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Implementation of Natural Language Processing Algorithms in Event Response Analysis

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ABSTRACT

With the new ways of social gathering and professional meetings, the online platform was extremely used in the last two years. Contents were delivered thru the Internet and audiences are virtually present during events and other activities. In the on-site set-up, it is quite easy to analyze the response of the participants because they are personally seen, and expressions are freely expressed. With the online set-up, virtual participants could be attentively participating or on the other hand, doing multitasking. The objective of this paper is to design an algorithm and implement natural language processing to assess survey returns from events participated in an online mode. Word clouds are used to describe the response and participation of the respondents, and the interpretations were based on sentiment-target word pairing technique. Results describes a picture of the condition of the respondents which are necessary input to events organizers, hosts, teachers, and other learning institutions.

Key words : Event Response Analysis, Natural Language Processing, Survey, Word Clouds

1. INTRODUCTION

The Covid-19 pandemic brought down a lot of social and community gathering activities and held them all captured in an online platform. Meetings, seminars, and other activities are done using electronic devices connected to the Internet. People have the option to be seen through their video cameras and be heard through their microphones. New methods of conveying information were formed and with the online platform, social meetings grow in scope defying space and distance for as long a connected to the Internet [1]. Talks from around the world can be watched in different social media platforms; webinars can reach up to thousands of participants around the globe, online trainings and learning activities go beyond borders of a traditional classroom, and masterclass sessions can capture more attendees beyond the capacity of a session hall.

Non-face-to-face (NFTF) meetings could hamper the effectiveness of an event and even fail to meet the expectations of the viewers [2]. With this, it is important to capture the sentiments, response, and feedback of the audience who are from different orientation, culture, and locality [3]–[5]. With the online platform in-place, registrations, expectations, anticipated questions, and feedbacks can be studied and analyzed for the benefit of the organizers, the host, and the speakers using intelligent systems through machine learning [6].

In this paper, it is aimed to design and build an algorithm that would analyze participants' responses in several talks, webinars using natural language processing and sentiment analysis by utilizing their responses in events' comments, recommendations, expectations, questions, and topic suggestions.

2. METHODOLOGY

The result of this work was guided by the framework as shown in Figure 1. It follows the Input-Process-Output (IPO) model wherein the inputs are the survey responses of the participants; the process includes preprocessing before the VADER – Natural Language Processing (NLP) as used in [7], and the outputs are the word clouds, compound scores, sentiment classification and interpretation. All responses were given consent via data privacy clause and respondents are held anonymously in this paper.

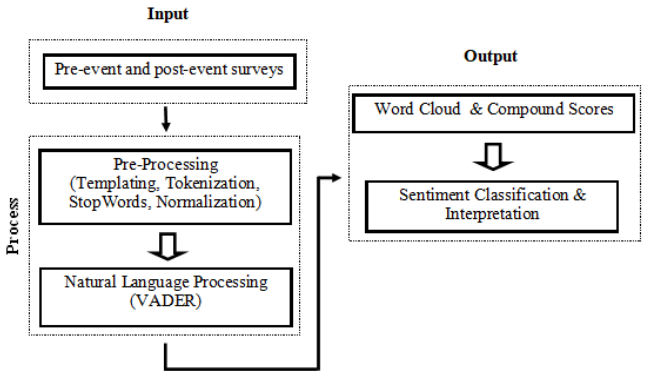

Figure 1: Framework of the Study

The responses of the participants were obtained from two major career event talks which were participated by 150 to 200 people across the different islands of the Philippines. The event is about transformation from virtual to on-site work and career progression. Pre-event and post-event questions were asked which deal with expectations, learnings, advance queries, relevant and helpful parts, as well as comments, recommendations, and suggestions.

The text responses were preprocessed by templating them in Microsoft Excel where TextData (survey responses) are numerically tagged with their respective IDs. The process of tokenization breaks down the paragraphs into smaller chunks such as sentences or words. Inappropriate texts and those without significant meaning are removed using the *StopWords* command. This process helps in reducing the noise in the text data. Normalization does lemmatization which reduces the words to its root word. Once the texts are ready, they are fed into the VADER natural language processing algorithm that produces the word clouds and the compound scores which describes the sentiment scores for tokenized documents [8]. Compound scores are normalized between -1 to 1. Values closer to 1 are positively connotated sentiments while values closer to -1 are negatively connotated sentiments. Zero values are neutral sentiments.

