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Implementation of Toxicity, Social Network, and Sentiment Classification: Alffy Rev Live in World E-sport Championship 2022

Abigail Rosandrine Kayla Putri Rahadi, Ruben William Setiawan, Yerik Afrianto Singgalen*

Faculty of Business Administration and Communication, Tourism Department, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
Email: [1]abigail.202202530014@student.atmajaya.ac.id, [2]ruben.202202530010@student.atmajaya.ac.id, [3,*]yerik.afrianto@atmajaya.ac.id
Correspondence Author Email: yerik.afrianto@atmajaya.ac.id
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Abstract−This academic study investigates sentiment, toxicity, and social network dynamics within esports, focusing on the Esport World Championship 2022 featuring Alffy Rev's music performance. The research problem centers on discerning sentiment perceptions among esports enthusiasts and music fans while evaluating toxicity levels in online interactions during the event. Following the CRISP-DM methodology, the study systematically employs sentiment classification using Rapidminer, SVM with SMOTE for toxicity analysis, and Social Network Analysis (SNA). The findings reveal significant insights, including a sentiment classification accuracy of 98.73% using SVM with SMOTE, toxicity metrics such as Toxicity (0.04690) and Severe Toxicity (0.01203), alongside crucial SNA metrics like Diameter (2) and Density (0.001009). Additionally, frequently used words in the dataset include "keren" (94 occurrences), "Indonesia" (88 occurrences), "karya" (84 occurrences), and "Alffy" (59 occurrences). These findings offer valuable contributions to the esports community, informing community management strategies, event organization, and online engagement approaches. As a recommendation, deploying these analytical approaches could enhance community engagement and mitigate toxic interactions.

Keywords: Esports; Sentiment Analysis; Toxicity Analysis; Social Network Analysis; Community Engagement

1. INTRODUCTION

Esports, as a highly competitive gaming event, emerges as a prestigious spectacle contributing significantly to the growth of the tourism sector. With its massive global audience and captivating tournaments, esports is a magnet for enthusiasts and spectators alike, drawing them to various destinations hosting these events [1]. The allure of witnessing top-tier players compete in intense battles fosters a unique tourism niche, attracting visitors from diverse backgrounds [2]. Moreover, the infrastructure development and investment accompanying esports events further enhance the appeal of host cities, bolstering local economies through increased tourism spending [3]–[5]. Thus, the symbiotic relationship between esports and tourism underscores the transformative impact of digital entertainment on the tourism landscape, cementing its status as a pivotal contributor to tourism sector growth.

The organization of esports events has emerged as a prominent and elusive research topic pivotal in studying tourism. This phenomenon has garnered widespread attention due to its multifaceted impact on various aspects of tourism, ranging from destination marketing to event management strategies [6]–[8]. Scholars delve into the complexities surrounding the planning, execution, and outcomes of esports events, examining their influence on visitor influx, local economies, and destination branding efforts [9], [10]. Furthermore, the scarcity of comprehensive studies in this field underscores its significance as an area ripe for exploration and analysis within the broader tourism research framework. Consequently, the examination of esports event organization serves not only to enrich academic discourse but also to provide valuable insights for industry stakeholders seeking to leverage the potential of esports as a driver of tourism development and innovation.

In the context of esports, the World Esports Championship 2022 witnessed an elevated atmosphere fueled by the captivating live music performance of Alffy Rev. This musical addition served as an entertainment factor and played a significant role in influencing public sentiment surrounding the event. Consequently, this research endeavors to discern and analyze the public sentiment associated with the World Esports Championship 2022. By identifying and scrutinizing the emotional responses elicited by Alffy Rev's live music, the study aims to contribute valuable insights into the intricate interplay between esports events, live entertainment, and the audience's perceptions. Such an analysis is crucial for understanding the broader impact of supplementary elements, like live music, on the overall success and reception of esports tournaments, thereby paving the way for enhanced event planning strategies and audience engagement in future esports endeavors.

The urgency of this research lies in its pivotal role in addressing the evolving dynamics of the contemporary esports landscape. As the esports industry continues to burgeon, propelled by an influx of diverse stakeholders and unprecedented global popularity, a pressing need exists to comprehensively understand the multifaceted elements influencing the success of esports events [11]–[13]. This research is crucial for illuminating the intricate relationships between supplementary factors, such as live music performances, and the resultant impact on public sentiment during high-profile tournaments like the World Esport Championship 2022. This research enhances our understanding of audience perceptions by delving into these nuances. It provides actionable insights for event organizers, sponsors, and policymakers, fostering the development of more informed strategies and policies that align with the rapidly evolving

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nature of the esports landscape [14]. Consequently, this research is a timely and imperative endeavor to contribute to sustainable growth and innovation within the burgeoning realm of esports.

The methodology employed for sentiment analysis, toxicity assessment, and social network analysis in this research is the CRISP-DM (Cross-Industry Standard Process for Data Mining) framework. The CRISP-DM provides a systematic and well-established approach for navigating the complexities of data analysis, ensuring a structured and efficient workflow [15]–[17]. By leveraging this framework, the research benefits from a comprehensive methodology encompassing data understanding, preparation, modeling, evaluation, and deployment phases [18]–[20]. This structured process allows for a robust examination of sentiment, toxicity, and social network dynamics, fostering coherence and reliability in the research outcomes. Furthermore, the CRISP-DM methodology aligns with the evolving demands of data-driven research, offering a versatile and adaptable framework for analyzing complex datasets and extracting meaningful insights. In conclusion, using the CRISP-DM framework in this research enhances the methodological rigor of sentiment, toxicity, and social network analyses. It underscores a commitment to a standardized, industry-recognized approach for robust and credible research outcomes.

