



**Utrecht  
University**

Master Thesis

## **Turkey 2023 Elections on TikTok:**

Insights from Computer Vision and Natural Language  
Processing

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## **Abstract**

This study investigates the digital presence of the Justice and Development Party (AKP) and the Republican People's Party (CHP) on TikTok. It aims to elucidate their political stance and digital marketing strategies using machine learning techniques. The research combines data acquisition and advanced analytical processes to decipher the political narratives and strategies of each party.

Data was categorized into profiles and hashtags related to AKP, CHP, and general discussions. Unique TikTok links streamlined the comprehensive data extraction process, with Python-based libraries assisting in retrieving engagement metrics and video descriptions. The choice to analyze the 'general discussion' category was determined by the study's progression and focus.

Several approaches were applied in the Machine Learning Analysis phase. The Isolation Forest algorithm was essential for its computational efficiency, highlighting videos with distinct engagement patterns. Face Detection and Emotion Recognition assessed the implicit emotions in the content, playing a crucial role in distinguishing the content and strategy between parties. Speech Recognition transcribed spoken elements from videos, paving the way for Topic Modeling to determine the central themes the parties addressed.

The culmination of the analysis used the K-means algorithm. This clustering aimed to highlight competition in content creation, offering a nuanced comparison based on the narratives each party emphasized. It also facilitated a holistic strategy analysis, enabling parties to gauge and respond to competing narratives.

Results show the effectiveness of machine learning in unveiling political strategies on TikTok. Face detection, Emotion detection, topic modeling, and Clustering analysis elucidate the tactics each party adopts to maximize interaction and spread their ideologies. The research underscores the significance of digital platforms in modern political discourse, offering a fresh perspective on social media's potential in understanding political strategies.



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## 1 INTRODUCTION

Understanding political communications transcends the limitations of traditional media in the dynamic digital world of the twenty-first century. Politics and the always changing tide of online platforms are merging together seamlessly. TikTok, a short-video app with a sizable global user base, is proof of this development. In addition to facilitating interpersonal and professional connection, this platform has turned into a crucial forum for political dialogue (Iqbal, 2023). As the Turkish elections of 2023 get near, it becomes clear that TikTok has become a focal point of political involvement and propaganda due to its appeal to younger generations (Akkaş, 2023).

The focus of this study is on TikTok's dynamics as a medium for political communication during the 2023 elections in Turkey. Given that TikTok is popular with the younger population in Turkey, it has evolved into a useful platform for political organizations to have a strong online presence. Notably, the major political parties in Turkey have since 2020 fully utilized the platform's potential by carefully creating video narratives that will appeal to and energize the younger electorate.

The primary objective of this research is to discern how the TikTok videos of the two major political parties in Turkey differ in terms of content and strategy. In pursuit of this overarching inquiry, several nuanced dimensions emerge: Delving into content creation strategies, a compelling aspect to explore is how each party harnesses popular faces to convey a populist approach. This facet promises insights into the mechanisms behind their resonance with the masses and the influential personas they leverage to solidify this connection. Building on this, variations in emotional undertones serve as a pivotal marker. Specifically, an examination of dominant emotions, contingent on content length, reveals the emotional landscapes each party seeks to traverse. What are the dominant feelings do they attempt to evoke in videos of specific durations? The emotional spectrum does not end there. The depth and breadth of emotional engagement are crucial. How extensively do parties approach viewers with a diversified emotional palette, and where lies the distinction in the emotional diversity across their content?

Transitioning from emotion to content focus, understanding the subjects these parties spotlight becomes vital. This involves not only identifying their chosen topics but also measuring the ebb and flow of engagement levels tethered to these subjects. Intertwining emotion and subject matter, the study also seeks to comprehend the manner in which parties emotionally frame their chosen topics. How does the synthesis of topic and emotion manifest distinctly in each party's strategy? Finally, amid these nuanced examinations, a foundational query persists: Is there a direct thematic confrontation between the parties?



Does a close analysis indicate a palpable head-to-head clash concerning their emphasized narratives? The complexities delineated within the digital communications of political parties on TikTok stimulate an overarching research question: How do the TikTok videos of the two major political parties differ in terms of content and strategy? To dissect this central inquiry and offer a structured and comprehensive exploration, the study is anchored on specific subsidiary questions:

- RQ1: How do the content creation strategies of the two parties differ in their use of popular faces to convey a populist approach?
- RQ2: How do dominant emotions vary between the two parties based on content length, and which party attempts to convey which dominant emotion in videos of specific durations?
- RQ3: How extensively do the two parties attempt to approach users by displaying different emotions in their content production? In what direction does emotional diversity vary in the contents of the two parties?
- RQ4: What topics do the parties focus on in their content, and how does their engagement level vary based on these topics?
- RQ5: How do the parties specifically aim to convey the topics they focus on in their content through emotions, and how does this combination vary within the content production of the two parties?
- RQ6: By analyzing the content produced by the parties, is there a direct competition in terms of the topics they focus on? With which topic tags does the opposition party use in its content production to respond to the ruling party?

By intricately weaving through these multilayered questions, the research aspires to construct a holistic perspective on the evolving strategies and tactics within TikTok's political communication landscape.

Venturing into this relatively new territory of TikTok's influence in political communications, especially within the context of Turkey's 2023 elections, this study holds significance. The findings are expected to not only elucidate the strategies adopted during the Turkish elections but also to illuminate the evolving paradigms of political communication in the age of data-driven insights. The research is timely, given the burgeoning role of digital platforms like TikTok in shaping political narratives and the broader implications it holds for the future of political discourse and strategy.



## **2 LITERATURE REVIEW**

The digital era has ushered in profound changes in political communication, reshaping how messages are disseminated and consumed. As the landscape becomes increasingly complex, understanding the nuances of different platforms and their strategic implications is paramount. This literature review delves into the existing body of research on political communication within digital platforms, aiming to elucidate established theories and pinpoint gaps that necessitate further exploration in the context of the study.

### **2.1 Political Actors' Engagement with Social Media**

Kaya and Yıldız's (2021) seminal work on social media's role in political communication offers a foundational lens. Their exploration into how political entities utilize platforms for ideology propagation and community engagement underscores the increasing symbiosis between politics and digital realms. While their research isn't TikTok-centric or deeply embedded in the Turkish context, the broad strokes painted offer crucial insights into the overarching themes of digital politics.

On a similar trajectory, Hu, Bellmore, & Kiciman's (2019) meta-analysis unraveled the tapestry of political campaigns on dominant platforms like Facebook and Twitter. Their in-depth review, covering a plethora of research domains, emphasizes the intricate dance of political communication in digital spaces. This research, however, intends to carve its niche. By focusing on TikTok, it aims to discern the unique intricacies of digital communication strategies shaped by political entities within their content.

Chen and Sharma's (2020) work stands as a testament to the depth of content analysis in the digital domain. By meticulously assigning codes to tweets based on categories like tone, topic, and sentiment, they opened doors to understanding political narratives in micro-messages. Drawing inspiration from their approach, the current research will leverage machine learning to extract features from TikTok videos, aiming to capture the subtleties in content production strategies of political parties.

Diving into the more abstract waters of algorithmic governance, Gilman's (2021) theoretical explorations offer a refreshing perspective. By juxtaposing multiple case studies through political theory's lens, he weaves narratives on algorithm-driven political endeavors. Yet, this study leans towards tangible results and practical implementations. By employing artificial intelligence and machine learning, it endeavors to dissect TikTok content, uncovering the interplay between algorithms and political messages.



Grover, Kar, Dwivedi, et al.'s (2017) research is particularly relevant from a methodological standpoint. Their pioneering efforts in quantifying public sentiment around political events via social media data stand as a beacon for this research. While they laid the groundwork, this study intends to expand, focusing particularly on TikTok's content. The objective is not merely to gauge sentiment but to unravel how political entities craft content, perhaps in reaction to rivals or in resonance with their audience.

## **2.2 Emotion in Political Campaigns**

Emotion plays a pivotal role in shaping political narratives and influencing public sentiment. In the realm of political campaigns, 'emotion' is conceptualized as a complex interplay of feelings and attitudes that can influence voter behavior. It is integral because it can drive decision-making, shape perceptions, and catalyze actions. Hence, understanding how emotions are conveyed and perceived in political campaigns is crucial.

Smith and Gonzalez's (2018) research titled "Emotions in Political Campaigning: An Analysis of Emotive Strategies in Digital Platforms" provides a comprehensive analysis of how emotions are used as potent tools within digital political campaigns. Their study highlighted that political campaigns on platforms like Instagram and Twitter often employ a mix of positive and negative emotions to resonate with their target audience. Their findings suggest that emotion-laden content, particularly those invoking sentiments of hope and fear, gains more traction and engagement. In relation to this study, the current research on TikTok aims to decipher whether similar emotive strategies are applied by political parties within the Turkish electoral context. With TikTok's unique format and predominantly younger demographic, understanding the emotional landscape becomes paramount.

Another pivotal study, Davis and Lee's (2020) "Sentiment Analysis in Political Elections: A Cross-Platform Study," delves deep into how sentiments and emotions shift and adapt across various digital platforms during election seasons. The authors emphasize that the digital medium itself plays a role in shaping the emotive content; for instance, bite-sized content on platforms like TikTok may lead to more concentrated emotional messaging. They also noted a trend where negative sentiments were more prevalent closer to the election dates, suggesting a strategic move to sway undecided voters. Drawing parallels to the Turkish 2023 elections, this research will investigate if the emotional ebb and flow noted by Davis and Lee manifest within TikTok content produced by Turkish political entities.

This study offers a distinctive approach by focusing on "face emotion" rather than text-based sentiment analysis. Facial emotions provide a raw, unfiltered insight into the emo-





tional undertones of content. The advantage of studying facial expressions is that they offer immediate, unscripted insights into the emotion being conveyed, often proving more genuine than scripted text.

Existing literature provides insight into the dynamics of political communication in the digital age. However, the unique mixture of strategies applied by both polarized parties in Turkey has not been identified in the context of the 2023 Turkish elections, revealing certain understudied areas. While researchers like Kaya and Yıldız have illuminated the role of social media in political communication, the specific impact of TikTok within the Turkish electoral context remains largely unexplored. This study delves into the content and strategy variations in TikTok videos of the two main political parties. It aims to discern how popular figures are utilized, how dominant emotions vary based on content length, and the priorities in conveying emotions. Additionally, the research investigates how parties communicate different emotions and the topics they emphasize. By deeply examining TikTok's role in political communication, this research aims to fill the identified gap in the literature, offering extensive implications for the future of political narratives in the age of digital platforms.

