suriyeli" but not referring to Syrian refugees in order to prevent potential negative outcomes that this could cause.

Data Preprocessing

Out of the 220,418 tweets collected, a Python program was used to clean out the 'retweets', quotes, replies, and mentions, resulting in 16,186 tweets. The primary aim of this process was to ensure that Twitter users' opinions regarding Syrian refugees were considered independently and within the context of their own views, without interference from others. It was observed that replies to any tweet often did not convey meaningful content when evaluated individually, even if they contained the word 'Suriyeli' (Syrian). The nature of retweets, whether they supported the original tweet or were part of a campaign activity, was unclear. Evaluating quotes independently from the text, photo, video, or link being quoted would yield unreliable results. 'Mentions', being directed at someone else or tagging

specific individuals, often did not align with the general topic. Taking all these factors into account, only the initial tweets related to Syrian refugees were considered in the research.

It is well known that various social media platforms, Twitter included, can be targeted by various social, political, or commercial campaigns. To safeguard the research from such campaigns and manipulations, only one of identical tweets was considered, and only one tweet from a single account related to the topic (the latest tweet) was taken into account. These processes were also conducted using two different Python programs. Following these procedures, the number of tweets reached 12,854, which were used for sentiment analysis.

Before proceeding with sentiment analysis on the tweets, the final processes involved converting uppercase letters to lowercase and removing links. Converting uppercase letters was necessary to prevent variations in word or character definitions during sentiment analysis, while removing links was done because they did not contribute to sentiment analysis and would have added extra computational burden. These processes were also carried out using a Python program.

The reliability of the method used in the study takes into account the levels of language processing skills in machine learning. To date, studies that have processed English and Turkish texts on Twitter data have achieved success and reliability rates ranging from 76% to 88% (Uçan, et al, 2014, p. 180-184). In this sense, it is possible to express the reliability of the study within this percentage range.

Sentiment analysis with machine learning method

In sentiment analysis models that use machine learning methods, the text is first manually classified by the applicator and then the program is trained with the classified text to automatically classify the remaining text. Sentiment analysis will be performed in 3 different dimensions. The first one is general perception analysis, followed by attribute and cause analysis in order. Therefore, tweets were classified as positive, negative, or neutral for general perception analysis; negative attributes such as dissatisfaction, anger, hatred, etc. or positive attributes such as sympathy, compassion/sadness, love, etc. for attribute analysis; and negative causes such as "Syrians are harming us," "Syrians have bad characteristics," or positive causes such as "They need help," "Our commonalities" for cause analysis. The classification table for all analysis units is as follows:

General Perception Analysis	Quality Analysis	Cause Analysis
Positive	Empathy	Need for help/victim status
	Acceptance / Acknowledgement	Positive attributes of Syrians
	Love	Our commonalities
	Agreement	Syrians being beneficial
	Compassion / Sympathy	No harm caused by Syrians
	Appreciation	Possibility of becoming friends with Syrians
	Respect	Other
	Esteem	
Negative	Dissatisfaction	Syrians are causing harm to us
	Hatred	Rights of Syrians in Turkey
	Anger	Syrians are in a better condition than us
	Ridicule	Syrian population
	Humiliation	Syrians have bad qualities
	Being sad	Personal opinions / Other
Neutral	Neutral	Neutral

Table 1. Manual classification table for sentiment analysis

The attribute and cause classifications in Table 1 were not predetermined at the beginning of the study and diversified and occasionally grouped as classification was performed. Especially, the classifications of negative causes have been shaped as headings for many detailed causes, as will be explained in more detail under the title "Causes of Perception".

1. General Perception Analysis

For the general perception analysis, 3024 tweets were classified as positive, negative, or neutral. Care was taken to make a balanced selection in terms of date, reflecting the entire year of 2021, when selecting the tweets to be classified. As a result of this classification, it was observed that out of the 3024 tweets, 2115 were negative, 547 were neutral, and 362 were positive.

In a sentiment analysis using machine learning, the first thing to do after determining the training set is to determine the test set. Based on the classifications made in the training set, the learning model will automatically classify the tweets in the test set. Although there is no ideal training-test set ratio for all sentiment analysis studies in the literature, it is generally accepted that the ratio of 70-80% for the training set and 20-30% for the test set is more common (Paulino et al., 2019, p. 170). In the scope of the general perception analysis, a similar ratio was preferred, as in the recent study "Sentiment Analysis and Topic Modeling on Tweets about Online Education during COVID-19" by Mujahid et al. (2021: 8), and a 75% training set – 25% test set ratio was selected. Accordingly, a training set consisting of 3024 tweets was created, accompanied by a test set of 975 tweets.