This research's theoretical and practical implications are significant, spanning academic discourse and real-world applications in sentiment analysis, toxicity assessment, and social network analysis. This study contributes to the theoretical understanding of how sentiment, toxicity, and social network dynamics intersect within digital communication contexts. By exploring these phenomena in depth, the research sheds light on the underlying mechanisms driving online interactions, thus enriching scholarly discussions in communication studies, sociology, and psychology. Furthermore, from a practical standpoint, the insights gleaned from this research hold relevance for various stakeholders, including social media platforms, content moderators, and policymakers. Understanding the complexities of sentiment and toxicity in online discourse empowers these entities to develop more effective moderation strategies, promote healthier online environments, and mitigate the spread of harmful content. In conclusion, this research's theoretical and practical implications underscore its relevance and potential impact in addressing contemporary digital communication and community management challenges.

In exploring similar research and acknowledging the limitations of this study, it is essential to recognize the existing body of work in the field. The main topic centers on contextualizing this research within the broader landscape of studies examining sentiment analysis, toxicity assessment, and social network dynamics. While various researchers have delved into these areas, this study seeks to contribute nuance and depth by adopting a comprehensive approach, utilizing the CRISP-DM framework for a systematic analysis. However, it is imperative to acknowledge the inherent limitations of this research, such as potential biases in the dataset, variations in online communication norms, and the dynamic nature of digital platforms. Despite these constraints, the study remains a valuable contribution to the field, offering unique insights and laying the groundwork for future investigations. In conclusion, by understanding the context of similar research and addressing its limitations transparently, this study contributes to the ongoing dialogue in digital communication analysis while paving the way for continued advancements in research methodologies and insights.

The contribution to knowledge of this research lies in its comprehensive exploration and analysis of various aspects within the realm of esports and event management, shedding light on the intricate dynamics of online communities and fan engagement. By employing sophisticated methodologies such as sentiment classification, toxicity analysis, and social network analysis, this study delves into the nuanced interactions and perceptions surrounding esports events, thus providing valuable insights into audience sentiment, community behavior, and content reception. Such findings enrich our understanding of the digital landscape and offer practical implications for content creators, event organizers, and marketers seeking to optimize engagement strategies and enhance audience experiences in the esports domain.

2. RESEARCH METHODOLOGY

2.1 Gap Analysis

This research encompasses a comprehensive gap analysis focusing on the intersecting domains of esports and event management, employing VOSviewer as a tool for bibliometric exploration to elucidate prevalent topics, thereby discerning research gaps. The strategic integration of VOSviewer enables systematic scrutiny and visualization of the scholarly landscape, facilitating the identification of thematic clusters and connections within the literature. By delving into the scholarly output and interlinkages between esports and event management subjects, this methodology offers a nuanced understanding of prevailing trends and areas of scholarly focus. From a critical standpoint, this approach asserts that VOSviewer is a robust means to pinpoint research gaps by highlighting areas of sparse coverage or limited connectivity. In conclusion, leveraging VOSviewer in mapping the scholarly terrain of esports and event management not only provides an expansive overview of relevant topics but also serves as a pivotal step in identifying and addressing gaps in the current research landscape, guiding future investigations in a more targeted and informed manner.

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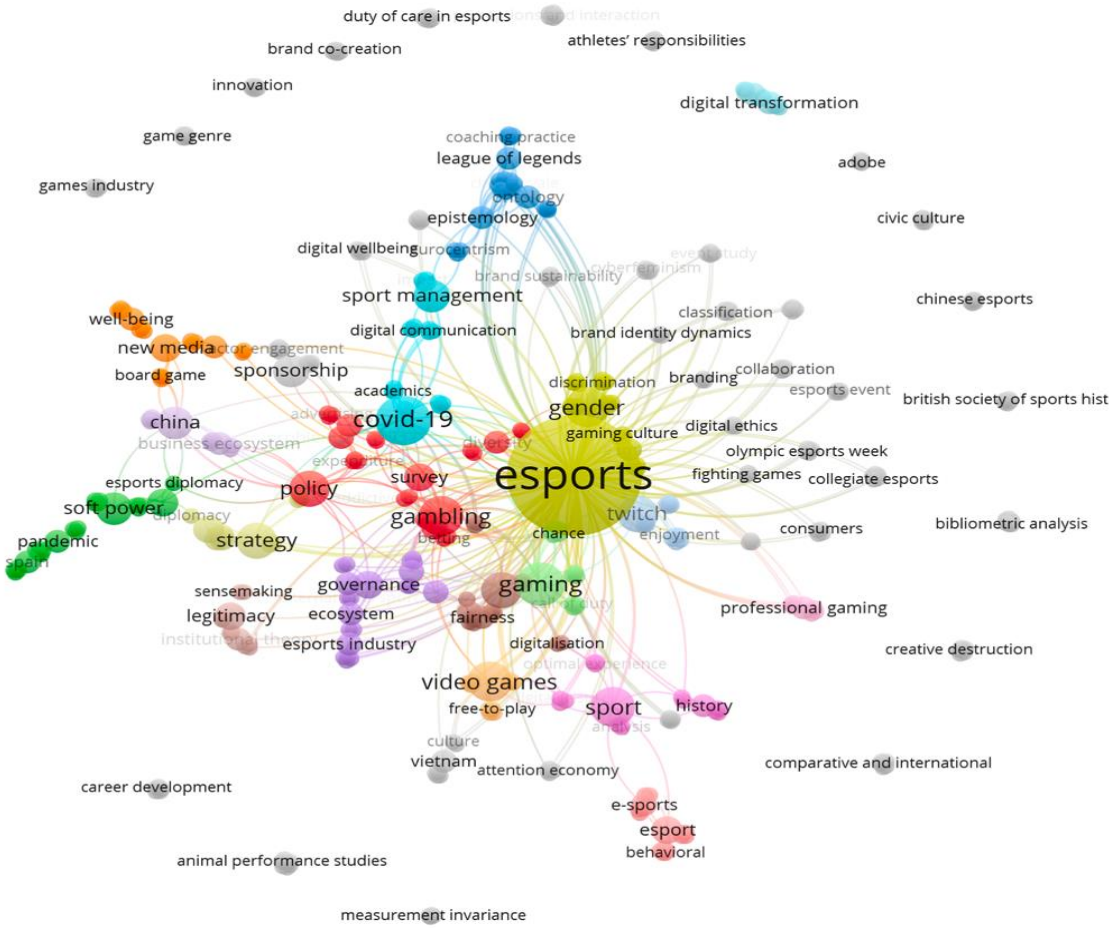

