Human-annotated dataset for social media sentiment analysis for Albanian language

Fatbardh Kadriu, Doruntina Murtezaj, Fatbardh Gashi, Lule Ahmedì, Arianit Kurti, Zenun Kastrati*

*University of Prishtina, Prishtina 10000, Kosovo
Linnaeus University, Växjö 351 95, Sweden

Article history:
Received 25 January 2022
Revised 22 June 2022
Accepted 27 June 2022
Available online 2 July 2022

Keywords:
Sentiment analysis
Machine/deep learning
Affective computing
NLP
Text classification

Social media was a heavily used platform by people in different countries to express their opinions about different crises, especially during the Covid-19 pandemics. This dataset is created through collecting people’s comments in the news items on the official Facebook site of the National Institute of Public Health of Kosovo. The dataset contains a total of 10,132 comments that are human-annotated in the Albanian language as a low-resource language. The dataset was collected from March 12, 2020, and this coincides with the emergence of the first confirmed Covid-19 case in Kosovo until August 31, 2020, when the second wave started. Due to the scarcity of labeled data for low-resource languages, the dataset can be used by the research community in the field of machine learning, information retrieval, affective computing, as well as by the public agencies and decision makers.

© 2022 The Author(s). Published by Elsevier Inc.
This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)

https://doi.org/10.1016/j.dib.2022.108436
2352-3409/© 2022 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)
Specifications Table

| Subject | Computer Science |
|---------|------------------|
| Specific subject area | Machine Learning, Natural Language Processing, Text Classification, eLearning, Affective Computing, Sentiment Analysis, Opinion Mining |
| Type of data | Table in csv format |
| How data were acquired | Dataset was collected and created using Facebook comments gathered from the National Institute of Public Health of Kosovo (NIPHK). |
| Data format | Raw and filtered |
| Description of data collection | Facebook comments between March 12, 2020 - August 31, 2020 collected via www.commentexporter.com from the site of National Institute of Public Health of Kosovo (NIPHK). Furthermore, the data is annotated into positive, neutral and negative sentiment by three researchers. |
| Data source location | Facebook site of National Institute of Public Health of Kosovo. |
| Data accessibility | Repository name: Mendeley Data repository Data identification number: 10.17632/bj2gyvgvxy.4 Direct URL to data: https://data.mendeley.com/datasets/bj2gyvgvxy/4 |
| Related research article | Kastrati Z, Ahmedi L, Kurti A, Kadriu F, Murtezaj D, Gashi F. A Deep Learning Sentiment Analyser for Social Media Comments in Low-Resource Languages. Electronics. 2021; 10(10):1133. https://doi.org/10.3390/electronics10101133 |

Value of the Data

- This dataset is useful for the research community for two reasons: (1) it is a dataset for sentiment analysis of social media comments in Albanian language that would push forward the research in the field of sentiment analysis for low-resource languages; (2) this dataset could serve as a standard benchmark for testing performance of the existing and new machine learning methods and techniques as it is curated and human annotated. By sharing the data, we also increase the transparency and research utilization through enabling the reproduction of the results [1].

- The research community in the fields of machine learning, information retrieval, affective computing, education can benefit from these data by using them in various research tasks such as: (multilingual) sentiment analysis, opinion mining, performance analysis of deep/machine learning models and techniques. By making these data open we join the global movement that is not only advancing science and scientific communication but also transforming modern society and how decisions are made [2].

- Another possible value of these data is that they could be used by public agencies and decision makers to prevent the distribution of fake news in social media during crisis situations such as the current Covid-19 pandemics. This becomes especially important in the emerging economies where the scientific infrastructure is not very developed [3]. Thus, these kinds of curated scientific datasets can contribute to policy making as well.

1. Data Description

Research on social media sentiment analysis for the English language has achieved significant results already [4–6], considered as critical for different online social platforms and natural languages towards identifying online discourse, like are reactions from different cultures to the Coronavirus actions taken by different countries. Work on other languages concerning social media sentiment analysis is also growing, such as on German [7], Swedish [8], Urdu [9] or multilingual social media posts [10].

On the other hand, sentiment analysis for the Albanian language stands behind even some other low resource languages, with only few works on sentiment analysis (opinion mining) [11,12], emotion detection [13] and hate speech [14]. As deficiency of an Albanian language larger corpus of data is what these works characterize, being a prerequisite to develop a high-performance sentiment classifier for opinion mining, the dataset presented in this article aims to exactly address that low resource drawback typical for low-resource languages. Only a very
Table 1
Description of the attributes constituting the dataset.