The RapidMiner Studio program (version 9.10) has been preferred for sentiment analysis. The widespread use of this program in similar studies has been effective in its testing and decision to use it. Değer's (2017) "Sentiment Analysis in Social Media Messages with Data Mining" and Kuş's (2019) "The Role of Public Relations in the Social Integration of Syrian Refugees" studies can be cited as examples of this.

The table below shows the accuracy percentage performance of all classifiers and attribute extraction methods applied in general perception analysis.

	4-Gram (Character)	3-Gram (Character)	2-Gram (Term)	3-Gram (Term)	Stem (Snowball)
K-Nearest Neighbor	72,24	72,31	71,31	71,84	71,81
Naive Bayes	65,18	49,48	79,81	78,94	63,25
Decision Tree	70,21	70,54	70,88	70,94	70,44
Deep Learning	70,24	69,14	79,54	79,04	68,77
Support Vector Machines	70,18	70,18	70,18	70,18	70,18

Table 2. Performance of classifiers and feature extraction methods for the cause analysis of negative perception

As seen in Table 2, Naive Bayes classifier with term-based 2-Gram feature extraction method demonstrated the highest performance in overall sentiment analysis, with an accuracy rate of 79.81 percent. It was followed by Deep Learning classifier with term-based 2-Gram feature extraction method, achieving an accuracy rate of 79.54 percent. Using these two models that showed the highest performance, the sentiment analysis prediction results were conducted on all tweets, as follows:

Number of predicted tweets: 12,854					
Classifier	Accuracy %	F-Measure	Positive %	Negative %	Neutral %
Naive Bayes	79,81	0,67	15,5	68,5	16
Deep Learning	79,47	0,65	11,9	76,5	11,6

Table 3. Predicted Results of the Best Performing Models in General Sentiment Analysis

In the analysis where the general sentiment class of 12,854 tweets is predicted, as seen in Table 3, Naive Bayes classifier has shown the highest performance with a slight accuracy difference of 0.34. Accordingly, concerning the Syrian refugees living in Turkey, the tweets expressing opinions on this topic on the Twitter social media platform are 81.5% negative and 18.5% positive (excluding neutral tweets). In the analysis conducted based on the second highest performing classifier, Deep Learning, the ratio is 86.5% negative and 13.5% positive (excluding neutral tweets).

2. Analysis of Perception Characteristics

In this analysis, the attributes of the perception regarding Syrian refugees have been attempted to be revealed. The analysis is divided into two parts: negative attribute analysis and positive attribute analysis.

Analysis of Negative Perception Characteristics

In this analysis, the characteristics of the negative perception towards Syrian refugees living in Turkey are examined. The tweets indicating negative attributes from the training set, which consists of 3024 tweets, were used for this analysis. A total of 2477 tweets indicating negative attributes were identified in the training set.

	Attribute	Classification Count	Percentage	Rank
Negative Attributes	Discontent	1839	74,2	1
	Hatred	132	5,3	3
	Anger	93	3,8	4
	Mockery	21	0,8	5
	Insult	19	0,8	6
	Sadness	9	0,4	7
	Positive Attributes	364	14,7	2
	Total	2477	100	

Table 4. Classification Data of the Training Set for Negative Sentiment Analysis

The performance accuracy of the models applied to analyze the negative sentiment in the test set of 975 tweets is as follows:

	4-Gram (Character)	3-Gram (Character)	2-Gram (Term)	Stem (Snowball)
K-Nearest Neighbor	64,08	64,31	63,25	63,35
Naive Bayes	56,65	42,95	35,15	54,28
Decision Tree	61,15	61,11	61,21	61,08
Deep Learning	62,18	61,45	67,14	61,05
Support Vector Machines	61,01	61,01	61,01	61,01

Table 5. Performance of classifiers—feature extraction methods in negative sentiment analysis

As shown in Table 5, the model that exhibited the highest performance in the analysis of sentiment attributes is the Deep Learning classifier with an accuracy rate of 67.14%, using the term-based 2-Gram feature extraction method. This model was applied to a collected set of 12,854 tweets from the year 2021, leading to the following results.