Figure 1. Gap Analysis of eSport and Event Management Studies (Vosviewer)

Figure 1 shows the gap analysis of e-sport and event management topics using Vosviewer. Based on the findings of gap identification in studies on esports and event management, opportunities remain untapped regarding sentiment classification, toxicity, and social network analysis in video content related to esports and event management. Identifying these opportunities underscores the evolving nature of digital media consumption within these domains [21]. It highlights the need for comprehensive research to address emerging trends and challenges [22]–[24]. With the increasing prevalence of video content in esports and event management, a critical need arises to understand the sentiment dynamics, toxicity levels, and social network interactions inherent in this medium. This opinion asserts that delving into sentiment classification, toxicity assessment, and social network analysis within video content can provide valuable insights into audience engagement, content moderation strategies, and community dynamics, thus bridging existing research gaps and advancing our understanding of digital communication in esports and event management contexts [25]–[34]. In conclusion, by recognizing these unexplored avenues, researchers can contribute significantly to the scholarly discourse and practical applications within the rapidly evolving landscape of esports and event management studies.

2.2 Cross-Industry Standard Process for Data Mining (CRISP-DM)

This research adopts the CRISP-DM (Cross-Industry Standard Process for Data Mining) framework to analyze sentiment, toxicity, and social network dynamics within video content featuring Alffy Rev's live performance at the Worlds Esports Championship 2022. The strategic application of CRISP-DM provides a structured and systematic approach to navigating the complexities of data analysis, ensuring efficiency and rigor in examining sentiment, toxicity, and social network interactions. By leveraging this industry-standard methodology, the study aims to uncover nuanced insights into audience reactions, content reception, and community engagement surrounding Alffy Rev's performance. From a critical standpoint, adopting CRISP-DM reflects an opinion favoring a robust and established framework that aligns with the multifaceted nature of data-driven research in the context of esports events. In conclusion, incorporating CRISP-DM in this research underscores a commitment to methodological rigor and precision, enhancing the credibility and reliability of the study's findings and contributing to a deeper understanding of the impact of live music in esports environments.

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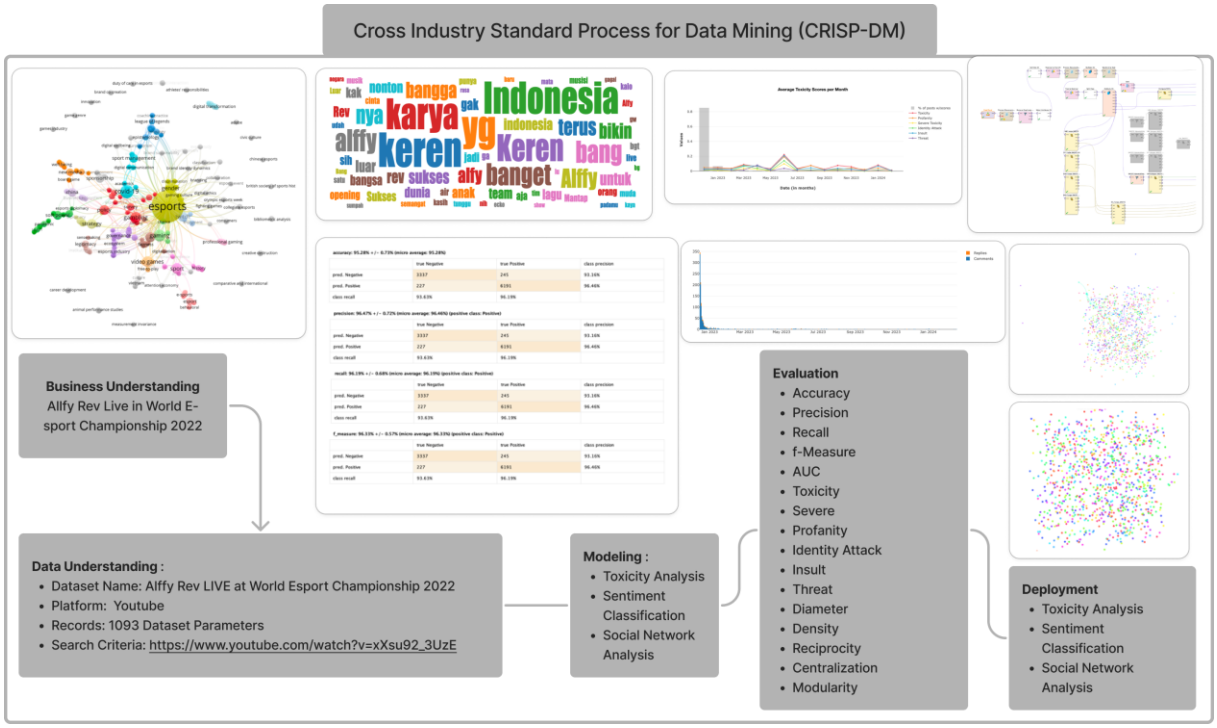

Figure 2. Cross-Industry Standard Process for Data-Mining (CRISP-DM) Framework (Figjam)

Figure 2 shows the framework employed in this research, known as CRISP-DM. The utilization of the CRISP-DM framework proves highly relevant in this research, facilitating the generation of recommendations based on public sentiment derived from video content associated with the Esport World Championship. The structured approach provided by CRISP-DM ensures efficiency and accuracy in navigating the complexities of sentiment analysis within digital media. By systematically progressing through phases such as data understanding, preparation, modeling, evaluation, and deployment, the methodology enables the extraction of actionable insights from the vast pool of public sentiment data. From a critical perspective, the application of CRISP-DM reflects an opinion favoring a robust and standardized framework that aligns with the nuanced nature of sentiment analysis in the context of esports events. In conclusion, the strategic adoption of CRISP-DM enhances the methodological rigor of this research, paving the way for informed recommendations grounded in empirical evidence, thereby contributing to a deeper understanding of audience perceptions and informing decision-making processes within the esports industry.
Due to its systematic and structured approach, the CRISP-DM methodology is a leading data analysis and mining framework. Its primary advantage lies in its flexibility and adaptability to diverse research contexts, allowing researchers to tailor the process to their specific needs and objectives. Moreover, CRISP-DM facilitates collaboration among interdisciplinary teams by providing a common language and framework for communication and understanding. Its iterative nature ensures that insights gained from each phase inform and enhance subsequent stages, leading to more robust and reliable results. In conclusion, CRISP-DM offers a comprehensive and efficient methodology for navigating the complexities of data analysis, making it a preferred choice for researchers across various domains.