To conclude, the imperative of exploring political communications on TikTok, especially against the backdrop of the 2023 Turkish elections, cannot be underscored enough. TikTok, acting as a digital indicator of public sentiment and a pivotal platform for voter engagement, has ushered in a paradigm shift in political communication strategies. Hence, this research holds value not only in its contemporaneous relevance but also as a potential beacon for impending scholarly pursuits and tactical evolutions in digital political communications.

### **3        METHODODOLOGY**

#### **3.1       Data Collection and Data Preparation:**

The data collection section of the thesis focuses on extracting and processing TikTok data using a systematic, analysis approach. For the extraction of video links, a list of video IDs was compiled. The compilation of video IDs commenced with manual data extraction from the TikTok platform using the Zeeschuimer Firefox extension. Specifically designed for data extraction from web pages, this extension captures data objects as users navigate and interact with the user interface. It records data objects visible on the user interface as the user scrolls, offering a comprehensive snapshot of the data landscape associated with each hashtag or user profile. Following the generation of ND-JSON files, the data collection process pivots to automation through Python scripts.



These scripts aim to extract unique video IDs and their corresponding usernames from each data object within the NDJSON files. These two identifiers, namely the video ID and username, serve the purpose of constructing TikTok video links which then act as inputs for the Pytok library. This method produces a rich, multifaceted dataset for each specified hashtag and user profile. Using these IDs, another function generated a set of TikTok video links, which were then fed to the Pytok library, a tool crafted for TikTok data extraction. The resultant links were saved in a CSV file for easy future access. Similarly, hashtags underwent the same process. An NDJSON file for a particular hashtag was imported, from which usernames and video IDs were extracted to generate TikTok video links.

This data collection method blended manual and automated techniques to ensure both the depth and breadth of the acquired data, showcasing the potential of platforms like TikTok as rich, user-generated data sources. A strategic shift toward maximizing Python's automation capabilities marked the culmination of the collection phase. The project employed meticulously developed functions ensuring efficient and error-free data collection.

Using unique usernames and video IDs, the initial procedure involved creating individual TikTok URLs for every video. Custom functions transformed raw data into actionable TikTok links, laying the groundwork for the subsequent web scraping phase.

To standardize different data types, a specialized function was employed. This key procedure guaranteed seamless subsequent automation. The PyTok(March 16 release) library was directed to extract data from these standardized links, each corresponding to a distinct TikTok video.

Data integrity was a prime concern. Functions were deployed to check for duplicate links and gather TikTok link details, ensuring the uniqueness and accuracy of the data used in later stages. For systematic organization, another function designated specific paths for each video link, greatly simplifying data management.

A master function, crucial at this juncture, automated video and metadata scraping while capturing any errors generated by the TikTok API. This led to a system that minimized manual intervention and enhanced precision. As the process approached its end, an oversight function managed the scraping operation for each data column.

Users had control, allowing them to decide on the execution. Post-scraping, all metadata were merged into a single file.



This thorough process culminated in a dataset of 15,000 videos, complete with metadata and comments, ready for advanced machine learning analysis. The closing of this rigorous collection phase marked a significant achievement.

Following the comprehensive video data collection, the research delved deeper, aiming to capitalize on the rich audio narratives embedded within the TikTok videos. Recognizing the potency of spoken content, especially in a political discourse, the next logical step was to decode these narratives, transforming them into textual data, further enhancing the dataset's depth.

In that sense speech recognition were utilized, significantly augmenting the TikTok political network analysis by identifying narratives and topics within the videos. This in-depth analysis of spoken content refines understanding of political discourse nuances, creating additional features for each video to enrich insight into the TikTok's political spectrum.

Given that content creators' subjects and sentiments can influence the network's prospective voters (Abdul-Majeed, 2019), the spoken content is meticulously deciphered to understand the transmitted messages, discussion topics, and evoked emotions.

This approach comprises two main functions. Firstly, audio extraction from videos is achieved using the Python library MoviePy (Porwal et al., 2022). A selective extraction mechanism is developed, considering TikTok's typical video length (15 seconds to a minute) and its unique editing style. This mechanism ensures capturing comprehensive discourse and minimizing noise from disjointed audio fragments. FFmpeg's demultiplexing capability is utilized for this process, extracting audio from videos scraped from each user profile and hashtag, storing it in the corresponding directory.

The second function involves converting the extracted audio into text using Google's Speech Recognition API pre-trained "recognize\_google" model (Iancu, 2019; Google Cloud, n.d.). The model's training on vast multilingual and multitask supervised data contributes to its approximate 84% accuracy. However, the quality of the input audio files significantly impacts its performance.

To enhance the input quality, the audio files undergo preprocessing using Noise Reduction, Filtering, Normalization, and Speech Enhancement.

An additional audio segmentation component is incorporated to improve the process efficiency by identifying significant audio pauses, thereby aiding in understanding discourse flow and managing speech rates.



The 'language' parameter is set to 'tr-TR' in the API call for processing Turkish audio files. The process includes error handling components to bypass videos the API can't process, ensuring uninterrupted progression. Despite inherent challenges, such as the informal and colloquial language often used on TikTok, refinement of the transcription procedure is ongoing to better handle linguistic peculiarities, potentially boosting speech recognition performance.

Serving as an intermediate analysis, the function of this speech recognition integration is pivotal in furnishing valid inputs for subsequent NLP algorithms. By transcribing the dialogues and narratives from the videos, a text-based dataset is constructed, ensuring the availability of legitimate textual data for the NLP analysis. Crucially, this approach bridges to the RQ4. Thus, it's instrumental in elucidating content creators' emphasized topics in videos.

This approach proves essential in combining emotion recognition with the transcribed texts, enhancing comprehension of the TikTok's political landscape. The automation of the method aligns with the objective of building a pipeline for TikTok data processing and analysis. Even though 14 video files were not convertible into audio file, the contribution of the approach to the overall analysis remains significant.

Beyond mere transcribing, a comprehensive analysis of natural language processing techniques on the transcribed content is intended, identifying recurring themes, keywords, and entities in political discourse (Chowdhury, 2003; Roller & Schulte im Walde, 2013).

Speech Recognition method is an essential supplementary analysis in capturing the text data from the videos of the political parties and essence of political discourse, providing invaluable insights into content creators' ideological leanings in the upcoming analysis methods.

## **3.2 Machine Learning Based Data Analysis:**

### **3.2.1 Anomaly Detection Analysis**

To elucidate the differences in content and strategy of TikTok videos by the two major political parties, several machine learning approaches were applied. The primary objective of the anomaly detection analysis was to ensure the robustness and validity of the answers provided for the six research questions posed. Detecting videos with anomalous patterns helped boost the consistency of the results. It was also a strategically efficient decision in terms of computational cost. Focusing on videos that



instigate change or stand out significantly reduces the size of the data to be processed. This method ensured that only videos that genuinely made an impact were the focus, paving the way for meaningful outcomes from subsequent advanced analyses.

The core purpose of the Anomaly Detection analysis was to identify these pivotal videos. By pinpointing videos that could be labeled as anomalies, it became possible to apply subsequent ML analyses to these videos to discern genuine and pronounced patterns.

Isolation Forest, a robust machine learning method, singles out anomalies diverging notably from typical data (Kumar, 2021). By capitalizing on the unique characteristics of these anomalies – their scarcity and distinction from other data points – it ensures precision (Togbe et al., 2020).

In addressing this imperative, the Anomaly Detection analysis was instrumental during the 2023 Turkish elections' TikTok data analysis. Utilizing the Isolation Forest algorithm, anomalies were pinpointed effectively, optimizing computational resources while diving deep into TikTok's engagement metrics.

From a sample of 15,000 videos, complete with their metadata and user comments, the goal was to spotlight those videos that stood out in user engagement. Metrics like likes, shares, comments, and views underwent standard scaling (Scikit-learn, 2023), forming the primary algorithm input.

Fine-tuning the 'contamination' parameter of the Isolation Forest algorithm – a representation of the expected anomalies proportion – the sensitivity was tailored to engagement metrics (Togbe et al., 2020; Akshara, 2023). A 0.02 setting flagged 289 'impactful' videos, revealing significant user engagement on TikTok during the elections.

In essence, the Anomaly Detection analysis zeros in on influential videos using consolidated engagement metrics, minimizes computational expenses, and uncovers nuanced insights about user interactions on TikTok in the lead-up to the 2023 Turkish elections. This strategic step acts as a bridge, ensuring the research moves from identifying standout videos to deeply analyzing their content and strategy. This stage underlines the synergy between data science and sociopolitical analysis through methodical machine learning application.



### **3.2.2 Face Detection & Emotion Recognition Analysis**

Before diving deep into the face detection and emotion recognition analysis, it's essential to highlight the pivotal role of the emotion recognition element in the approach, which primarily focuses on addressing RQ1, RQ2 and RQ3.

To discern differences in content and strategy within TikTok videos of the two major political parties, the methodology incorporates an analysis of face detection and emotion recognition. This technique aids in understanding the emotional nuances embedded within the content. Central to this analytical analysis is a function that seamlessly combines face detection and emotion recognition. The Haar-Cascade Classifier, acclaimed for its 95% success rate across diverse emotions on significant datasets, is employed in tandem with the DeepFace algorithm, developed by Facebook's AI Research team, known for its 92.3% accuracy rate on benchmark datasets.

For the detailed process of face detection and emotion recognition, three interconnected Python functions are utilized. These functions manage the extraction of video paths, ensure the retrieval of pertinent files, and label each video accordingly. Such a systematic approach not only solidifies the validity and interpretability of the results but also paves the way for a more comprehensive dataset.

Every video in the analysis undergoes an exhaustive frame-by-frame examination. By detecting faces and recognizing the emotions they portray, it ensures no transient facial expressions are missed. This meticulous approach deepens the understanding of the emotional undertones present in the content and aids in unveiling underlying content creation strategies.

From this rigorous analysis, a set of 18 distinct features emerges. These features showcase a spectrum of emotional nuances present within the videos, facilitating the identification of potential shifts in the emotional tone of the content. At its core, this analysis underlines the efficacy of machine learning in deciphering emotional strategies within political communication, ultimately revealing insights into the very essence of political parties' digital outreach efforts.



### **3.2.3 Natural Language Processing(Text Preprocessing, LDA Modeling) on Transcribed Text**

To provide clarity on the methodology's direction, it's crucial to underline that the applied text preprocessing and topic modeling analysis aim to address RQ4 and RQ5.