Number of predicted tweets: 12854			The accuracy rate is 66.84%.	
Attribute	**Classification Count**	**Percentage**	**Rank**	**Percentage without positives and neutrals: N/A**
Discontent	9600	74,7	1	91,2
Hatred	588	4,6	4	5,59
Anger	247	1,9	5	2,3
Mockery	42	0,3	6	0,3
Belittlement	29	0,2	7	0,2
Sadness	9	0,1	8	0,08
Positive Attributes	1087	8,5	3	
Neutral	1252	9,7	2	

Table 6. Prediction results of negative sentiment analysis

As seen in Table 6, in the analysis of negative sentiment attributes, 91.2% of the tweets expressing negative attributes are classified as "discontent". It is followed by "hatred" with 5.5% and "anger" with 2.3%. This result indicates that a significant majority of the tweets expressing negative views regarding Syrian refugees living in Turkey fall under the attribute of "discontent".

Analysis of Positive Sentiment Attributes

The training set consisting of 2477 tweets, which was initially created for the analysis of negative sentiment attributes, has been modified and used as the training set for the analysis of positive sentiment attributes. The modifications include grouping all negative attributes under a single category and classifying positive attributes separately. The resulting training set is as follows:

	Attribute	Classification Count	Percentage	Rank
	Negative Attributes	2113	85,3	1
Positive Attributes	Empathy	112	4,5	2
	Acceptance	109	4,4	3
	Love	44	1,8	4
	Acknowledgment	33	1,3	5
	Compassion	31	1,3	6
	Admiration	27	1,1	7
	Respect	5	0,2	8
	Appreciation	3	0,1	9
	Total	2477	100	

Table 7. Classification data for the training set of positive sentiment attribute analysis

The test set, corresponding to the training set, was used for the general sentiment analysis. According to the change in classifiers and feature extraction methods, the accuracy performances of the applied models are as follows:

Number of predicted tweets: 12854			The accuracy rate is 73,34	
Attribute	Classification Count	Percentage	Rank	Percentage without positives and neutrals: N/A
Sympathy	400	3,1	3	32,6
Acceptance	258	2	4	21
Love	183	1,4	5	14,9
Recognition	139	1,1	6	11,3
Compassion	121	0,9	7	9,8
Likability	108	0,8	8	8,8
Respect	12	0,1	9	0,9
Valuing	4	0,03	10	0,3
Negative Attributes	10197	79,3	1	
Neutral	1432	11,1	2	
Total		100		100

Table 9. Predictions of Positive Sentiment Analysis

As shown in Table 9, 32.6% of the tweets expressing positive attributes about Syrian refugees in Turkey are related to "sympathy". This is followed by 21% for "acceptance/acknowledgment", 14.9% for "liking", 11.3% for "giving rights", 9.8% for "compassion/sadness", and 8.8% for "appreciation" attributes.

3. Perception Cause Analysis

An analysis of the reasons behind the perception of Syrian refugees living in Turkey has been conducted in the latest sentiment analysis. The analysis categorized the reasons behind the perception into positive and negative factors.

Analysis of the Reasons for Negative Perception

In order to identify the reasons behind the negative perception, a training set was created at the beginning of each sentiment analysis process, following the standard procedure. For the training set, the negative reason-expressing tweets from the general perception analysis first training set were used, resulting in a training set consisting of 1888 tweets. The classification data for the training set are as follows:

Titles of Negative Perception Reasons	Reasons	Classification Count	Percentage	Rank
The Syrians are harming us.	Economic burden / damage	500	26,5	1
	Security issue			
	They commit crimes			
	They cause discomfort			
	One of the reasons for unemployment is Syrians			
	They disrupt our social peace			
	They lead to receiving lower healthcare services			
	They lead to receiving lower education services			
	They do not abide by the rules.			
The rights of Syrian refugees in Turkey can be listed as follows	Right to asylum/residence	452	23,9	2
	Right to citizenship			
	Right to education			
	Access to legal remedies against Turkish citizens			
	Right to employment			
Syrian refugees are in a better condition than us/their current situation is better.	They have more rights/privileges than us / they are in a better condition / more value is given to Syrians / they are comfortable.	406	21,5	3
Population of Syrians	They are numerous in number	315	16,7	4
	They have a high birth rate			
Syrians have negative characteristics	They have negative characteristics	122	6,5	5
Personal opinions / Others	Personal opinions	93	4,9	6
	Others			
Total			100	

Table 10. Classification data of the training set for the analysis of negative perception causes

As seen in Table 10, the reasons identified during the classification process were subjected to grouping, as mentioned before, and reasons with common characteristics were grouped under the same title. The purpose of this approach is to achieve higher performance in sentiment analysis by using fewer classes. This has been confirmed through the conducted tests. Consequently, the reason titles were used as classes in sentiment analysis.