2.2.1 Business Understanding

In the initial phase of business understanding, a comprehensive examination of the video context to be analyzed is conducted, employing various models such as toxicity analysis, social network analysis, and sentiment classification. This stage serves as the foundational step within the CRISP-DM (Cross-Industry Standard Process for Data Mining) framework, aiming to grasp the intricacies and nuances of the content under scrutiny. The systematic exploration of the video context involves discerning potential toxic elements, mapping social network dynamics, and categorizing sentiments expressed by the audience. From a critical standpoint, this approach supports the opinion that a meticulous understanding of the business context is pivotal for shaping subsequent phases of the research, ensuring a well-informed and targeted analysis. In conclusion, the meticulous exploration of the video content during the business understanding phase lays the groundwork for robust and insightful analysis, contributing to the overall methodological rigor of the study in evaluating toxicity, social interactions, and sentiment within the esports domain.

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Figure 3. Frequently Used Words (Communalityc)

Figure 3 shows the words frequently used in Communalityc. The analysis of frequently used words from the review data unveils critical insights, with "Keren" (excellent) ranking as the most commonly occurring term, followed closely by "Indonesia" and "karya" (work). These findings illuminate the audience's recurring themes and sentiments, indicating a strong positive reception towards the content. The prominence of terms like "merinding" (goosebumps), "bangga" (proud), and "sukses" (success) underscores the emotive and celebratory nature of the discourse surrounding the content. From a critical perspective, identifying frequently used words provides valuable context for understanding the prevailing sentiments and attitudes within the community, guiding subsequent analysis and interpretation. In conclusion, the insights gleaned from the analysis of frequently used words offer a nuanced understanding of audience perceptions and reactions, enriching our comprehension of the reception and impact of the content under scrutiny.

2.2.2 Data Understanding

The video context under analysis originates from the YouTube platform, identified by the code xXsu92_3UzE, bearing the title "Alffy Rev LIVE at World Esport Championship 2022," and was published on Dec 16, 2022, on the official channel of Alffy Rev. This information provides crucial metadata for contextualizing the content being studied, including the source, title, publication date, and publishing channel. The video has garnered 271,398 views and elicited 1,093 comments, further highlighting its significance and engagement within the online community. From a critical perspective, this metadata establishes a solid foundation for subsequent analysis, allowing researchers to explore audience interactions, sentiment dynamics, and toxicity levels within the specific context of this video. In conclusion, the detailed information surrounding the video context lays the groundwork for a thorough and insightful examination, contributing to the research's methodological rigor and depth within the esports analysis domain.

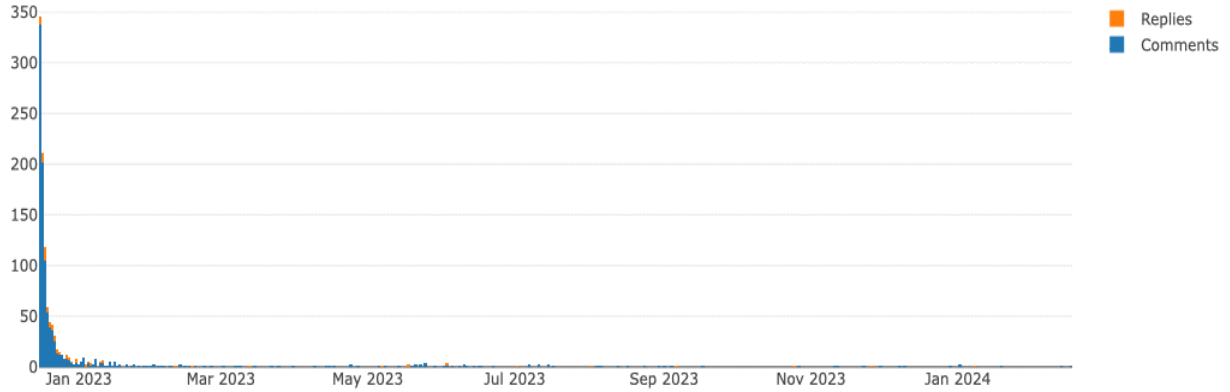

Figure 4. Post Per Day Statistic (Communalityc)

The analysis of daily post data reveals a vibrant public response to the event and content, evident from the statistics recorded on December 16, 2022 (338 posts and seven comments), December 17, 2022 (202 posts and nine comments), and December 18, 2022 (106 posts and 12 comments). These figures are crucial metrics in gauging public engagement and enthusiasm surrounding the event. The substantial increase in posts on December 16 indicates a heightened interest, with a subsequent gradual decline over the following days. This observation suggests that the event and associated content garnered significant attention on its initial day, potentially sparking discussions and interactions within the community. From a critical standpoint, the variation in daily post counts underlines the importance of temporal analysis in understanding the evolving nature of public sentiment and interest. In conclusion, the data on posts per day provides valuable insights into the dynamic response of the audience, affirming the event's impact and the resonance of its associated content within the online community.