The significance of this analysis to the overarching research is substantial. The methodology is meticulously crafted to ensure that the focal points of these research questions are directly tackled, shedding light on the intricate sociopolitical dynamics at play on the platform

A multi-layered machine learning model is applied to comprehend the platform's sociopolitical dynamics, initiated by preprocessing unstructured text data. Standard text preprocessing procedures such as tokenization, stop words removal, stemming, and lemmatization are employed, facilitating core semantics' extraction (Kao and Poteet, 2007).

Following this, a corpus is created using the preprocessed data, which is numerically represented using the Bag-of-Words (BoW) model (Great Learning Team, 2022). While the BoW model might result in potential loss of context or ordering information, its simple representation is adept for many NLP tasks. It manages to preserve essential document meaning while effectively reducing data dimensionality.

Subsequently, the Latent Dirichlet Allocation (LDA) model is applied to the corpus's BoW representation. This probabilistic generative model identifies latent topics within the corpus (Heinrich, 2008). From these results, topics are labeled for each video, establishing a clear link between the video content and its associated theme. By modeling how documents were 'generated', LDA facilitates nuanced data structure comprehension, acting as a robust mechanism for topic discovery in dynamic text collections.

After the LDA analysis, the results for each video were manually inspected, considering the word outputs provided by the LDA model. From this inspection, topic labels were devised for the videos. As a result, the videos could now be compared based on the topic labels that the content creators intended to convey, facilitating the comparative analyses within this study. For a detailed description and understanding of these topic labels, please refer to the Appendix.

Topic optimization within the LDA model leverages the coherence value (Hasan et al., 2021). Coherence measures the quality of discovered topics, considering word similarity within each topic.



This metric not only evaluates the coherence of individual topics but also gauges coherence across the entire topic spectrum. The coherence score serves as a valuable guide, steering the analysis towards the most pertinent and distinguishable topics.

Two critical hyperparameters in the LDA model, alpha and beta (Yang & Shami, 2021), are set at a value of 5. These values govern the density of document topics and the distribution of words within topics, respectively. Balancing these parameters encourages a diverse range of topics within each document, while ensuring a concentrated vocabulary for each topic. Achieving this balance is vital for deriving meaningful and interpretable topics.

These analyses also support the RQ6 in terms of topic focus. By classifying videos based on derived variables and subsequently assessing them based on topic labels, the research intends to discern whether there exists a mutual contest in terms of user outreach and topic focus between the two parties. This analysis expands understanding of TikTok's content, capturing the topics of conversation behind them.

Subsequent layers in the analysis will aim to merge these generated features with attributes obtained from earlier layers, providing a comprehensive understanding of content creation trends on TikTok.

### **3.2.4 Clustering Analysis**

The final machine learning analysis directly answers RQ6. This analysis classifies the videos based on specific features extracted from preceding analyzes, thus providing profound insights into the strategic maneuvers of the political parties. Essential machine learning and statistical tools, such as the KMeans clustering algorithm, the Elbow method, and the StandardScaler method, are central to this process.

Research Question 6 (RQ6) aims to understand the competitive dynamics between the topics of content produced by political parties. Clustering analysis serves as a foundational tool for answering this question. Classifying the content produced by political parties on TikTok into clusters, based on their thematic similarities, illuminates which topics each party emphasizes and how these topics display competition or overlap within the overall platform dynamics. Clustering allows for an automatic identification of the topics the videos represent, determining where the political parties intersect or diverge in their content topics. Therefore, employing clustering analysis when addressing RQ6 is essential to determine how the topics are distributed and how this distribution leads to competition between the strategies of the political parties.





KMeans is favored due to its simplicity and interpretability. It not only provides clear insights into clustering results, which are vital when deciphering complex topics like political strategies, but also allows results to be visualized in ways that even non-technical stakeholders can comprehend.

Considering KMeans, the importance of feature scaling cannot be overstated. The distance between data points dictates clusters, and without appropriate scaling, certain factors could unduly sway the outcome. The StandardScaler method is employed, ensuring that every feature contributes equally by standardizing them to a zero mean and one standard deviation.

Upon scaling the features, KMeans is then applied to the videos of each political party. While effective with large datasets, determining the right number of clusters is often challenging. Using the Elbow method, this study identifies the optimal number by testing up to 100 clusters. The point where additional clusters do not drastically decrease inertia is at 24 clusters. This classification determined that 24 clusters are optimal for the 289 videos analyzed. Videos within the same cluster are examined in terms of their topic tags, providing a clearer picture of how the two parties compete in terms of content themes within TikTok. By examining videos from the same category, it becomes evident whether the themes tackled by the two sides exhibit any signs of mutual competition.

KMeans has the advantage of discovering critical data features that might have been overlooked previously. This is especially significant when sifting through complex and high-dimensional datasets like videos.

This analysis also plays a crucial summarizing and consolidating role, offering insights into hidden characteristics and showcasing possible mutual competitive themes between the parties.

Based on the results from this clustering analysis, the study aims to decipher how both parties maneuver in terms of video posting, revealing potential strategic content battles. This methodology not only clarifies video characteristics that parties might use strategically but also visualizes these relationships, providing a foundation for discerning strategic moves.

To succinctly revisit the study's methodology, it's pivotal to emphasize its role in illuminating political strategies on the TikTok network. The initial analysis, Anomaly Detection, streamlines the dataset by focusing on influential videos. The subsequent analysis introduces face detection and emotion recognition, unearthing the prevailing emotional tones.



The third method employs speech recognition tools to transcribe video content, setting the stage for in-depth Natural Language Processing (NLP) analyses. The aim of this multifaceted methodology is to unravel the intricate web of political communication strategies on TikTok.

## **4 RESULTS AND FINDINGS**

In the digital age, where traditional media boundaries have been redefined, the intersection of politics with online platforms stands as a testament to the evolution of political communication. TikTok, which burgeoned as a vital nexus for interpersonal interactions and professional connections, has undeniably marked its territory in the realm of political discourse. As observed during the run-up to the Turkish elections of 2023, this platform, with its intrinsic allure to the younger demographic, became a powerful conduit for political narratives and strategic maneuvering. Two major political contenders in Turkey, deeply entrenched in this digital battleground, have manifested distinct approaches in content and strategy.

The nuances of these distinctions, ranging from the employment of popular figures for a populist resonance to the strategic integration of emotions in their content, offer a rich tapestry of insights. This section delves deep into these intricacies, unraveling the data patterns and presenting the findings which illuminate the variances and parallels between the parties' TikTok strategies. Beyond just identifying these strategies, it's imperative to understand the depth of their emotional engagement, their topic preferences, and the unique interplay between emotion and content within their digital narratives.

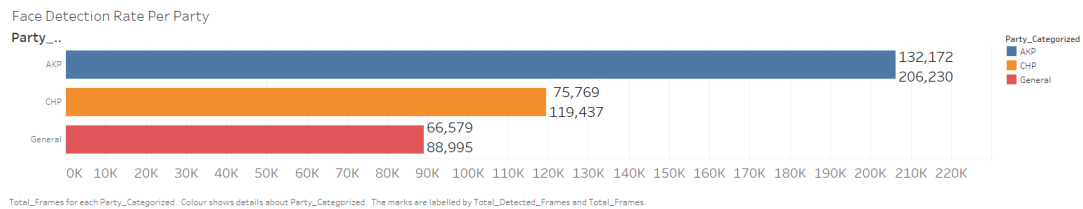
As these details unfold, one can't help but ponder on the possibility of a thematic confrontation between these political entities, potentially spotlighting a direct contestation in their highlighted narratives.

Following the analysis, the results and findings have been detailed using visualization techniques. These visual representations serve to deepen the understanding of the research questions. In the subsequent sections, a thorough examination will be made to illuminate how the illustrated findings correlate with the stipulated research queries.

In the analysis of the TikTok videos related to the 2023 Turkish elections, vast amount of visual data is processed and utilized face detection technology to gain a deeper understanding of the TikTok strategies of the parties. In the analysis the collective duration of all processed videos was determined to be 3,7 hours, with a total of 414,662 frames.

## 4.1 Face Detection Analysis Results

*Figure 1: Face Detection Rate Per Party*



In the visualization titled "Face Detection Analysis and Party", the data sheds light on the distinct strategies of political parties in their TikTok content. Specifically, this exploration centers on understanding the nuances of their content creation strategies around the use of popular figures, thereby potentially revealing their tendency towards a populist approach.

In this regard, AKP-related videos exhibit a face detection rate of 66% compared to the 62% of CHP-related videos. The higher detection rate in AKP's videos implies a deliberate strategy to frequently showcase prominent politicians, a gesture in line with their populist stance. By consistently highlighting recognizable figures, such as President Erdogan, the party possibly leverages the charisma and appeal of these individuals to engage the TikTok audience.

Conversely, the CHP's slightly lesser face detection rate suggests a different narrative. Rather than focusing predominantly on key political figures, CHP's content strategy seems more oriented

towards presenting the party's policies, achievements, and forward-looking solutions. Such an approach reflects their dedication to addressing national concerns and less reliance on the populist method of spotlighting well-known figures.

Further, general discussion-related videos showcased a high rate of face detection, in line with expectations, as they are typically characterized by individuals discussing a diverse range of political subjects. This aligns with the broader trend of emphasizing well-known figures or discussants in digital content.

One notable distinction highlighted by the data is the variance between AKP and CHP's face detection rates. AKP's inclination towards frequently featuring familiar faces may be interpreted as a move to evoke feelings of continuity and assurance.

On the other hand, CHP's concentration on substantive matters and solutions might appeal to a demographic eager for change and progression.

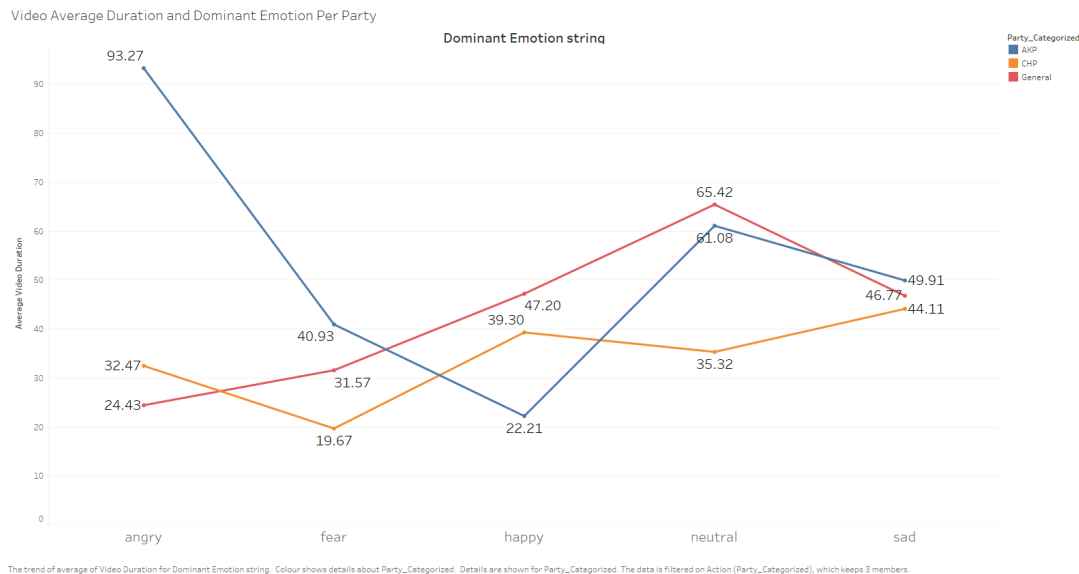


This distinction underscores the pivotal role of the medium, in this instance, TikTok, in molding public perceptions during pivotal junctures like elections.