The performance results, indicating the models applied and their accuracy rates, using the test set corresponding to the created training set for general sentiment analysis, are as follows:

	4-Gram (Character)	3-Gram (Character)	2-Gram (Term)	Stem (Snowball)
K-Nearest Neighbor	47,72	48,02	45,95	47,78
Naive Bayes	40,05	34,62	41,49	38,22
Decision Tree	37,32	37,25	37,65	37,52
Deep Learning	48,35	49,25	56,82	49,45
Support Vector Machines	37,39	37,39	37,39	37,39

Table 11. Shows the performance results of classifier-feature extraction methods for the analysis of negative perception cause

As shown in Table 11, the model applied using Deep Learning classifier and term-based 2-Gram feature extraction method achieved the highest performance for the analysis of negative perception cause, with an accuracy rate of 56.82%. Using this model with the highest performance, all available tweets were subjected to analysis and the following results were obtained.

Number of predicted tweets: 12854		Accuracy: 57.38%			
Titles of Negative Perception Reasons	Reasons	The number of predictions is	Percentage	Rank	When neutrals are removed, the percentage is
Syrians are causing harm to us	Economic burden / harm Security problem Committing crimes Causing disturbance	1816	14,1	2	28,2

	Contributing to unemployment				
	Disrupting social harmony				
	Leading to lower healthcare services				
	Leading to lower education services				
	Non-compliance with rules/regulations.				
The population of Syrians in Turkey	They are quite numerous in terms of numbers They are having a lot of children	1635	12,7	3	25,4
Rights of Syrians in Turkey include	Asylum/residence right Citizenship right Education right Access to legal remedies against Turkish citizens Right to employment	1307	10,2	4	20,3
Syrian refugees are in a better condition than us / their current situation	They have more rights and privileges than us / they are in a better condition / they are valued more than us They are living comfortably	1156	9	5	18
Syrian refugees have negative characteristics	They have negative characteristics	255	2	6	3,9
Personal opinions / Others	Personal opinions Others	253	2	7	3,9
	Neutral	6432	50	1	
Total			100		100

Table 12. Prediction Results of Negative Perception Cause Analysis

As seen in Table 12, the analysis of negative perception cause has been completed with a higher accuracy rate of 57.38% compared to the test analysis, and the cause categories show a more balanced distribution. Among the tweets expressing negative causes, 28.2% fall under the category of "Syrians are harming us". This is followed by 25.4% for "Syrian population", 20.3% for "Rights of Syrians in Turkey", and 18% for "Syrians are in a better situation than us / their current situation".

Positive Perception Cause Analysis

The latest analysis conducted is the cause analysis of positive perception regarding Syrian refugees living in Turkey. As with previous analyses, an initial training set was created. The classification data for the training set are as follows:

	Cause Title	The number of predictions is	Percentage	Rank
	Negative Attributes	1894	87,9	1
Positive Attributes	Need for assistance / being victims / being oppressed	114	5,3	2
	Positive qualities of Syrians	48	2,2	3
	Our commonalities	41	1,9	4
	Beneficial impact of Syrians	32	1,5	5
	Lack of harm caused by Syrians	11	0,5	6
	Possibility of becoming friends with Syrians	9	0,4	7
	Other	6	0,3	8
	Total	2155	100	

Table 13. Training set classification data for the analysis of positive perception causes

The test set used for general perception analysis was based on the training set created in the aforementioned manner. The performance results of sentiment analysis conducted using this test set are as follows:

	4-Gram (Character)	3-Gram (Character)	2-Gram (Term)	Stem (Snowball)
K-Nearest Neighbor	66,68	67,41	65,84	67,41
Naive Bayes	59,45	52,52	43,05	55,71
Decision Tree	62,81	62,81	62,75	62,81
Deep Learning	66,11	66,28	67,88	64,91
Support Vector Machines	62,81	62,81	62,81	62,81

**Table 14. Performance of classifier-feature extraction methods
in the analysis of positive perception causes**

As seen in Table 14, the model with the highest performance in the analysis of positive perception causes is the Deep Learning classifier using term-based 2-Gram feature extraction method, which achieved an accuracy rate of 67.88%. The table below shows the prediction results of sentiment analysis performed using this model.