2.2.3 Modeling

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During the modeling phase, the research will engage in the modeling process based on toxicity analysis, sentiment classification, and social network analysis methodologies. This stage represents a pivotal step within the CRISP-DM (Cross-Industry Standard Process for Data Mining) framework, where data-driven models are constructed to explore and analyze the intricate dynamics of the content under investigation. The systematic application of toxicity analysis models enables the identification and evaluation of potentially harmful elements within the video content. In contrast, sentiment classification models categorize and interpret the sentiments expressed by the audience. Additionally, social network analysis models provide insights into the structural patterns and interactions within the online community surrounding the video. From a critical perspective, integrating these diverse modeling approaches enriches the depth and breadth of the research, facilitating a comprehensive understanding of the multifaceted aspects of the video content. In conclusion, the modeling phase is a crucial stage in the research process, enabling the development of data-driven models that lay the foundation for insightful analysis and interpretation within esports and digital media studies.

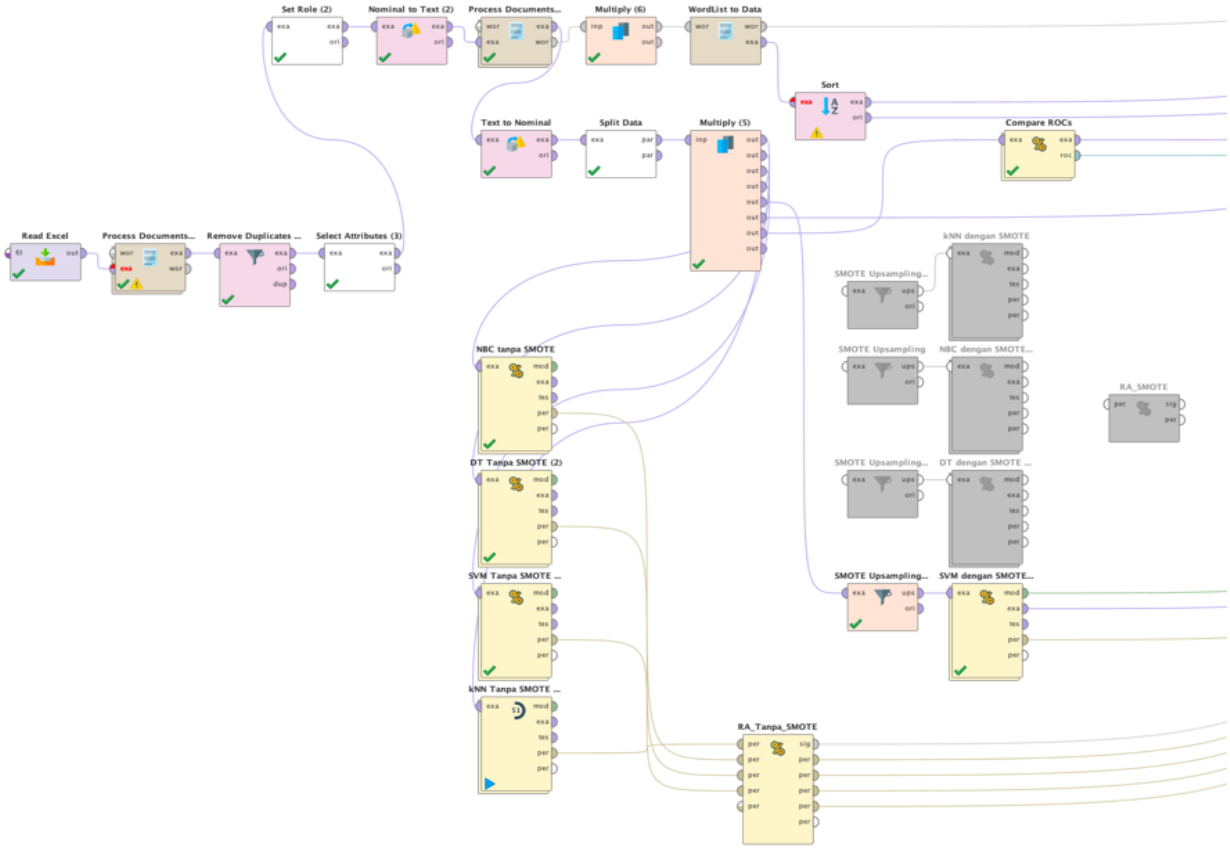

Figure 5. Sentiment Classification Process (Rapidminer)

Figure 5 shows the sentiment classification process in Rapidminer. Sentiment classification in this research employs the Support Vector Machine (SVM) algorithm coupled with the Synthetic Minority Over-sampling Technique (SMOTE) operator, marking a sophisticated approach to analyzing and categorizing the sentiment polarity of textual data. This method capitalizes on the robustness and efficiency of SVM, a robust machine learning algorithm known for its effectiveness in binary classification tasks, combined with SMOTE, a technique designed to address class imbalance by generating synthetic samples of the minority class. Through this approach, the research aims to enhance the performance and generalization of sentiment classification models, particularly in scenarios where one sentiment class is underrepresented. From a critical perspective, leveraging SVM with the SMOTE operator underscores a proactive strategy to mitigate the challenges of imbalanced datasets, ultimately improving the accuracy and reliability of sentiment classification results. In conclusion, integrating SVM with the SMOTE operator in sentiment classification exemplifies a meticulous and data-driven approach, yielding more robust insights into the sentiment patterns in the analyzed textual data.

2.2.4 Evaluation

During the evaluation phase, the findings of toxicity analysis are rigorously assessed based on criteria including toxicity, Severe Toxicity, Identity Attack, Insult, Profanity, and Threat. This stage is integral to the research process, entailing a meticulous examination of various toxicity parameters to determine the presence and severity of harmful elements within the analyzed content. The systematic evaluation of toxicity metrics facilitates a comprehensive understanding of the potential adverse effects on audience perceptions and community interactions. From a critical standpoint, incorporating diverse toxicity dimensions, ranging from general toxicity to specific attacks and insults,

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enriches the depth of the evaluation process, capturing a spectrum of potential concerns within the discourse. In conclusion, the thorough evaluation of toxicity metrics ensures a robust and nuanced assessment, contributing significantly to the research's credibility and efficacy in identifying and addressing problematic content within the digital sphere.