However, these interpretations form just one piece of a multifaceted puzzle. Subsequent analysis employing advanced algorithms could juxtapose these revelations with other data extracted through comprehensive machine learning evaluations. Such a comprehensive approach aims to derive a deeper comprehension of how each political faction operates within the TikTok sphere, elucidating the intricate roles of platforms like TikTok in influencing public sentiments during key national events.

## 4.2 Emotion Recognition Analysis Results

Figure 2: Video Average Duration and Dominant Emotion Per Party



In the exploration of TikTok content from different political parties, a key observation centers around the relationship between video duration and the predominant emotions evoked by such content. Addressing the query on how do dominant emotions vary between the two parties based on content length, and which party attempts to convey which dominant emotion in videos of specific durations, the findings offer the following insights:

For both parties, influential videos averaged a length of 45 seconds, with sadness being the main emotion invoked. Diving deeper into the nuances, shorter videos produced by AKP are predominantly characterized by happiness.

This strategy appears to cultivate a positive image in concise content, perhaps aiming to retain or even grow their follower base. Conversely, the shortest videos from the CHP

primarily convey fear, potentially serving as an emphasis on the issues the party seeks to challenge, reinforcing their stance among their followers.

When extending the content duration, the narrative shifts. AKP's lengthier content predominantly invokes anger, possibly seeking to mobilize their most ardent supporters. In contrast, the longer videos from the CHP resonate with sadness, emphasizing the party's perspective on Turkey's challenges.

A deeper breakdown reveals that the average duration for AKP's most extended TikTok videos stands at 93.27 seconds, with anger as the central emotion. For the CHP, their lengthier content averages 39.30 seconds, surprisingly projecting happiness.

In the shortest content segment, averaging 22.21 seconds for AKP and 19.67 seconds for CHP, the leading emotions are happiness and fear, respectively.

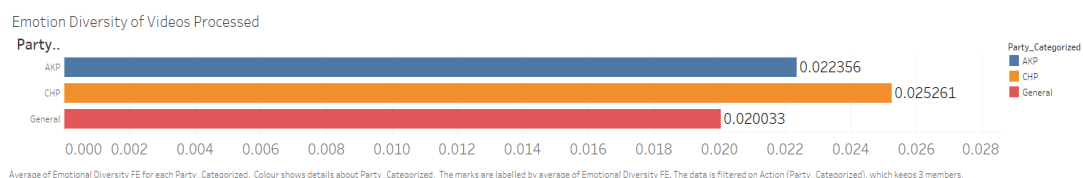
These findings underscore the parties' strategic approaches. The CHP's 2023 election campaign, themed around the promise of a brighter future, mirrors in their content. Their longer videos exude optimism, presenting a vision of a revitalized Turkey, while shorter content emphasizes existing challenges, echoing fear.

On the other end, AKP's brief content commences positively, suggesting progress. However, as videos stretch in duration, they shift to a more aggressive tone, possibly aiming to engage their more devoted audience.

In culmination, while initial analyses were rooted in face detection rates, the exploration of dominant emotions, set against the backdrop of video duration, offers a fresh lens to decipher digital communication strategies. This interplay between emotion and video length enriches the understanding of the meticulous strategies at play.

### 4.3 Emotion Diversity Analysis Results

Figure 3: Emotion Diversity of Videos Per Party



In the pursuit of understanding the extent to which the two political parties, AKP and CHP, attempt to approach users by displaying varying emotions in their content production, the "Emotional Diversity of Videos Per Party" was analyzed.



Through this analysis, it became evident how extensively do the two parties attempt to approach users by displaying different emotions in their content production and in what direction does emotional diversity vary in the contents of the two parties?

The visualization, representing the average emotional diversity per party, utilized three color-coded bars indicating AKP, CHP, and general discussions. Here, emotional diversity is gauged by the standard deviation of detected emotion confidence levels in videos. This metric captures the spectrum of emotions conveyed: a higher score indicates a broader emotional range, while a lower one suggests a concentrated emotional tone.

The findings revealed that CHP videos consistently portrayed a greater emotional diversity compared to AKP videos, which scored approximately 13% lower. This suggests that CHP aims to incorporate a broader emotional palette in their content, whereas AKP tends to deliver a more consistent and focused emotional narrative.

When translated to numbers, the emotional diversity scores stood at 0.22 for AKP, 0.25 for CHP, with general discussions trailing noticeably lower. The latter's reduced score is understandable, as general discussions often veer towards a neutral emotional tone.

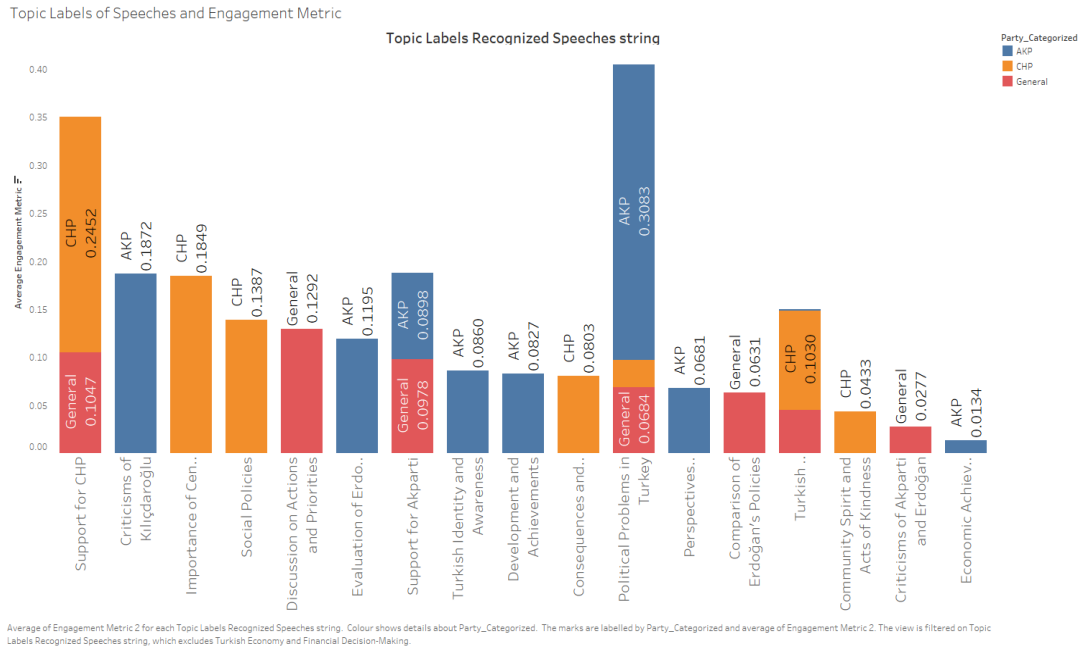
CHP's strategy, reflecting a broader emotional spectrum, might aim to connect deeply with its viewers, potentially crafting a dynamic campaign experience. This approach is especially pertinent for platforms like TikTok, frequented by Generations Y and Z, who value content authenticity and emotional depth.

On the other side, AKP's consistent emotional narrative suggests a strategic endeavor to present a distinct and unwavering image. This is possibly an alignment strategy with specific emotions or beliefs, aiming at a distinct audience segment.

These pronounced differences between the two parties' emotional content strategies highlight the significance of tailored approaches in political campaigning, bearing in mind the diverse emotional needs and preferences of their target audiences.

## 4.4 Topic Modeling Results

Figure 4: Topic Labels of Speeches(Transcribed Text) with Engagement Levels



In the pursuit of elucidating the research question, "What topics do the parties focus on in their content, and how does their engagement level vary based on these topics?", the study drew from a meticulous examination of transcribed video dialogues. From this analysis, 17 distinct topic labels emerged, each encapsulating the thematic essence of the videos.

Within the spectrum of CHP content, the theme "Support For CHP" unmistakably dominated with an impressive engagement of 0.2452. Parallel to this, the theme stressing the "Importance of Central Bank Independence and Justice in Turkey" caught substantial attention, registering an engagement of 0.1849. As the content trail proceeded, themes reflecting "Social Policies" and the repercussions encapsulated in the "Consequences and Reactions in Turkey After Elections" manifested engagement levels of 0.1387 and 0.0803 respectively. Additionally, the study noticed the CHP's commitment to promoting "Community Spirit and Acts of Kindness", which, although essential, garnered a modest 0.0433 in engagement. An intriguing intersection was observed in the theme "Turkish Identity and Awareness", where CHP's engagement rate stood at 0.1030, suggesting a thematic overlap with the AKP's content strategy.

Diving into AKP's narrative landscape, the pressing issues categorized under "Political Problems in Turkey" resonated the most, with an engagement soaring to 0.3083.



Meanwhile, a significant portion of their content was drenched in "Criticisms of Kılıçdaroğlu", achieving a notable 0.1872 in engagement. Themes emphasizing the "Evaluation of Erdogan's Impact on the Turkish System/Order" and the unwavering "Support for Akparti" witnessed engagement rates of 0.1195 and 0.0898 respectively. As for the previously mentioned shared theme of "Turkish Identity and Awareness", the AKP's representation lagged slightly behind the CHP with a 0.0860 engagement rate. Rounding off their thematic representation, the AKP's discourse on "Development and Achievements" recorded an engagement of 0.0827.

A stark contrast in strategies became evident with AKP's inclination to criticize Kılıçdaroğlu, while the CHP refrained from deploying a similar tactic towards Akparti and Erdogan.

These variances in engagement levels underscore the intricate dynamics of audience preferences on TikTok. For instance, the robust engagement with the CHP's theme "Support for CHP" suggests a particular resonance with the TikTok community, though it is imperative to avoid interpreting this as a broader political endorsement.