	Number of predicted tweets: 12854		Accuracy: 68,48		
	Cause Title	Number of codes	Percentage	Rank	When neutrals are removed, the percentage is
Positive Attributes	Need for assistance / Being victims / Being oppressed	520	4	3	51,6
	Positive attributes of Syrians	259	2	4	25,7
	Commonalities	142	1,1	5	14,1
	Being beneficial	39	0,3	6	3,8
	No harm caused by Syrians	19	0,1	7	1,8
	Other	15	0,1	8	1,4
	Friendships with Syrians	12	0,1	9	1,1
	Negative Attributes	9928	77,2	1	
	Neutral	1920	14,9	2	
	Total		100		100

Table 15. Prediction Results of Positive Perception Cause Analysis

As seen in Table 15, the positive cause analysis was completed with a higher percentage of 68.48% compared to the test analysis. Among the tweets expressing positive reasons, the highest percentage of 51.6% belongs to the cause title "Need for assistance / Being victims / Being oppressed". It is followed by 25.7% for "Positive attributes of Syrians" and 14.1% for "Commonalities" cause titles.

Conclusion

In recent years, one of the most significant topics on the agenda in both the world and Turkey is Syrian refugees. Numerous studies have been conducted in Turkey in this context, often focusing on the situation of Syrian refugees in Turkey. This research distinguishes itself by using social media platforms to reveal the opinions of the Turkish population regarding Syrian refugees.

Social media platforms allow individuals to freely express their views on social issues. The discourse expressed on social media is often taken seriously by society and can become part of the social reality. The Syrian conflict led to the migration of millions of people from Syria to Turkey. The prolonged duration of this wave of migration, which began in 2011, has increased the number of Syrian refugees in Turkey. The social, cultural, and economic effects of this situation have been widely discussed and debated in both traditional and digital media. Particularly, findings obtained from Twitter posts, where a significant portion of the population expresses their thoughts and opinions, were analyzed to reveal the perception of Syrian refugees.

The perception of Syrian refugees living in Turkey was measured through Twitter posts made in 2021. General, qualitative, and reason-based perception analyses revealed that at least 81.5% of the tweets made in 2021 expressing opinions on this topic were negative, while 18.5% were positive. The main reasons for the negative perception revealed by the analysis include the fact that refugees who initially lived in camps started living in cities as their numbers reached millions in subsequent years, leading to increased interaction with the Turkish population. Another significant factor contributing to the formation of a negative perception is the sheer number of refugees. More than half of the Syrian refugees who fled the country moved to Turkey, with the registered Syrian refugee population in Turkey surpassing 3.8 million, accounting for 4.4% of the Turkish population. The high population density of Syrian refugees, especially in cities located in the south of Turkey, is notable. The high fertility rate among Syrian refugees in Turkey, at 5.3, is about three times the fertility rate of Turkey's native population. As a result, reasons such as changes in the demographic structure and concerns about security can be cited as factors contributing to the negative perception of Syrian refugees. Despite lower crime rates proportionally, due to their high population density, a significant number of them, approximately 57,692, were involved in crimes in 2021, further reinforcing the negative perception.

Another significant factor contributing to the negative perception is the economic burden imposed by Syrian refugees on Turkey. As of 2019, the money spent by official authorities on education, health, and accommodation expenses for Syrian refugees exceeded 40 billion dollars. The media's coverage of this situation has played a role in fostering a negative perception among the public. Other reasons contributing to the negative perception include the free access of Syrian refugees to health and education services, their admission to universities without exams, and their role as a source of cheap labor in Turkey. The International Labour Organization (ILO) reports that more than 940,921 Syrian refugees work informally in Turkey.

Additionally, the politicization of the refugee issue has been another factor in the formation of a negative perception. Political parties incorporating this issue into their main campaign promises with negative rhetoric has fueled the debate about Syrian refugees on social media platforms, especially Twitter.

In the core context of the tweets on Twitter, it can be observed that a significant majority of the Turkish population is at least Twitter-uncomfortable with the presence of Syrian refugees. This contributes to the perception of Syrian refugees as a problem in the eyes of the society.

However, it is also possible to mention a positive perception regarding Syrian refugees. The fact that Syria and Turkey are neighboring countries, with historical and ongoing neighborly relations, plays a role in this positive perception. Common religious and humanitarian aspects are highlighted in this relationship. Another factor that highlights positive perception is the element of sexual preference, including marriages, mostly with Syrian refugee women. Finally, their status as individuals in need of humanitarian assistance also contributes to the positive perception.

In future studies, other social media platforms could be included, and surveys could be conducted to understand Turkish people's views on Syrian refugees. Comparing social media data with survey data would become possible. Finally, examining similar perceptions from the perspective of Syrian refugees regarding their views on Turkey could provide valuable insights for developing more informed policies.

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