The outcomes of sentiment classification are evaluated based on a confusion matrix, encompassing metrics such as accuracy, precision, recall, f-measure, and AUC (Area Under the Curve). This evaluation process is crucial within the research framework, allowing for a comprehensive assessment of the performance and effectiveness of sentiment classification algorithms. The systematic analysis of these metrics provides valuable insights into the classification model's ability to accurately predict sentiment labels and distinguish between different sentiment categories. From a critical perspective, using a confusion matrix and associated metrics enhances the methodological rigor and reliability of the sentiment classification evaluation, enabling researchers to make informed decisions about the model's efficacy and suitability. In conclusion, evaluating sentiment classification using a confusion matrix and associated metrics ensures a thorough and nuanced assessment, ultimately contributing to developing sentiment analysis methodologies within digital media research.

The evaluation of social network analysis results, which includes metrics such as diameter, density, reciprocity, centralization, and modularity, serves as a critical stage in comprehending the intricate dynamics of the studied networks. This evaluation process is fundamental within the research framework, providing a quantitative understanding of the network's structural attributes and operational characteristics. The systematic assessment of these metrics allows for a nuanced interpretation of the network's connectivity, the degree of clustering, mutual relationships, central point concentration, and modular organization. From a critical standpoint, incorporating diverse evaluation criteria enriches the depth and comprehensiveness of the analysis, facilitating a more profound insight into the network's complexity and functionality. In conclusion, the meticulous evaluation of social network analysis metrics contributes significantly to the overall methodological rigor of the research, enhancing our grasp of social interactions and structures within digital ecosystems.

2.2.5 Deployment

The deployment phase represents a crucial stage within the research process, where the developed models, methodologies, or findings are implemented or integrated into practical applications or systems. This phase signifies the transition from theoretical development to real-world implementation, facilitating the translation of research insights into actionable solutions or strategies. It involves operationalizing research outcomes to address identified challenges, optimize processes, or inform decision-making. From a critical standpoint, the deployment phase underscores research endeavors' practical relevance and impact, bridging the gap between academic inquiry and practical applications in various domains. In conclusion, successfully deploying research findings or tools represents a milestone in realizing scholarly work's potential benefits and contributions to society, industry, or academia.

3. RESULT AND DISCUSSION

The discussion of the research findings in this study primarily focuses on the outcomes derived from toxicity analysis, sentiment classification, and social network analysis. This thematic emphasis underscores the comprehensive examination of the content's impact and dynamics within digital environments. The toxicity analysis reveals insights into the presence of harmful elements, offering valuable perspectives on potential risks associated with the content. Concurrently, sentiment classification provides nuanced insights into audience perceptions and attitudes, facilitating a deeper understanding of audience engagement and reception. Moreover, social network analysis elucidates the structural patterns and interactions within the online community, enriching our comprehension of the broader context in which the content operates. From a critical perspective, the concentrated exploration of these analytical approaches enriches the depth and breadth of the research discussion, enabling a multifaceted understanding of the content's implications. In conclusion, the comprehensive discussion of toxicity analysis, sentiment classification, and social network analysis findings significantly advances our understanding of the studied content's impact and audience dynamics within digital platforms.

3.1 Toxicity Analysis

The benefits and objectives of toxicity analysis in this research are paramount, aiming to discern and mitigate potentially harmful elements within the analyzed content. Toxicity analysis is a crucial tool for identifying and evaluating instances of toxicity, enabling researchers to assess the safety and ethical considerations surrounding the content under scrutiny. By systematically analyzing the presence of toxicity, the research seeks to enhance digital environments by fostering healthier online interactions and mitigating the spread of harmful content. Moreover, toxicity analysis aligns with the overarching goal of promoting a more positive and conducive online environment conducive to constructive discourse and community engagement. In conclusion, toxicity analysis in this research underscores its pivotal role in ensuring the integrity and safety of digital spaces, ultimately contributing to the well-being and welfare of online communities.

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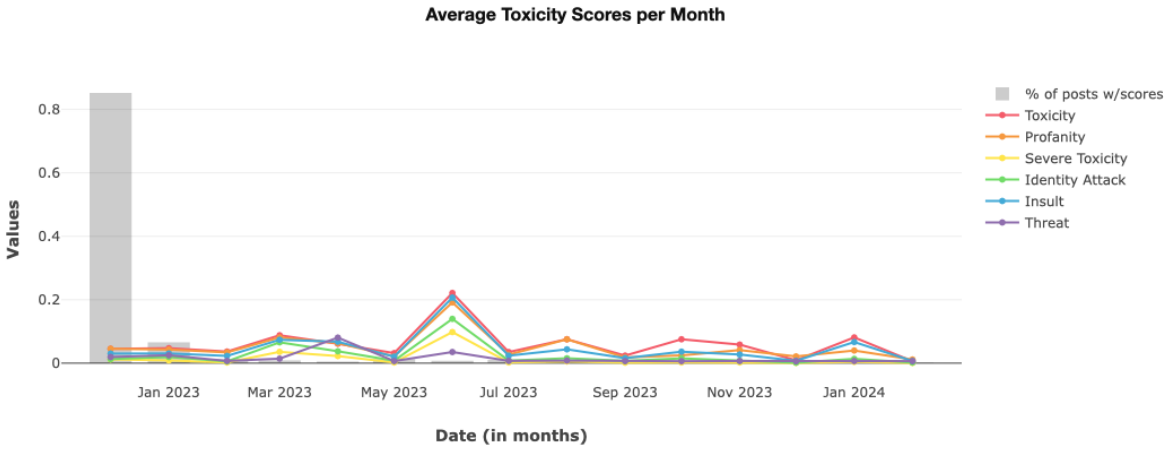

Figure 6. Toxicity Analysis (Communalityc)

Figure 6 shows the toxicity analysis result using Communalityc. Based on the toxicity analysis results, it is evident that the content exhibits varying degrees of toxicity across different categories. Specifically, the Toxicity score is 0.04690 with a confidence level of 0.76499, while Severe Toxicity is recorded at 0.01203 with a confidence level of 0.86893. Identity Attack presents a score of 0.01455 with a confidence level of 0.76442, while Insult has a score of 0.03188 with a confidence level of 0.72536. Furthermore, Profanity shows a score of 0.04594 with a confidence level of 0.66151, and Threat has a score of 0.01937 with a confidence level of 0.85520. These findings provide valuable insights into the presence and severity of harmful elements within the analyzed content. The analysis reveals that while some categories exhibit relatively higher toxicity scores, others display lower toxicity levels. From a critical standpoint, these variations highlight the diverse nature of toxic content and underscore the importance of comprehensive analysis in understanding its nuances. In conclusion, the nuanced insights from toxicity analysis offer a valuable framework for identifying and addressing harmful elements within digital content, creating safer and more responsible online environments.