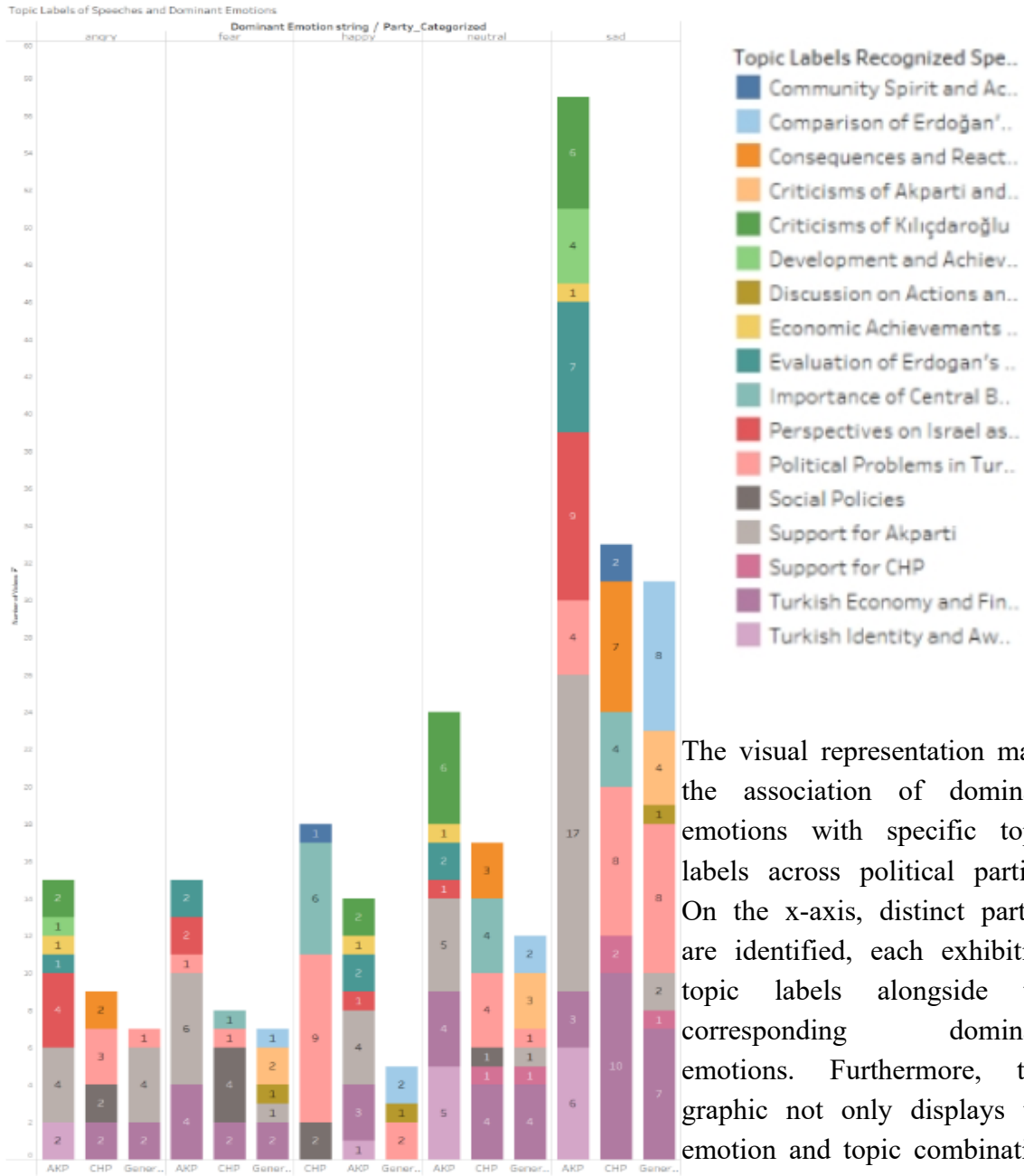
In sum, these nuanced findings meticulously chart the narrative territories explored by both parties, while also reflecting on the varying degrees of resonance each topic experiences within the TikTok realm. The study discerns CHP's emphasis on socio-economic concerns and national awareness, juxtaposed against AKP's more pronounced leader-centric narrative.





### 4.5 Topic Modeling and Emotion Recognition Results

Figure 5: Topic Labels of Speeches (Transcribed Text) with Dominant Emotions



The visual representation maps the association of dominant emotions with specific topic labels across political parties. On the x-axis, distinct parties are identified, each exhibiting topic labels alongside the corresponding dominant emotions. Furthermore, this graphic not only displays the emotion and topic combination but also indicates the count of videos shared within the network under each specific pairing. The insights from this portrayal are grounded in the results of previous analytical work, shedding light on the emotional backdrop with which the two parties approach topics and strategize in the digital realm.



Grasping this visualization lays the foundation for understanding the how the parties specifically aim to convey the topics they focus on in their content through emotions, and how does this combination vary within the content production of the two parties in TikTok.

After unveiling how political parties paired with topic labels and with emotions, the in-depth breakdown of the visual representation exposes contrasting strategies employed by the AKP and the CHP. For instance, under the emotion of 'Anger', the AKP is chiefly concerned with "Perspectives on Israel as a State and Terrorism" and showing "Support For Akparti," represented by four videos for each topic. In contrast, the CHP centers its attention on internal matters, with videos on "Political Problems in Turkey" and discussions regarding the "Consequences and Reactions in Turkey After Elections" and "Social Policies."

Shifting to the emotion "Fear-Concern," the AKP remains focused on "Support for AKP" with six videos, while the CHP explores "Social Policies," represented by four videos. The theme of "Support for Akparti" emerges again under the emotion "Happiness" for the AKP, with the CHP delving deeper into "Political Problems in Turkey" through nine videos.

For neutral emotions, the two parties exhibit unique focal points. The AKP discusses "Criticisms of Kılıçdaroğlu" with six videos and "Turkish Identity and Awareness" with five videos. In contrast, the CHP emphasizes themes such as the "Importance of Central Bank Independence and Justice in Turkey," the aforementioned "Political Problems in Turkey," and deliberations on the "Turkish Economy and Financial Decision-Making," each encompassed in four videos.

Lastly, under 'Sadness,' the AKP presents a robust collection of 17 videos on "Support for Akparti," while the CHP intensifies the dialogue around "Turkish Economy and Financial Decision-Making" with ten videos. These differences underline the unique thematic emphases of the two parties and their tactical application of emotions to enhance their narratives and connect with their target groups.

From the emotional tone and topic labels in the videos, distinct strategic approaches by the AKP and CHP emerge. The AKP seems to capitalize on the sentiment of anger linked to subjects like "Perspectives on Israel as a State and Terrorism" and "Support for Akparti." This might suggest an intention to energize their followers by touching upon polarizing international subjects and reinforcing their own merits. The recurring theme of "Criticisms of Kılıçdaroğlu" associated with both anger and sadness might hint at an orchestrated move to contest and possibly weaken the stance of the opposition leader.



Conversely, the emotion of fear or concern, in tandem with "Support for AKP," may allude to internal uncertainties or perhaps an effort to instill a sense of urgency among their supporters.

The CHP's strategy stands in contrast. Their internal challenges such as "Political Problems in Turkey" and election aftermath dominate the emotion of anger, possibly pointing towards a drive to amplify domestic discontent. The coupling of happiness with the said political problems suggests a possible silver lining, viewing these challenges as potential catalysts for positive change. Another pivotal point for the CHP remains the "Importance of Central Bank Independence and Justice in Turkey," which consistently surfaces across various emotional tones, indicating its crucial role in the party's narrative.

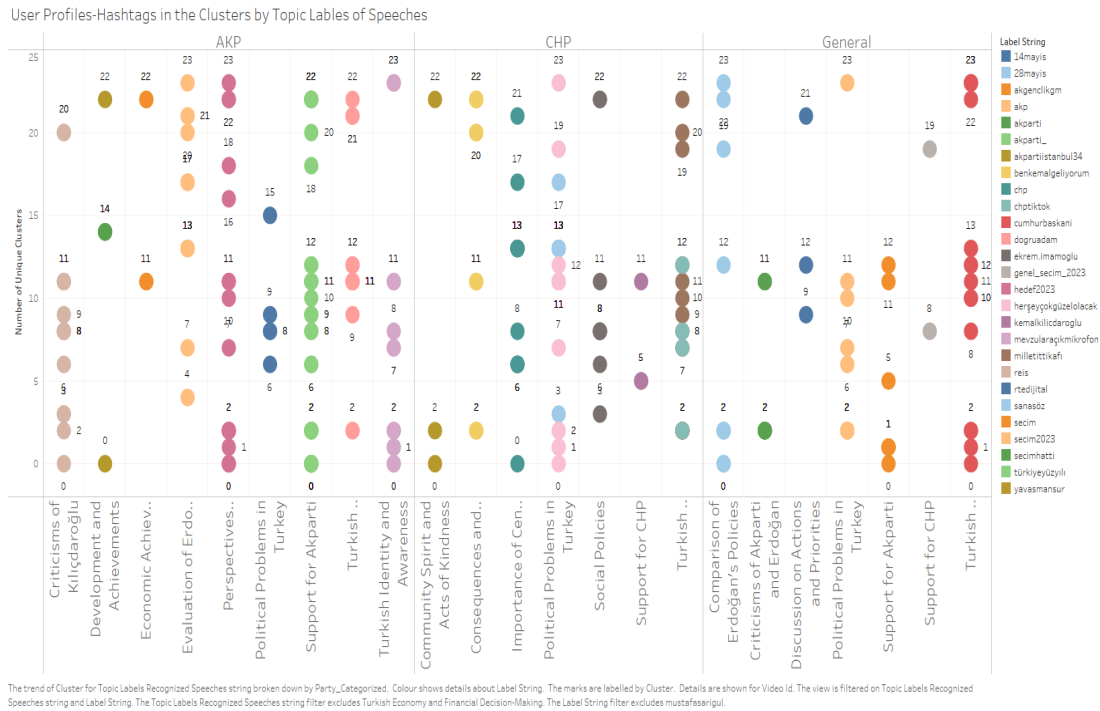
When sadness comes to the fore, the AKP's emphasis remains on bolstering its support base and presenting its stance on international issues. Meanwhile, the CHP addresses the country's economic and political scenarios, potentially spotlighting perceived missteps of the ruling establishment.

The examination of the political discourse on TikTok reveals the meticulous strategies of political parties in harnessing emotions to resonate with their audiences. Both AKP and CHP, though differing in thematic priorities, employ emotions as powerful tools in their narrative constructions. This investigation underscores the dynamic interplay of emotions in political content, providing a comprehensive view of modern political engagement on social media.

