

Text Based Emotion Detection using Emojis

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Abstract - Emojis have emerged as a growing trend. It is used to send nonverbal communications organized around computers. From the standpoint of the message sender and recipient, we examine people's conditions in order to use four types of emoji: neutral, positive, negative, and non-facial. We go further into the emotional effects of emojis, as well as their impact on spoken communication. We look at the sentiments of emoticons and their situations as a whole, unlike previous emoji sentiment studies. The outcomes of this study reveal that four different emoji types have diverse capabilities for communicating emotion, and that emoji sentiment affects fluctuate depending on valence.

Key Words: Emojis, emoticons, sentiment, emotions, nonverbal communication

1.INTRODUCTION =

Detecting a person's emotional state by examining a text message written by him or her may appear difficult, but it is often necessary because most textual expressions are not only direct employing emotional words, but also derive from the use of emotional words. the interpretation of concepts meanings and the interaction of concepts described in the text message Recognizing the texts emotional content is crucial. Emojis are "digital images that are added to messages in electronic communication," according to one definition. They are frequently used in instant messaging, emails, social network services, and many other kinds of CMC (Computer-Mediated Communication) as effective supplements to nonverbal indications in verbal messages (Lo 2008). (Dresner and Herring 2010). Emojis are reportedly used in about half of Instagram posts (Dimson 2015), and emojis are displacing emoticons (e.g., ;) and :-) on Twitter to become a popular way of portraying things, feelings, concepts, and so on (Pavalanathan and Eisenstein 2015). Emojis are also establishing a new language for the next generation, according to sociology and psychology studies (Alshenqeeti 2016). This research looks at emoji usage from two angles. First, from the perspective of the message sender, We investigate the motivations behind the use of emojis in communication. Second, we investigate the impact of emojis on message feelings from the perspective of message recipients. It is a mode of interaction among people in which they produce,

share, and exchange information and ideas in virtual communities and networks, and it is a terrific medium for examining developments that matter most to a broad audience. Magazines, Internet forums, weblogs, social blogs, micro blogging, wiki, social network, podcasts, images or pictures, video, rating, and social bookmarking are all examples of social media technology. People use social networking sites like Facebook and Gmail to communicate with one another and share their opinions and concerns about various topics. Occasionally, this end user misinterprets the feelings of the first user from whom he received the message. Sentiment analysis is used to determine a speaker's or writer's attitude toward a topic or a document's overall contextual polarity. His or her attitude could be based on his or her judgement or evaluation, affective state (the author's emotional state while writing), or planned emotional message (the emotional effect the author aims to have on the reader). Classifying the polarity of a given text at the document, phrase, or feature/aspect level, whether the conveyed opinion in a document, a sentence, or an entity feature/aspect is positive, negative, or neutral, is a basic task in sentiment analysis. For example, advanced "beyond polarity" sentiment classification examines emotional states including "angry," "sad," and "happy."

Typically, all accessible technologies are limited to working with English-language written texts, which are the most prevalent on social media. There are a few open-source tools that can process French, German, and Spanish texts as well, but reimplementing and combining diverse methodologies is not ideal. Another necessity is the capacity to efficiently analyze both dynamic data streams and static historical datasets. As a counterpoint to these broad requirements, less correctness and completeness of evaluated messages is acceptable. The report describes an example Twitter data collection for the aim of opinion mining. The obtained data is subjected to multilingual sentiment analysis, and the results are briefly explained. The analysis is carried out using a custom-built system that makes use of the AFINN-165, a manually reviewed English word dictionary. This dictionary was translated into different languages with the use of the Google Translate API, which was thoroughly tested throughout the process. It is then feasible to identify whether the sentiment is good, negative, or neutral. The study's findings reveal new information. enable for more widespread use and optimization of the wordlists/tool, resulting in improved future study findings The geospatial analysis of the initial experimental findings reveals an intriguing relationship

between time, location, and sentiment, allowing readers to consider a variety of use scenarios.