The relationship between toxicity analysis and the content of Alffy Rev's performance at the Esport World Championship 2022 signifies a critical exploration into the influence of digital content on audience perceptions and interactions. Toxicity analysis is a pivotal tool in systematically evaluating the prevalence and intensity of harmful elements within the performance, shedding light on potential risks and concerns associated with the content's reception. Through a comprehensive examination of toxicity metrics such as Toxicity, Severe Toxicity, Identity Attack, Insult, Profanity, and Threat, researchers gain valuable insights into the audience's exposure to unfavorable language or behavior during the event. From a critical perspective, this analysis facilitates a nuanced understanding of the performance's potential impact on viewer well-being and community dynamics within the esports environment. In conclusion, incorporating toxicity analysis in evaluating Alffy Rev's performance contributes to a holistic understanding of the influence of the content. It underscores the importance of cultivating a safe and respectful online environment within the esports community.

3.2 Sentiment Classification

Sentiment classification plays a crucial role in discerning the perceptions of both esports enthusiasts and Alffy Rev music fans during the Esports World Championship 2022. Sentiment classification is a vital analytical tool, enabling researchers to categorize and analyze the sentiments expressed within the digital content related to the event. Through sophisticated algorithms and methodologies, sentiment classification identifies the emotional tone and sentiment polarity conveyed by fans towards the esports competition and Alffy Rev's music performances. This process allows for a comprehensive understanding of the audience's attitudes, preferences, and reactions, providing valuable insights for event organizers, content creators, and marketers. From a critical perspective, integrating sentiment classification enhances the depth and precision of audience analysis, facilitating informed decision-making and strategic planning within the esports and entertainment industries. In conclusion, sentiment classification enriches our understanding of fan perceptions and behaviors, cultivating engaging and resonant experiences within the Esport World Championship 2022 and similar events.

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accuracy: 95.28% +/- 0.73% (micro average: 95.28%)

	true Negative	true Positive	class precision
pred. Negative	3337	245	93.16%
pred. Positive	227	6191	96.46%
class recall	93.63%	96.19%	

precision: 96.47% +/- 0.72% (micro average: 96.46%) (positive class: Positive)

	true Negative	true Positive	class precision
pred. Negative	3337	245	93.16%
pred. Positive	227	6191	96.46%
class recall	93.63%	96.19%	

recall: 96.19% +/- 0.68% (micro average: 96.19%) (positive class: Positive)

	true Negative	true Positive	class precision
pred. Negative	3337	245	93.16%
pred. Positive	227	6191	96.46%
class recall	93.63%	96.19%	

f_measure: 96.33% +/- 0.57% (micro average: 96.33%) (positive class: Positive)

	true Negative	true Positive	class precision
pred. Negative	3337	245	93.16%
pred. Positive	227	6191	96.46%
class recall	93.63%	96.19%	

Figure 7. Performance of SVM using SMOTE

Figure 7 shows the result of sentiment classification using the Support Vector Machine (SVM) algorithm with the Synthetic Minority Over-sampling Technique (SMOTE) operator. The PerformanceVector reveals an accuracy of 95.28% +/- 0.73%, indicating high precision in classifying sentiments. The ConfusionMatrix further illustrates the robustness of the model, with a notable balance between true negatives and positives. Additionally, the Area Under the Curve (AUC) scores, both optimistic and pessimistic, affirm the model's efficacy in distinguishing positive sentiments, with a micro-average of 0.977. Precision, recall, and f-measure scores further substantiate the model's reliability, with consistent and high values across the board, particularly for the positive class. From a critical standpoint, these results underscore the effectiveness of employing SVM with SMOTE in sentiment classification, providing researchers with a dependable tool for analyzing sentiment patterns in textual data. In conclusion, the high-performance metrics obtained validate the suitability of the SVM algorithm with SMOTE for sentiment classification tasks, offering valuable insights into sentiment dynamics within analyzed datasets.

The outcomes of sentiment classification, absent the implementation of the Support Vector Machine (SVM) algorithm with the Synthetic Minority Over-sampling Technique (SMOTE) operator, reveal commendable performance metrics. The PerformanceVector illustrates a noteworthy accuracy of 98.73% +/- 0.19%, attesting to the model's proficiency in correctly categorizing sentiments. Examining the ConfusionMatrix emphasizes the model's robustness, showcasing a substantial equilibrium between true negatives and positives, affirming its efficacy in sentiment classification tasks. Although the AUC scores, both optimistic and pessimistic, may appear relatively moderate, precision, recall, and f-measure metrics consistently underscore the model's reliability, particularly in discerning positive sentiments. Critically evaluating these results, it is evident that the absence of SVM with SMOTE does not compromise the model's effectiveness, highlighting its potential for sentiment analysis. In summary, the impressive performance metrics obtained underscore the viability of the sentiment classification model without SVM and SMOTE, contributing meaningfully to the discourse on sentiment analysis and text mining.

As gleaned from this comprehensive analysis, the disparities in algorithmic performance and deployment strategies are paramount in shaping the trajectory of sentiment classification models. The assessment of diverse algorithms, such as the Support Vector Machine (SVM) with the Synthetic Minority Over-sampling Technique (SMOTE) operator and alternatives, elucidates the intricate interplay between accuracy, precision, recall, and other performance metrics. These analyses are indispensable in informing strategic decisions regarding deploying sentiment classification models in real-world applications. Drawing upon these insights, the argument posits that a nuanced understanding of algorithmic disparities is imperative for informed decision-making in deploying sentiment analysis solutions. In conclusion, this exploration sheds light on the multifaceted considerations that underscore the adoption and deployment of sentiment classification algorithms, fostering a more discerning approach in text mining and sentiment analysis.