In summary, when considering the synthesis of emotions and topics in political communication on TikTok, the following dynamics were observed: While AKP accentuates the emotion of 'Anger', they tend to couple this emotion with topics such as "Perspectives on Israel as a State and Terrorism" and "Support For Akparti." Conversely, CHP, under the same emotion of 'Anger', emphasizes "Political Problems in Turkey." In the context of the "Fear-Concern" emotion, AKP maintains its emphasis on "Support for AKP," whereas CHP focuses on "Social Policies." With neutral emotions, AKP gravitates towards "Criticisms of Kılıçdaroğlu" and "Turkish Identity and Awareness," while CHP accentuates topics like "Turkish Economy and Financial Decision-Making" and the "Importance of Central Bank Independence and Justice in Turkey." Lastly, under the banner of 'Sadness', AKP consistently leans towards content bolstering its party image, while CHP highlights perceived flaws in Turkey's economic and political landscape.

## 4.6 Clustering Analysis Results

Figure 6: Cluster Comparison of the Videos of Parties Based on Topic Labels of Speeches



The visualization, Figure 6, serves as a response to the RQ6. This comprehensive representation provides insight into the nuanced political discourse on TikTok, especially against the backdrop of the 2023 Turkish elections. It underscores the thematic strategies employed by both parties concerning video posting on TikTok. The X-axis showcases the topic labels, which are elaborated in detail in Appendix , while the Y-axis presents class numbers. Videos are depicted as circles, with distinct colors representing the specific hashtag or user profile from which the video originates. Direct numerical annotations on the videos indicate the associated class numbers.

Building on previous analyses that explored the digital communication strategies of the two polarized parties in Turkey's political landscape, emphasis was placed on their TikTok initiatives and engagement metrics within the platform's network. Patterns in these strategies emerged, directing the attention towards answering the research question. The current segment applies clustering techniques to give a more in-depth insight into the content-sharing dynamics between the two parties.



This clustering methodology's power becomes evident as it enables a granular comparison of videos within identical clusters by their topic labels. Videos are clustered based on features generated across all ML analyzes, focusing the comparison on the topic labels of videos located within the same clusters. This comparative technique brings to light how both parties respond to each other and the distinct narrative strategies they employ, further highlighting the potential head-to-head battle in topics of focus and their significance on TikTok. It becomes increasingly clear that the two major parties, AKP and CHP, are locked in intense competition, vying for attention and influence among the Turkish populace on TikTok.

Based on the clustering analysis, a strategic categorization has been discerned from the videos shared by the political parties AKP and CHP on TikTok. In the analysis where the optimal class number was identified as 24, a selection of salient clusters provides insight into the content strategies of the two major parties.

Within Cluster 0, AKP's narrative trajectory suggests a multi-faceted approach. There's a direct address to criticisms of Kılıçdaroğlu, possibly to engage with oppositional voices. This is supplemented by content spotlighting the party's developmental milestones and achievements, suggesting an intention to highlight their governance efficacy. Moreover, the emphasis on perspectives concerning Israel, terrorism, and broader narratives about Turkish identity reinforces the party's position on both domestic and international matters. By foregrounding support for Akparti, the narrative paints a picture of unity and allegiance within the party. CHP, in contrast, appears to prioritize societal values, with videos emphasizing community spirit and acts of kindness. This thematic choice projects an image of a party deeply rooted in fostering communal bonds and societal harmony. However, the content doesn't shy away from intricate economic and political discussions, as underscored by videos on the importance of central bank independence, justice, and broader political challenges facing Turkey.

In cluster 2, while AKP leans heavily into direct criticisms, as seen in their focus on Kılıçdaroğlu, CHP opts for a message emphasizing community spirit and unity. The divergence in approach is further underscored when AKP highlights its accomplishments, and in contrast, CHP brings forth concerns about systemic challenges, specifically central bank independence and justice in Turkey. This divergence suggests AKP's inclination to spotlight its milestones, whereas CHP casts light on institutional quandaries. In another video, AKP delves into external geopolitical narratives, addressing perspectives on Israel and terrorism. Conversely, CHP narrows its focus on Turkey's internal political dynamics.



The subsequent videos from AKP pivot towards themes of party allegiance and national identity, underscoring their intent to resonate with shared cultural sentiments. Although there isn't a direct response from CHP, their prior content, centered on community and systemic issues, stands as an implicit counter-narrative. It highlights CHP's preference for a comprehensive vision for Turkey over direct confrontation with AKP's themes.

Focusing on cluster 6 offers insightful contrasts in strategic orientation too. AKP primarily critiques Kılıçdaroğlu, while CHP pivots to systemic challenges, with a pronounced emphasis on the independence of the central bank and justice in Turkey. This strategic choice of CHP reflects its commitment to foregrounding overarching national issues over engaging in direct political altercations. Meanwhile, when AKP highlights Turkey's political problems, CHP redirects the narrative to underscore social policies, accentuating welfare and citizen well-being. Such divergence exemplifies AKP's focus on highlighting hurdles, in contrast to CHP's emphasis on societal betterment. Despite AKP's video rallying support for Akparti, CHP doesn't offer a direct counter. Instead, consistent with prior tendencies, CHP shapes a broader narrative, centered on pressing national challenges, sidestepping direct engagement with party-focused content from AKP.

Videos in Cluster 8 showcases a palpable head to head rivalry between AKP and CHP in terms of narrative crafting. While AKP's emphasis lies in critiquing Kılıçdaroğlu and highlighting political problems in Turkey, they also aim to rally internal support and accentuate Turkish identity. In stark contrast, CHP strategically prioritizes larger systemic issues, underscored by their focus on the central bank's independence, justice, and financial decision-making. Their attention to social policies further delineates their commitment to societal welfare and progress. The strategies employed by each party elucidate their respective intentions and priorities. AKP, on one hand, is cementing its base by rallying support and echoing sentiments of Turkish identity, suggesting a tactic of identity politics intertwined with criticisms of the opposition. CHP, however, weaves a narrative centered on the nation's holistic progression and economic stability. Their concentration on the economy, and notably on financial decision-making, subtly counters AKP's narrative by stressing the importance of sound economic policies.

Focusing on Cluster 11 offers similar strategies analyzed in previous clusters too. The AKP recurrently critiques Kılıçdaroğlu, but also prominently presents its stance on economic management and achievements. By juxtaposing their perspective on Israel and terrorism alongside Turkish identity and awareness, the AKP constructs a narrative that meshes both domestic economic successes with broader geopolitical stances.



Conversely, CHP delves deep into Turkey's political landscape, emphasizing post-election reactions and consequences, a subject which might resonate deeply with voters keen on understanding political trajectories. Their content on social policies underscores their commitment to societal progression. The interesting intersection between both parties, however, emerges in their respective emphasis on the Turkish economy and financial decision-making. Both AKP and CHP vie to position themselves as the better economic steward for Turkey's future. Furthermore, each party's evident rally cry for support—AKP's video promoting its unity and strengths, versus CHP's call for bolstered backing—portrays a clear attempt to solidify their respective bases.

Cluster 12 presents a concise snapshot of both AKP's and CHP's narrative focuses. AKP's emphasis on rallying support indicates its ongoing effort to consolidate its base, suggesting a perceived need to reaffirm solidarity amidst changing political climates. Furthermore, AKP's exploration of the Turkish economy and financial decision-making signals an attempt to communicate expertise and effective governance in these arenas. On the other hand, CHP draws attention to political problems within Turkey, perhaps implying a critique of the current governance and emphasizing a need for change. Interestingly, both parties converge on the topic of the Turkish economy and financial decision-making. This shared emphasis underscores the paramount importance of economic discourse in the current political landscape. The juxtaposition of these narratives indicates AKP's drive to communicate stability and accomplishments, while CHP continues its mission to highlight areas of contention and promise reform.

In Cluster 20, AKP's narrative appears chiefly anchored in affirming leadership, as demonstrated by their content targeting criticisms of Kılıçdaroğlu and offering robust support for both Erdoğan and Akparti. This suggests AKP's continuous endeavors to fortify its leadership's image and rally its base behind key party figures, especially in an atmosphere potentially thick with political criticism.

Conversely, CHP delves into the consequences and reactions post-elections, shedding light on the societal and political repercussions that followed. This offers a hint towards the party's inclination to scrutinize and perhaps critique the outcomes of recent political events. Additionally, CHP's focus on the Turkish economy and financial decision-making aligns with previous patterns, reinforcing their commitment to spotlighting economic policy as a cornerstone issue. These contrasting narratives reveal AKP's emphasis on party unity and leadership strength, set against CHP's inclination towards policy-driven discourse and potential governance critiques. The overlapping attention to economic matters by both parties, once again, accentuates the economy's central role in Turkish political dialogues.



In Cluster 22, AKP appears to be vigorously spotlighting its developmental strides and economic milestones, as seen through videos on development, economic achievements, and financial decision-making. This portrayal paints the picture of a party striving to showcase its accomplishments and its capability in managing Turkey's economic landscape. Furthermore, their perspectives on international matters, notably concerning Israel, suggests their intent to elucidate their stance on geopolitical issues and potential threats. Their emphasis on rallying support for Akparti complements this narrative, emphasizing party solidarity amidst these developments. On the other hand, CHP exhibits a diversified approach, weaving together the tapestry of societal compassion with videos on community spirit and acts of kindness. This provides an image of a party vested in nurturing a sense of community within Turkey. Concurrently, CHP's exploration of the aftermath of elections reveals their keenness to dissect political outcomes, possibly underscoring potential areas of concern or critique. Their attention to social policies and the economy aligns with their continuous efforts to address holistic well-being and national economic strategies. Both parties converge on the pivotal topic of the economy, reiterating its significance in the Turkish political arena. However, their distinct narrative choices—AKP's accomplishments and stances versus CHP's community and policy concerns—highlight the contrasting lenses through which each party views national progress.

In light of the presented analysis, the research question – "By analyzing the content produced by the parties, is there a head-to-head battle in terms of the topics they focus on?" – finds its comprehensive answer. The clustering analysis conducted, based on features derived from preceding ML layers, indeed unveils distinctive content production and sharing patterns by both political entities. When the governing party shares content pertaining to a specific topic, a clear trend emerges from the opposition party: they often disseminate videos addressing a wider range of issues. This observation not only suggests meticulous planning and background work in producing these videos but also indicates a strategic battle between the parties to gain prominence on particular themes within TikTok.