RELATED WORK

Previous study on emojis has mostly focused on three research directions: the meanings and sentiments of emoticons, as well as the many ways in which individuals utilise emojis. Instagram's technical report is the first attempt to use a word embedding approach to explore the semantics of emoticons (Dimson 2015). The authors vectorized the emoticons that appeared in Instagram posts and explained them using the semantically closest words to the emojis in the vector space. Eisner et al. have proposed the emoji2vec embedding model. to become familiar with emoji symbols (Eisner et al. 2016). They used the emoji descriptions instead of learning the emoji vectors from social media posts, and they reported higher results on evaluation tasks. Wijeratne et al. created a machine-readable sense inventory for emojis by compiling emoji explanations from a variety of online sources (Wijeratne et al. 2016). Novak et al developed an emoji sentiment vocabulary that included a huge number of emojis (Novak et al. 2015). In this study, participants were asked to classify the sentiment of texts that included at least one emoji. The average scores of all the messages where this emoji appeared were then used to get the sentiment score of that emoji. They found that the majority of emojis are positive, and that the ones that are used the most are more emotionally charged. loaded. Tauch et al. investigated the impact of sentiment on mobile devices. Duplicate emoji notifications on phones (Tauch and Kanjo) 2016). When the number of emojis was increased, they discovered high, the entire message's meaning was unrelated to the content of the text Emoji sentiments and interpretations differ from person to person, according to (Miller et al. 2016) peoples. In the article, the authors reported the most emojis that were read differently. Emojis are used in a variety of ways, which reveals individual variations. Countries are said to have particular emoji preferences (Barbieri et al. 2016), and these choices are thought to reflect the countries' cultural and regional characteristics in numerous ways (Lu et al. 2016).

Intentions of Using Emoticons & Emojis

Because there aren't enough nonverbal cues in CMC, individuals utilise surrogates like emoticons and emojis to fill in the gaps. In the literature, the typical intentions of employing emoticons and emojis have been discussed. One of the most researched uses of emoticons is to express emotion (Lo 2008; Tauch and Kanjo 2016). People often like to utilise emoticons to reinforce their expressions and communicate comedy (Walther and DAddario 2001). (Dresner and Herring 2010). According to Derkes et al. (Derks, Bos, and Von Grumbkow 2008), these three purposes are the most common reasons for utilising emoticons. The authors discussed the functions of emoticons in communicating intimacy in (Derks, Bos, and Von Grumbkow 2007a). Emoticons are said to be used to represent

sarcasm in the same way that face expressions are (Filik et al. 2015). Filik et al. investigated the effects of emoticons on conveying sarcasm in this paper. Another purpose of emojis is to change the tone of a message people appeared to use emojis to make their messages less serious and more friendly y (Walther and DAddario 2001; Derks, Bos, and 103 Von Grumbkow 2007b) (Cramer, de Juan, and Tetreault 2016; Kelly and Watts 2015) discuss the language functions of emojis. It was suggested that emojis were occasionally utilised as word substitutes and to describe contents.

Sentiment Effects of Emojis

Four different groups of workers take part in the polls for four different emoji kinds. Measurement that is repeated The acquired data is initially subjected to ANOVA testing. All of the tests show that the mean sentiment scores of the two groups differ significantly. Emojis and simple spoken phrases in combination to research We test the impact of an emoji on a message. Post by Tukey hoc tests are used to compare the mean sentiment scores of two groups of people. (1) The message must include the emoji, and (2) the state of control (the same message with no emoji). A substantial positive difference of 107 suggests that the emoji improves the mood, whereas a large negative difference shows that the emoji worsens the mood. To investigate the sentiment impacts of duplicate emojis, we compare the mean sentiment scores of two conditions: (1) a single emoji with a message, and (2) duplications of the same emoji with the same message. We focus on two sorts of combinations in particular: Positive emojis with negative emojis, as well as negative emojis with positive emoticons. In order to make these combos, To see which one determines the sentiment, we compare their mean sentiment scores to 4 points (neutral sentiment). Emojis or plain vocal phrases can be used in a combined message. The comparisons are made with a single sample that is one-tailed. t-tests. Take, for example, a simple positive statement combined with a negative emoji. If the combined message's mean sentiment score is much more than 4 points, the total sentiment is positive, implying that the basic message contributes more in terms of emotion. The emoji decides the overall sentiment if the score is much lower than 4 points. If the mean score and 4 points are not significantly different, the message and emoji cancel each other out.

It's also worth noting that the ordinary positive, neutral, and negative verbal messages had mean sentiment ratings of (6.26, 4.20, 1.81), (6.13, 4.15, 1.75), and (6.11, 4.00, 1.55), respectively. In four polls, the average score was (6.44, 4.25, and 1.38)5. This demonstrates both the constancy of employees' scales across surveys and the usefulness of the control circumstances. We talk about increments.

or emoji-induced decreases in sentiment ratings in this. summarizes the findings. The standard deviations and mean values of emotion scores

In terms of mean emotion score, Tukey post hoc tests show that there is no significant difference between the basic positive verbal message and the combinations of the message with five positive emojis. These findings imply that using positive emojis in conjunction with a positive spoken statement does not increase positivity. It also suggests that positive emojis and positive emoticons are not the same thing. According to Walther and DAddario (2001), the latter has an increasing influence on positive verbal communications.