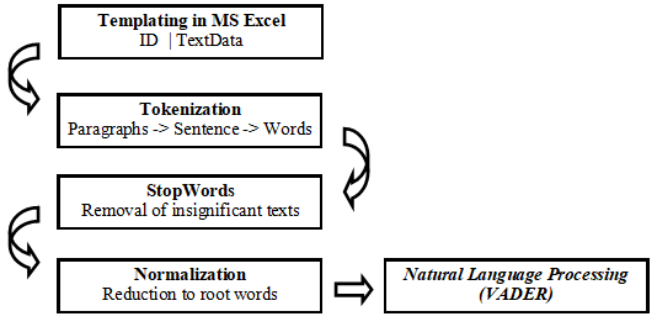

Figure 2: Survey Response NLP Algorithm

3. RESULTS AND DISCUSSION

The results of this study are word clouds which describes the arrangement in terms of text size of the significant words from the participants' responses. In addition, compound scores are tabulated to validate positive and negative sentiments of the respondents. The areas of the survey response include expectations, advance questions, favorite part of the event, helpful part of the event, relevant part of the event, learnings, suggested topics in the succeeding events, comments, suggestions, and recommendations.

Figures 3 to 11 show the word clouds of the significant texts according to the responses of the participants relative to the survey area. It is important to consider the context of the words in the cloud in relation to the question being asked and answered by the respondents.

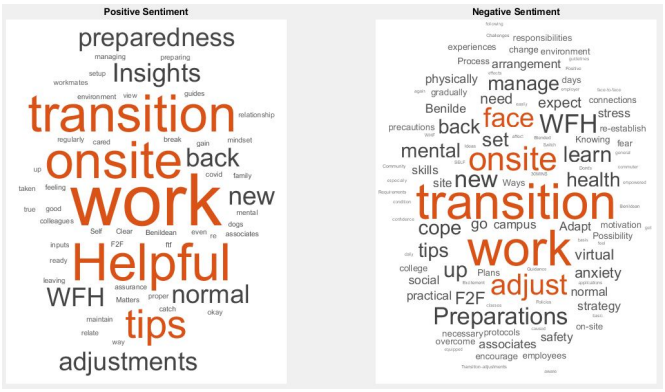

Figure 3: Word Cloud for Expectations

Figure 4: Word Cloud for Advance Questions

Figure 5: Word Cloud for Favorite Part of the Event

Figure 6: Word Cloud for Helpful Part of the Event

Figure 7: Word Cloud for Relevant Part of the Event

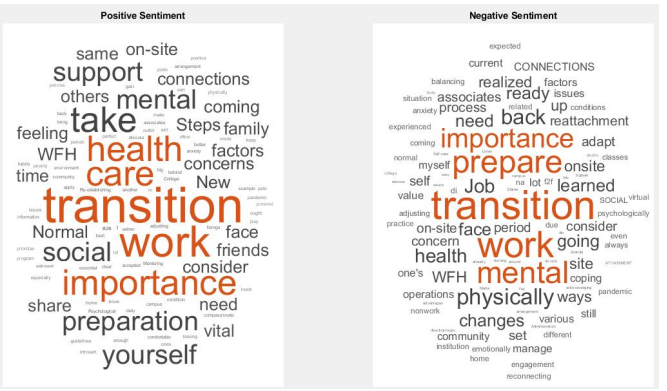

Figure 8: Word Cloud for Learnings

Figure 9: Word Cloud for Suggested Topics

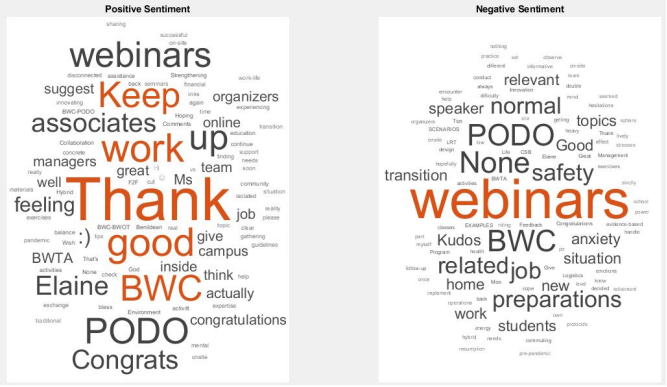

Figure 10: Word Cloud for Comments & Suggestions

Figure 11: Word Cloud for Comments & Recommendations

Table 1 shows the summary of the top significant words under the positive and negative sentiments for each survey area. Underlined words are those distinct between the positive and negative columns. Under Expectations, the participants are positive in getting helpful tips from the event about transition from online to on-site and as they grow with their careers. However, adjustments are significant due to the long period of work from home arrangements as they back to face-to-face arrangements. Under Advance Questions, the participants are positive in getting updates about covid, onsite arrangements, how their days will be spent in schools, that could possibly bring anxieties. These could be brought by transition of work from home to going back to their respective workstations, facing either their colleagues or students. Under the Favorite Part, the participants are positive with the sharing of thoughts, experiences, and ideas during the event thru the speaker who led the discussion which brings-in a sense of care for them. Mentimeter is third party software wherein to participate, it usually requires another device. Participants who are in mobile or lacks another device might have found this thing negative as they answer questions though that social information gathering platform. Under the Helpful Part, there no other significant there but helpful. The event was found to be very helpful to the respondents. The events could have possibly addressed their concerns about transition, questions (Q), that affects their mental health. Under the Relevant Part, positive sentiments are related to safety, leader, psychological, and People and Organization Development Office (PODO). Negative sentiments are related to connections, social, transition, and discussion. About Learning, the participants are positive about health care however, during transition, preparations are required both physically and mentally. Positive future topics are related to progression and development in consideration with health and stress management. The participants commended that the event is good, and they are thankful about the things shared to them in a webinar could have brought some fatigue [9] as compared to when presented in person. These are observations and interpretations based on the context of how the event was conducted and how the respondents were observed during their participation. The concept of