The alignment of videos from both parties within the same classes in a multi-class clustering exercise underscores the depth of strategic considerations, extending even to nuanced factors such as the emotional and tonal expression within the content. Moreover, by comparing videos within the same class based on their topic labels, it becomes evident that there exists a direct engagement strategy from the opposition, which seemingly operates on a man-to-man combat mode in terms of content and audience appeal. Conversely, the content produced by the AKP consistently aligns with the party's overarching stance and principles. Thus, the analysis robustly demonstrates that there is indeed a head-to-head battle in terms of the topics both parties focus on.





## **5 DISCUSSION**

In examining political communication on TikTok, particularly in relation to the 2023 Turkish elections, several deep insights into the Turkish political landscape emerges, highlighting the two dominant polarized parties. A comparative visual analysis generated from several Machine Learning algorithms enables the pinpointing of nuanced yet pivotal distinctions in the digital strategies of Turkey's foremost political entities: the Justice Development Party (AKP) and the Republican People's Party (CHP). These observations are harnessed using advanced machine learning methodologies, analyzing both the metadata and the actual content of the videos. This study is fundamentally driven by the central research question: "How do the TikTok videos of the two major political parties differ in terms of content and strategy?" To be able to answer this question 6 research questions are created and answered through Anomaly Detection, Face Detection, Emotion Recognition, Speech Recognition and NLP Analysis methods. In this section, the findings will be discussed in the context of these pivotal questions.

### **5.1 Populist Approach in Content Creation**

The pressing inquiry of "How do the content creation strategies of the two parties differ in their use of popular faces to convey a populist approach?" finds intriguing answers when diving deep into the visual analytics of TikTok content. Analysis of the "Face Detection Rate Per Party" reveals distinct nuances in the digital communication tactics employed by Turkey's political giants. AKP's content, boasting a 66% face detection rate, seemingly focuses on spotlighting prominent political figures, thereby resonating with its populist narrative. Such a tactic, possibly aiming to evoke feelings of continuity and stability, harnesses the charisma of figures like President Erdogan to captivate viewers. On the other side of the spectrum, CHP, with a 62% detection rate, appears to be charting a slightly different course. Rather than amplifying individual personalities, CHP seems more inclined to shine a light on national issues and potential solutions. This approach may signify a dedication to address the nation's trials, resonating with those yearning for a shift in the political landscape. Such discernments underscore TikTok's profound capability to mold political discourse, wherein facial presence and the accompanying emotional undertone wield substantial influence. Ultimately, these machine learning insights don't just illuminate these digital orientations but also pave the way for deeper explorations into the digital marketing landscape and party dynamics on such platforms.



## **5.2 Emotional Undertones and Content Duration**

Driven by the pivotal research inquiry into how dominant emotions are intertwined with content duration among parties, a dive into the video lengths and predominant sentiments portrayed by AKP and CHP on TikTok illuminates stark strategic variations. In dissecting video length juxtaposed with elicited emotions, the results hint at the underpinnings of each party's digital strategy. AKP's concise videos overwhelmingly radiate happiness, potentially positioning as a magnet for followers, while their more extensive offerings evoke anger, seemingly tailored for their fervent supporters. In contrast, CHP's succinct videos brim with fear, accentuating the obstacles they spotlight, and their protracted narratives are imbued with sadness, amplifying the magnitude of perceived national concerns. Such deep dives elucidate the intricacies of how each party maneuvers the emotional tenor in relation with content duration. This exploration not only sheds light on their digital stance in driving specific emotions but also accentuates their overarching marketing and communication tactics on TikTok.

## **5.3 Emotional Diversity in Content Production**

In understanding how major political parties shape their digital image on TikTok, the exploration revolves around the inquiry: How extensively do the two parties attempt to approach users by displaying different emotions in their content production, and in which direction does the emotional diversity manifest in their content? With this backdrop, emotional diversity stands out as a critical metric, illuminating the strategic orientation and measures employed by the parties and offering a window into their marketing tactics.

When it comes to emotional diversity, which gauges the range of emotions expressed in content, CHP videos exhibit a notably higher diversity score compared to AKP. Such a tendency might be the reason for a drive to connect deeply with the diverse sentiments of Generations Y and Z, championing authenticity. On the other hand, AKP's more streamlined emotional narrative suggests a concerted effort to reinforce their identity, harmonizing especially with a selected audience. Broad conversations, expectedly, adhere to a neutral tenor. Acknowledging these distinct emotional terrains accentuates the meticulousness with which parties navigate digital domains like TikTok.



#### **5.4 Topical Focus and Engagement Level of Parties**

When striving to decipher what topics parties prioritize in their content and how engagement varies based on these topics, the analysis unfolds striking differences between the two political parties. The strategic focus of each party becomes evident from the topic labels extracted from content transcriptions: CHP's content prominently circles around themes such as "Support for CHP," "Importance of Central Bank Independency," and "Social Policies." These themes mirror the party's narrative direction toward current socioeconomic challenges, aligning closely with the platform's users – a correlation further evidenced by the heightened engagement level of 0.2452 on "Support for CHP" videos. On the flip side, the AKP embarks on a contrasting, leader-driven narrative. Topics encompassing "Criticism on Kılıçdaroğlu" and "Evaluation of Erdogan's impact on the Turkish system and order" spearhead its content, signifying a dual strategy: critiquing the opposition and underscoring their own achievements. While CHP seems to distance itself from direct critiques of the AKP, AKP's criticism-centered content garners significant attention. These variances in engagement with specific topic labels elucidate the diverse inclinations within the TikTok demographic. It might be inferred that CHP's heightened engagement on particular subjects reflects the younger generation's reform aspirations, whereas Erdogan's charismatic leadership continues to be a central pillar of the AKP's digital appeal.

#### **5.5 Conveyance of Topics Through Emotions**

Addressing the research question, "How do the parties specifically aim to convey the topics they focus on in their content through emotions, and how does this combination vary within the content production of the two parties?", a visual analysis comparing video topic labels with dominant emotions unveils the strategic narratives of AKP and CHP. AKP harnesses emotions like 'Anger' in association with topics such as "Perspectives on Israel as a State and Terrorism" and "Support for Akparti". Simultaneously, they exploit 'Fear-Concern' and 'Happiness' to underscore their unwavering base of support. A recurring critique of Kılıçdaroğlu under both 'Anger' and 'Neutral' emotions suggests a tactic of challenging the opposition. In juxtaposition, CHP predominantly engages with 'Anger' when addressing domestic subjects like "Political Problems in Turkey" and the aftermath of elections, coupling this with 'Happiness', possibly hinting at an anticipated optimistic outcome. Persistent emphasis on the "Importance of Central Bank Independence and Justice in Turkey" across diverse emotions signifies its central narrative. When the dominant emotion shifts to 'Sadness', AKP focuses on bolstering its international stance and party allegiance, whereas CHP amplifies discussions around "The Turkish Economy and Financial Decision-Making."



## **5.6 Competition Analysis in Content Focus**

In light of the research question, "By analyzing the content produced by the parties, is there a head-to-head battle in terms of the topics they focus on?", the clustering analysis uncovers distinct content production and sharing patterns. When AKP circulates content on focused topics, such as critiques of Kılıçdaroğlu or accentuating their governance efficacy and geopolitical views, CHP responds by illuminating a wider range of societal issues, including economic policy and community bonds. This dynamic implies a meticulously devised content strategy from both sides: AKP persistently reflects its foundational beliefs, while CHP chooses a multifaceted approach, addressing broader systemic problems and accentuating community principles. The recognition of the economy's central position in the political discourse by both parties is evident. AKP emphasizes its achievements, and CHP draws attention to its comprehensive national strategies. The harmonious positioning of their content within identical clusters showcases profound strategic considerations, encompassing even the emotional undertones of their narratives. The topics within these clusters reveal a direct confrontation strategy by CHP, marking an aggressive approach in content dissemination. Through this lens, it becomes apparent that there exists a direct, head-to-head confrontation in terms of content focus. This evaluation proficiently highlights the diverse digital postures both parties adopt, further emphasizing the potency of machine learning in uncovering subtle digital marketing maneuvers on TikTok.

## **6 CONCLUSION**

In the digital age, political discourse undergoes a dynamic transformation, prominently steered by social media platforms, with TikTok standing out significantly (Cervi, Tejedor, & Garca Bles, 2023; Herrman, 2020). Notably, these platforms have come to redefine how political parties design their campaigns and interaction strategies, especially concerning their influence on the electorate. This research specifically delved into the content and strategy differentiation between two primary political parties on TikTok in the context of the 2023 Turkish elections.

Supplementary research questions further enriched this primary investigation, such as the utilization of popular figures in content creation, dominant emotions relative to content length, the emotional diversity adopted by each party, the primary focus of their content, and how they conveyed these topics emotionally. Methodologies such as Anomaly Detection, Face Detection, Emotion Recognition, Speech Recognition, NLP Analysis, and Clustering were employed to achieve a profound understanding of the content presented by the parties. These tools illuminated the subjects they spotlighted and their distinct approaches.



Several pivotal findings were discerned. Both parties demonstrated differing strategies in employing popular figures; AKP prominently featured recognized political figures with high face detection rates, whereas the CHP emphasized national issues and potential resolutions. Emotionally, discernible strategic variations were evident between the parties concerning content duration on TikTok. For instance, while AKP's short videos predominantly evoked happiness and their longer ones anger, CHP's short content leaned towards inducing fear, with longer ones resonating with sadness. From an emotional diversity perspective, CHP's content exhibited greater variance compared to AKP, which maintained a consistent emotional narrative aiming to establish a harmonious relationship with a particular audience segment. When assessing content topics and engagement, both parties presented distinct strategies. CHP concentrated on socioeconomic challenges, while the AKP cultivated a leader-centric narrative, both critiquing the opposition and accentuating their achievements.

The significance of this study lies in its contribution to the literature regarding political communication dynamics in the digital age. Despite abundant research spotlighting the role of social media in political communication, the distinct influence of TikTok in the context of the 2023 Turkish elections remains largely uncharted. Thus, this study endeavors to bridge this gap, offering comprehensive insights that are pivotal for the future of political narratives in the era of digital platforms.

In light of the methodology employed in this study, it's imperative to delve deeper into the intricacies and limitations surrounding the use of face emotion recognition as a primary tool for analysis. Contemporary academic discourses on face-recognition techniques have highlighted a myriad of challenges, ranging from potential misinterpretations of intricate facial expressions to biases influenced by cultural or contextual factors (Fasel & Luettin, 2003; Bowyer, Chang, & Flynn, 2006). Such nuances become particularly pertinent when exploring a socio-politically diverse landscape like Turkey's. While this research utilized one of the leading face emotion recognition tools available, it is crucial to recognize the potential pitfalls associated with extrapolating intricate political sentiments from these results. Future scholars exploring this domain might consider bolstering face emotion analyses with supplementary qualitative methodologies. Incorporating techniques such as audience feedback mechanisms or focused group discussions can provide a multi-dimensional perspective, thereby bridging the interpretive void that might arise from an over-reliance on algorithmic assessments. By acknowledging these methodological subtleties and intertwining them with the study's findings, future research endeavors can be directed towards a more nuanced and interdisciplinary approach, ensuring the academic robustness and integrity of the work.