Neutral Message All five positive emojis increase the sentiment score of the plain neutral message. The largest increment is brought by , with a mean increment of 2.04 (SD = 0.14), and the smallest is brought by (M = 1.27, SD = 0.12). **Negative Message** Positive emojis significantly increase the sentiment of the plain negative message. Again, is the most effective emojis for increasing sentiment (M = 1.61, SD = 0.17), and is the least (M = 1.19, SD = 0.14).

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	Meg _{pos}	Meg _{neu}	Meg _{neg}
Emojis _{pos}	No effect	Increasing	Increasing
Emojis _{neu}	Decreasing	No effect	No effect
Emojis _{neg}	Decreasing*	Decreasing	No effect

Three forms of facial emojis have different impacts on three valences of simple spoken messages. Nonfacial emoticons are not included in this table since their sentiment effects on plain texts are inconsistent. The overall attitude of the negative emojis combined with the basic positive speech statement is neutral or negative. Also, compare the sentiment ratings of these combinations with 4 points using five one-sample one-tailed t-tests. The results show that they are all substantially less than 4 points in sentiment. As a result, when happy emojis combined with bad verbal messages transmit less negativity, the total feelings are still unfavourable because of the verbal portion.

Neutral Emojis Positive Message Interestingly, neutral emojis have significant decreasing effects on the sentiment of the plain positive message. Emoji brings the largest decrement (M = -2.11, SD = 0.20), and brings the least (M = -1.19, SD = 0.19). According to our study in intentions, neutral emojis are the most proper to express irony. We suppose that neutral emojis may introduce sarcasm to a plain positive message, and consequently, decrease the positivity. **Neutral Message** It is suggested that neutral emojis do not have significant effects on a neutral message. All five Tukey post hoc tests report no significant difference between a plain neutral message and

combinations of neutral emojis and the message, in terms of mean sentiment score. **Negative Message** Similar to the neutral message, no significant effect is found of neutral emojis on a negative message. Therefore, the decreasing effects of neutral emojis are only observed on a plain positive message.

Negative Emojis Positive Message All five negative emojis significantly decrease the sentiment of a plain positive message, with the largest decrement of (M = -3.18, SD = 0.24), and smallest decrement of (M = -2.32, SD = 0.20). We also compute the overall valences of these combinations. The results show that the sentiment of the combination of and the positive message is significantly lower than 4 points, indicating negative valence.

The sentiment scores of other four combinations have no significant difference from 4 points, indicating neutral valence. The results suggest that negative emojis can either neutralize the sentiment of a positive message resulting in a neutral valence, or turn the overall sentiment to negative. Therefore, negative emojis are more powerful than positive emojis in expressing sentiment, which is consistent with our result in the earlier intention study – peo108 ple are more willing to use negative emojis to express sentiment than positive emojis.

Neutral Message Tukey post hoc tests report that negative emojis also have significant decreasing effects on plain neutral messages, but not as great as on plain positive messages. The largest decrement is brought by (M = -1.97, SD = 0.14), and the smallest by (M = -0.38, SD = 0.14). **Negative Message** Similar to positive emojis on a plain positive message, negative emojis also do not have sentiment effects on a plain negative message. The tests results show that the sentiment scores of these combinations are not significantly different from that of a plain message. **Non-facial Emojis** Our results of positive, neutral, and negative emojis suggest that the sentiment effects of emojis of one type are consistent. However, the sentiment effects on plain messages of non-facial emojis vary from emojis to emojis. Meanwhile, it is also observed that the effects of non-facial emojis, if any, are relatively small (lower than 1 point). **Positive Message** Test results show that two non-facial emojis have increasing sentiment effects on a plain positive message, while increment are both relatively small. These two are (M = 0.47, SD = 0.10), and (M = 0.49, SD = 0.08).