sentiment-target word pair [10] was also considered in delivering the constructs between the significant words from the participants.

Table 1: Summary of Significant Words per Survey Area

Survey Area	Positive	Negative
Expectations	work, helpful, onsite, transition, tips	transition, work, onsite, adjust, face
Advance Questions	covid, onsite, school, days, anxiety	transition, work, classes, face, back
Favorite Part	sharing, care, speaker, leader	answer, question, mentimeter, part, social
Helpful Part	helpful	transition, Q, mentally
Relevant Part	safety, work, leader, psychological, PODO	work, connections, social, transition, discussion
Learnings	transition, work, importance, health, care	transition, work, prepare importance, mental
Topics	career, progression, mental, development, topic	stress, mental, health, management, career
Comments & Suggestions / Recommendations	thank, good, BWC, work, keep, topic	webinars, informative, topic

4. CONCLUSION

Events conducted either online or on-site are evaluated and can be improved through the survey responses of the participants. Manual analysis of the responses could be very tedious and difficult for the organizers to facilitate especially during pre- and post-event scenarios as this could add up more into their preparation tasks. With computer-based intelligent systems that could analyze pre- and post- survey responses, this could possibly provide more insights to the organizers, hists, and speakers on what to expect and prepare so an event can be more effective and efficient. This will result to a more productive activity hence, delivering the expectations of the audience and achieving the set goals of the organizers.

REFERENCES

1. L. L. Ramos and P. C. Soliven. **Rise of webinars : An impact assessment of online seminar learning from the students ' perspective Rise of webinars : An impact assessment of online seminar learning from the students ' perspective**, *PCS Rev.*,December, 2021.
2. A. Sergio, T. Penedo, and V. S. Pereira. **Distance education : advantages and disadvantages of the point of view of education and society**, *Dialogia*, no. August, pp. 139–152, 2018.
3. V. Umarani, A. Julian, and J. Deepa. **Sentiment Analysis using various Machine Learning and Deep Learning Techniques**, *J. Niger. Soc. Phys. Sci.*, vol. 3, no. 4, pp. 385–394, 2021.
4. U. Ö. Osmanoğlu, O. N. Atak, K. Çağlar, H. Kayhan, and T. Can. **Sentiment Analysis for Distance Education Course Materials: A Machine Learning Approach**, *J. Educ. Technol. Online Learn.*, vol. 3, no. 1, pp. 31–48, 2020.
5. E. M. Aranda and R. F. Navea. **A Data Analytic Approach in the Thematic Classification of the Reasons and Perspectives of Adolescents' Social Media Engagement**, *Int. J. Adv. Trends Comput. Sci. Eng.*, vol. 10, no. 3, pp. 1765–1770, 2021.
6. N. Shah, D. Mohan, J. Juste, and H. Bashingwa. **Using Machine Learning to Optimize the Quality of Survey Data : Protocol for a Use Case in India**, in *International Conference DisCo 2013: New technologies and media literacy education*, 2020.
7. E. M. Aranda and R. F. Navea. **Social Media Engagement Of Young People : A Sentiment Analysis Using Natural Language Processing**, *Webology*, vol. 19, no. 2, pp. 4895–4903, 2022.
8. C. J. Hutto and E. Gilbert. **VADER : A Parsimonious Rule-based Model for Sentiment Analysis of Social VADER : A Parsimonious Rule-based Model for Sentiment Analysis of Social Media Text**, in *Conference: Proceedings of the Eighth International AAAI Conference on Weblogs and Social Media*, 2015.
9. A. A. Bennett, E. D. Campion, K. R. Keeler, and S. K. Keener. **Videoconference Fatigue? Exploring Changes in Fatigue After Videoconference Meetings During COVID-19**, *J. Appl. Psychol.*, vol. 106, no. 3, pp. 330–344, 2021.
10. J. Jo and G. Kim. **Sentiment-Target Word Pair Extraction Model Using Statistical Analysis of Sentence Structures**, *Electronics*, vol. 10, no. 3187, pp. 1–9, 2021.