However, while this study offers critical insights into Turkey's political communication strategies, it's not devoid of limitations. Primary among these is the computational cost, which necessitates the judicious selection of the most impactful videos for analysis. Future research equipped with additional resources could encompass a broader data spectrum, possibly leading to divergent outcomes. Additionally, the accuracy of the face detection methodologies can be enhanced with better-trained algorithms to recognize specific politicians. Furthermore, the NLP analysis remains constrained due to the unique nuances of the Turkish language. The employment of tools specifically tailored for Turkish text preprocessing might elevate the quality of subsequent research.

For future endeavors, it is advisable to expand the existing methodology to incorporate official news channels and other significant digital actors. Such an approach can elucidate if these channels exhibit polarization towards specific political parties or topics. As the digital age progresses, continuous efforts will be essential to comprehend these emerging political arenas, which, when understood, can offer invaluable insights for those grappling with the fluid nature of the digital political landscape.



## REFERENCES

Abdul-Majeed, M. (2019). The Influence of Social Media on the Voting Behaviour of Tertiary Students in the WA Municipality: Ghana's 2016 General Elections in Perspective (M. Phil. Degree in Development Studies).

Akkaş, S. (2023). Seçim 2023: Y ve Z Kuşağı Seçmen Çoğunlukta. Retrieved from <https://www.dogrulukpayi.com/bulten/14-mayis-secmenlerin-cogu-ilk-kez-y-ve-z-kusagi>.

Akshara. (2023, April 26). Anomaly Detection Using Isolation Forest: A Complete Guide. Analytics Vidhya. Retrieved from <https://www.analyticsvidhya.com/blog/2021/07/anomaly-detection-using-isolation-forest-a-complete-guide/>

Bowyer, K. W., Chang, K., & Flynn, P. (2006). A survey of approaches and challenges in 3D and multi-modal 3D + 2D face recognition. *Computer Vision and Image Understanding*, 101(1), 1-15.

BrandMentions. (2021). Hashtag Tracker. BrandMentions. Retrieved from <https://brandmentions.com/hashtag-tracker/>

Cervi, L., Tejedor, S., & García Blesa, F. (2023). TikTok and Political Communication: The Latest Frontier of Politainment? A Case Study. Autonomous University of Barcelona, Spain and University of Lima, Peru.

Choi, C. H., Kim, J., Hyun, J., Kim, Y., & Moon, B. (2022). Face Detection Using Haar Cascade Classifiers Based on Vertical Component Calibration. *Human-centric Computing and Information Sciences*, 12(11). doi:10.22967/HCIS.2022.12.011

Chowdhury, G. (2003). Natural language processing. *Annual Review of Information Science and Technology*, 37, 51-89.

Cuimei, L., Zhiliang, Q., Nan, J., & Jianhua, W. (2017). Human face detection algorithm via Haar cascade classifier combined with three additional classifiers. School of Communication and Electronics, Jiangxi Science & Technology Normal University Nanchang 330013, China.

digitalmethodsinitiative. (2023). Zeeschuimer. GitHub. Retrieved from <https://github.com/digitalmethodsinitiative/zeeschuimer>

Falaha, A., Pan, L., Huda, S., Pokhrel, S.R., & Anwar, A. (2020). Improving Malicious PDF Classifier with Feature Engineering: A Data-Driven Approach. School of Information Technology, Faculty of Science, Engineering and Built Environment, Deakin University, Geelong, VIC 3220, Australia.



Fasel, B., & Luetin, J. (2003). An introduction to face detection and recognition. *Image and Vision Computing Journal*, 21(1), 9-21.

Freelon, D. (2023). Pytok. GitHub. Retrieved from <https://github.com/dfreelon/pytok>

Google Cloud. (n.d.). Speech-to-Text: Automatic Speech Recognition. Retrieved from <https://cloud.google.com/speech-to-text/docs>

Great Learning Team. (2022, October 24). An Introduction to Bag of Words (BoW) | What is Bag of Words?. Retrieved from <https://www.mygreatlearning.com/blog/bag-of-words/>

Grover, P., Kar, A. K., & Dwivedi, Y. K., et al. (2017). Polarization and Acculturation in US Election 2016 outcomes – Can Twitter Analytics predict changes in Voting Preferences. In *Digital Nations – Smart Cities, Innovation, and Sustainability - 16th IFIP WG 6.11 Conference on eBusiness, e-Services, and e-Society, I3E 2017, Proceedings*.

Gujjar, P. J., & Kumar, P. H. R. (2021). Sentiment Analysis: Textblob For Decision Making. *International Journal of Scientific Research & Engineering Trends*, 7(2).

Hasan, M., Rahman, A., Karim, M. R., Khan, M. S. I., & Islam, M. J. (2021). Normalized Approach to Find Optimal Number of Topics in Latent Dirichlet Allocation (LDA).

Heinrich, G. (2008). Parameter Estimation for Text Analysis.

Herrman, J. (2020, June 28). TikTok Is Shaping Politics. But How? Two researchers have studied political expression on the app since the Musical.ly era. Here's what they found. *The New York Times*.

Hu, K., Wu, H., Qi, K., Yu, J., Yang, S., Yu, T., Zheng, J., & Liu, B. (2017). A domain keyword analysis approach extending Term Frequency-Keyword Active Index with Google Word2Vec model. *Akadé'miai Kiado', Budapest, Hungary*.

Iancu, B. (2019). Evaluating Google Speech-to-Text API's Performance for Romanian e-Learning Resources. *The Bucharest University of Economic Studies, Romania*.

Iqbal, M. (2023). TikTok Revenue and Usage Statistics. Retrieved from <https://www.businessofapps.com/data/tik-tok-statistics/>.

Kao, A., & Potteet, S. R. (Eds.). (2007). *Natural Language Processing and Text Mining*. Springer-Verlag London Limited.





Kaya, S., & Yıldız, M. (2021). The Role of Social Media in Political Communication: A Study on the Use of TikTok by Political Parties in Turkey. *Social Sciences*, 10(5), 162. doi:10.11648/j.ss.20210503.11

Kumar, S. (2021, December 13). 5 Anomaly Detection Algorithms Every Data Scientist Should Know. *Towards Data Science*. Retrieved from <https://towardsdatascience.com/5-anomaly-detection-algorithms-every-data-scientist-should-know-b36c3605ea16>

Loria, S. (2020). *Textblob Documentation (Version 0.16.0)*.

Ma, L., & Zhang, Y. (2017). Using Word2Vec to Process Big Text Data. *Computer Science Department, Georgia State University, Atlanta, Georgia*.

OpenCV. (2023). *Cascade Classifier Training*. Retrieved from [https://docs.opencv.org/4.x/dc/d88/tutorial\\_traincascade.html](https://docs.opencv.org/4.x/dc/d88/tutorial_traincascade.html)

Porwal, K., Srivastava, H., Gupta, R., Mall, S.P., & Gupta, N. (2022). *Video Transcription and Summarization using NLP*.

Roller, S., & Schulte im Walde, S. (2013). *A Multimodal LDA Model Integrating Textual, Cognitive and Visual Modalities*. Department of Computer Science, The University of Texas at Austin.

Taigman, Y., Yang, M., Ranzato, M., & Wolf, L. (2014). *DeepFace: Closing the Gap to Human-Level Performance in Face Verification*. Facebook AI Research Menlo Park, CA, USA.

Togbe, M. U., Barry, M., Boly, A., Chabchoub, Y., Chiky, R., Montiel, J., & Tran, V.-T. (2020). Anomaly Detection for Data Streams Based on Isolation Forest using Scikit-multiflow. In *Proceedings of the 20th International Conference on Computational Science and its Applications (ICCSA 2020)*. Retrieved from <https://hal.archives-ouvertes.fr/hal-02874869v2>

Yeni Şafak. (2023). Screenshot of 14 May 2023 general election results. [Screenshot]. Retrieved from <https://www.yenisafak.com/secim-2023/dunya-secim-sonuclari>

Yang, L., & Shami, A. (2022). *On Hyperparameter Optimization of Machine Learning Algorithms: Theory and Practice*.

Zheng, A., & Casari, A. (2018). *Feature Engineering for Machine Learning: Principles and Techniques for Data Scientists*. O'Reilly Media, Inc.



## APPENDIX

### Speech Topic Labels

**Discussion on Actions and Priorities:** Addresses initial actions required to ameliorate the Turkish economy.

**Comparison of Erdoğan's Policies:** Considers Erdoğan's political decisions and managerial approach relative to conventional practices.

**Support for Akparti:** Features conservative or religious affirmations of support for Akparti and Erdoğan.

**Evaluation of Erdogan's Impact on the Turkish System/Order:** Evaluates the influence Erdoğan has exerted on Turkey's stature and power dynamics over the years.

**Consequences and Reactions in Turkey After Elections:** Refers to the popular TikTok meme and hashtag #benkemalgeliyorum ("Opposition is coming to power"), associated with CHP's anticipated return to power.

**Importance of Central Bank Independence and Justice in Turkey:** Discusses Turkey's economic challenges, with specific focus on the lack of an independent central bank and an unbiased judicial system.

**Turkish Economy and Financial Decision-Making:** Mainly addresses the Turkish economy and critical financial decisions.

**Perspectives on Israel as a State and Terrorism:** Expresses critical views on Israel's historical and current role in the Middle East.

**Political Problems in Turkey:** Discusses general political issues in Turkey.

**Turkish Identity and Awareness:** Highlights the need for recognition and appreciation of Turkish identity and heritage.

**Criticisms of Kılıçdaroğlu:** Features criticisms directed at the CHP's president.

**Support for CHP:** Constitutes affirmations of electoral support for CHP.

**Economic Achievements and Management:** Highlights Turkey's economic milestones and successful policy implementations.

**Development and Achievements:** Discusses general industrial progress and achievements.

**Social Policies:** Discusses social policies and advocates for increased attention in this area.

**Criticisms of Akparti and Erdoğan:** Features criticisms of Akparti and Erdoğan.

**Community Spirit and Acts of Kindness:** Advocates for unity, open communication, and a respectful atmosphere within the diverse political spectrum in Turkey.