The remaining three emojis are reported having no significant sentiment effects on a plain message. **Neutral Message** Except for , all non-facial emojis are reported significantly increasing the sentiment of a plain neutral message. Again, the increments are relatively small, with the largest brought by (M = 0.93, SD = 0.11), and smallest brought by (M = 0.71, SD = 0.09). Emoji does not significantly affect the sentiment in this case. **Negative Message** All five Tukey post hoc tests report that adding non-facial emojis to the plain negative message does not result in significant differences. Therefore, non-facial emojis do not affect the sentiment of a negative message. **Duplicate Emojis** Different from the conclusion reported in (Tauch and Kanjo 2016), our results suggest that, in most cases, duplicating do not make significant differences over single emojis, in terms of sentiment score. Under all circumstances, the usage of duplicate positive and neutral emojis do not increase or decrease sentiment scores. For negative emojis, we observe that

the duplications of two emojis convey more negativity, but only when coupled with the plain negative messages. The decreasing effects are relatively small, and these two negative emojis are ($M = -0.39$, $SD = 0.09$), and ($M = -0.32$, $SD = 0.06$). The duplications of non-facial are reported expressing more positivity than single emoji only in two cases, both coupled with the plain positive message. The duplication of are more positive than its single version ($M = 0.45$, $SD = 0.08$), so does the duplication of ($M = 0.31$, $SD = 0.06$). It is suggested that duplications of emojis only enhance the sentiment under limited circumstances, and the enhancements are relatively small.

Charts

3. CONCLUSIONS

We analyze the use of emojis in messages from the viewpoints of both message senders and recipients in this paper. To examine the acquired data, two user studies are created, and statistical hypothesis testing is performed. From the standpoint of senders, we concentrate on the reasons for employing emojis. We found that conveying feeling, enhancing expressiveness, and altering tone are the most common aims. Furthermore, our findings show minor distinctions across emoji types, such as the usage of negative emojis to communicate sentiment rather than positive emojis, and the use of neutral emojis to express sarcasm. From the standpoint of the message receiver, we investigate how they feel about the emotion represented by emojis. From the standpoint of the message recipient, we investigate how they feel about the emotion represented by emojis. Rather than segregating emoticons and verbal messages, we consider them as one. as a whole, these two parts Our findings reveal the disparity between the two groups. Emoji emotion effects: good emoticons have no effect on the sentiment of others. Negative verb messages do not have the same feeling as straightforward positive verb messages. Emojis have an impact on the tone of basic negative messages. In Furthermore, the findings imply that using multiple emojis does not convey more intense emotion than using a single emoji. in the majority of cases Our research contributes to a better understanding of the situation. use of emojis, and provide further light on this rapidly growing trend. Nonverbal cue surrogates are a common sort of nonverbal cue in communication.

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REFERENCES

1. Alshenqeeti, H. 2016. Are emojis creating a new or old visual language for new generations? a socio-semiotic study. *Advances in Language and Literary Studies* 7(6):56–69. Cardelli, L., Pierce,
2. Christos Baziotis, Athanasios Nikolaos, Pinelopi Papalampidi, Athanasia Kolovou, Georgios Paraskevopoulos, Nikolaos Ellinas, and Alexandros Potamianos. 2018. Ntua-slp at semeval-2018 task 3: Tracking ironic tweets using ensembles of word and character level attentive rnns. In *Proceedings of The 12th International Workshop on Semantic Evaluation (SemEval-2018)*, pages 613–621. Association for Computational Linguistics.

3. Ankush Chatterjee, Kedhar Nath Narahari, Meghana Joshi, and Puneet Agrawal. 2019. Semeval-2019 task 3: Emocontext: Contextual emotion detection in text. In *Proceedings of The 13th International Workshop on Semantic Evaluation (SemEval-2019)*, Minneapolis, Minnesota
4. Miller, H.; Thebault-Spieker, J.; Chang, S.; Johnson, I.; Terveen, L.; and Hecht, B. 2016. blissfully happy or ready to fight: Varying interpretations of emoji. *ICWSM16*.
5. Barbieri, F.; Kruszewski, G.; Ronzano, F.; and Saggion, H. 2016. How cosmopolitan are emojis?: Exploring emojis usage and meaning over different languages with distributional semantics. In *Proceedings of the 2016 ACM on Multimedia Conference*, 531–535. ACM.
6. Cramer, H.; de Juan, P.; and Tetreault, J. 2016. Senderintended functions of emojis in us messaging. In *Proceedings of the 18th International Conference on Human Computer Interaction with Mobile Devices and Services*, 504–509. ACM.
7. Wijeratne, S.; Balasuriya, L.; Sheth, A.; and Doran, D. 2016. Emojinet: Building a machine readable sense inventory for emoji. In *International Conference on Social Informatics*, 527–541. Springer.
8. Venkatesh Duppada, Royal Jain, and Sushant Hiray. 2018. Seernet at semeval-2018 task 1: Domain adaptation for affect in tweets. In *Proceedings of the 12th International Workshop on Semantic Evaluation (SemEval-2018)*, pages 18–23. Association for Computational Linguistics.