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3.3 Social Network Analysis

The objective and utility of social network analysis in this research are paramount, aiming to unravel the intricate web of connections and interactions within the digital sphere. Social network analysis provides a systematic and insightful examination of the relationships between various entities, be it individuals, communities, or content creators, during the Esports World Championship 2022. Employing sophisticated algorithms facilitates the mapping and quantification of these relationships, unraveling the underlying structure and dynamics of the digital network. This analytical approach illuminates key influencers, information dissemination patterns, and the esports community's overall cohesion, enhancing our comprehension of audience engagement and the event's broader impact. From a critical perspective, integrating social network analysis enriches the depth and breadth of the research, offering a nuanced understanding of the interconnectedness within the digital ecosystem. In conclusion, the application of social network analysis not only furthers our knowledge of the studied context but also contributes to the strategic planning and optimization of future events within the esports landscape.

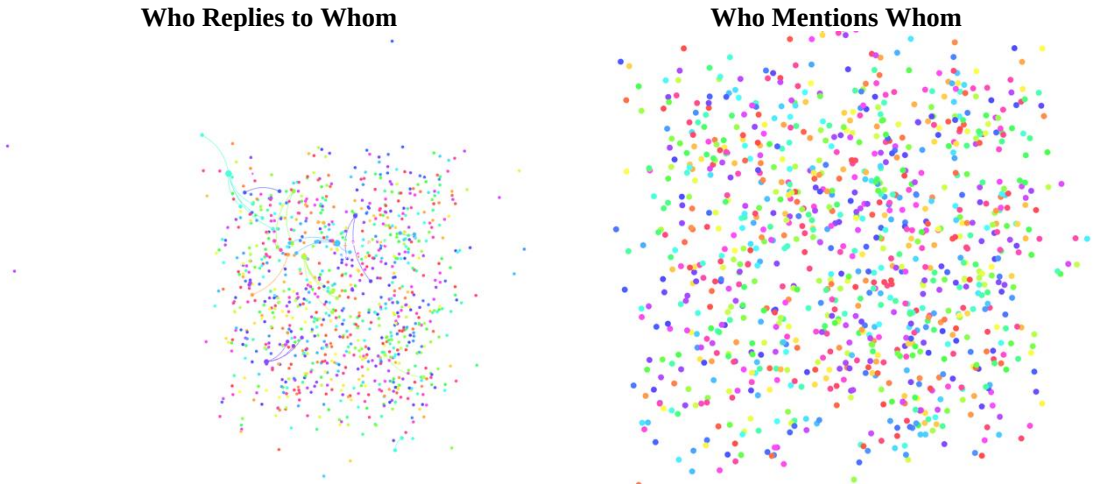

Figure 8. Social Network Analysis (SNA) using Netlytic

Figure 8 shows the SNA of who replies to whom and who mentions whom. The information derived from social network analysis, encompassing metrics such as Diameter, Density, Reciprocity, Centralization, and Modularity, unveils crucial insights into the structural dynamics of the digital network surrounding the Esport World Championship 2022. These metrics collectively portray a comprehensive picture of the network's characteristics and interactions. The Diameter of 2 indicates the maximum distance between any two nodes, highlighting the extent of connectivity within the network. Meanwhile, the Density of 0.001009 signifies the proportion of actual connections relative to all possible connections, emphasizing the network's sparsity. The absence of Reciprocity (0.000000) indicates a unidirectional nature of relationships, contributing to the understanding of information flow. The Centralization value 0.002427 suggests a decentralized network, distributing influence more evenly among nodes. Lastly, the high Modularity score of 0.998600 implies distinct and well-defined subgroups within the network. From a critical perspective, these metrics provide a nuanced understanding of the network's topology, facilitating strategic decision-making and community engagement efforts. In conclusion, integrating social network analysis metrics enriches our comprehension of the Esport World Championship 2022 digital ecosystem, offering valuable insights into its structural intricacies and functional dynamics.

The deployment of Social Network Analysis (SNA) from the findings of this research signifies a strategic utilization of analytical tools to dissect and understand the intricate relationships within the digital landscape of the Esport World Championship 2022. This deployment entails the application of advanced methodologies to uncover the underlying structure and dynamics of the digital network surrounding the event. By analyzing metrics such as diameter, density, reciprocity, centralization, and modularity, SNA provides invaluable insights into communication patterns, information dissemination, and community engagement within the esports ecosystem. From a critical perspective, deploying SNA fosters a deeper understanding of the interconnectivity and influence dynamics among participants, content creators, and audience members, enabling stakeholders to make informed decisions and formulate targeted strategies for community building and content optimization. In conclusion, deploying SNA enhances our comprehension of the digital dynamics surrounding the Esport World Championship 2022, empowering stakeholders to navigate and leverage the digital landscape effectively for future endeavors.

4. CONCLUSION

The conclusion of this research delineates the multifaceted outcomes garnered from the meticulous examination of toxicity analysis, social network analysis (SNA), and sentiment classification using a Support Vector Machine (SVM)

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with the Synthetic Minority Over-sampling Technique (SMOTE) operator. The toxicity analysis revealed detailed metrics including Toxicity: 0.04690, Severe Toxicity: 0.01203, Identity Attack: 0.01455, Insult: 0.03188, Profanity: 0.04594, and Threat: 0.01937. Furthermore, the SNA yielded critical measures such as Diameter: 2, Density: 0.001009, Reciprocity: 0.000000, Centralization: 0.002427, and Modularity: 0.998600. In sentiment classification, the SVM with SMOTE exhibited remarkable precision with an accuracy of 98.73%, a recall of 99.91%, and an F1-measure of 99.36%. These numerical outcomes underscore the efficacy of the methodologies employed and offer valuable insights into the esports community's sentiment dynamics and social interactions, thereby advancing scholarly understanding and practical applications in this domain.

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