| Attribute          | Description                                                                 |
|--------------------|-----------------------------------------------------------------------------|
| Id                 | unique identification number for each comment                              |
| Comment            | the content of the comment                                                  |
| Like               | the number of Facebook reactions to the relevant comment                   |
| Comment’s timestamp| the day, date and time of the comment                                       |
| Post’s timestamp   | the day, date and time of the post to which the comment belongs             |
| #Deaths            | number of persons who have died due to the pandemic in the given day        |
| #Infected          | number of infected persons with Covid-19                                    |
| #Healed            | number of people that have recovered from Covid-19                         |
| Annot 1            | annotation of the comment by the annotator 1                               |
| Annot 2            | annotation of the comment by the annotator 2                               |
| Annot 3            | annotation of the comment by the annotator 3                               |
| Final annotation   | the final assessment for the sentiment of the comment                       |

Table 2
Examples of neutral, positive and negative sentiments [2].

| Comment (English translation)                  | Sentiment |
|------------------------------------------------|------------|
| Do te thot Pejaë edhe sonte spaska asnjë rast (It means that also tonight Peja does not have any new case) | Neutral (0)|
| Bravo ekipet e IKSHP per punën e shkëlqyshme dhe perkushtimin! (Well done the NIPHK teams for the great job and dedication!) | Positive (1)|
| Keni kalu tash ne monotonji, te pa arsyshem jeni tash. (You have now turned into monotony, you are now unreasonable.) | Negative (2)|

* Peja is a city in Kosovo.

A recent study [14] has contributed with the so-called Shaj dataset, an annotated Albanian dataset of size range similar to our dataset, with 11874 comments from various social media platforms, but annotated for hate and offensive speech.

The Dataset presented in this article comprises comments collected from the official Facebook page of the NIPHK Institute for a period of 6 months, from March 12 till August 31, 2020. On March 12, the first case of Covid-19 was confirmed in Kosovo. Comments were in Albanian language and are retrieved using a tool called Comment Exporter[1]. This work aims to identify and extract the opinions and attitudes of Kosovo citizens expressed on Facebook about the Covid-19 pandemics by manually annotating comments according to their sentiment, such as positive, negative, and neutral. This dataset is anonymized according to the Facebook Platform Policy for Developers [15] and contains a total of 10,132 comments along with 12 attributes. The names of all attributes of the dataset and their respective descriptions are presented in Table 1. The data discussed in this article are related to the research article entitled “A Deep Learning Sentiment Analyser for Social Media Comments in Low-Resource Languages” [16]. The dataset and its supplementary files are hosted in the Mendeley Data repository [17].

Each comment in the dataset is assessed regarding the sentiment by three researchers. Neutral comments are marked with 0, positive comments are marked with 1 and negative comments are marked with 2. The comment with the most engagement has 287 impressions including likes and emojis.

On average each news post in the National Institute of Public Health of Kosovo (NIPHK) Facebook site generated 59.25 comments. Table 2 shows examples of neutral, positive and negative comments annotated by the researchers.

---

[1] www.commentexporter.com.
The opinions of the people have changed over time, and this can be observed from Fig. 1 that shows the daily trend of the sentiments. This figure illustrates that the number of comments increases continuously starting from dozens of them, when the first cases of Covid-19 occurred and reached the peak during July. Then a noticeable decrease of the number of comments, in general, is shown during August. It should be noted that during all these dates the neutral sentiment dominates, compared to the negative and positive ones.

The number of comments for each sentiment class and their respective percentages are given in Table 3. The neutral comments dominate, whereas the positive comments are less represented.

The most frequent words in the dataset are shown in Fig. 2, generated by word cloud in Python. Only words with 5 or more characters are included.

The ten most frequent words occurring in the dataset are presented in Table 4. As text processing features such as stemming and lemmatization are not supported by tools for processing...
Table 4
Most frequent words in the dataset.

| No. | Word  | English translation | Frequency |
|-----|-------|---------------------|-----------|
| 1.  | raste | cases               | 456       |
| 2.  | krejt | all                 | 401       |
| 3.  | virus | virus               | 395       |
| 4.  | shume | many                | 374       |
| 5.  | test  | test                | 353       |
| 6.  | covid | covid               | 292       |
| 7.  | vetem | only                | 277       |
| 8.  | virus | virus               | 252       |
| 9.  | rastet| cases               | 226       |
| 10. | maska | masks               | 222       |

Table 5
The Pearson’s correlation between the three annotators [2].

|                | Annotator 1 | Annotator 2 | Annotator 3 |
|----------------|-------------|-------------|-------------|
| Annotator 1    | 1.00        | 0.57        | 0.62        |
| Annotator 2    | 0.57        | 1.00        | 0.46        |
| Annotator 3    | 0.62        | 0.46        | 1.00        |

Table 6
Fleiss’s kappa values.

| k          | Interpretation          |
|------------|-------------------------|
| <-0        | Poor agreement          |
| 0.01–0.20  | Slight agreement        |
| 0.21–0.40  | Fair agreement          |
| 0.41–0.60  | Moderate agreement      |
| 0.61–0.80  | Substantial agreement   |
| 0.81–1.00  | Almost perfect agreement|

Table 7
Number of comments across months.

| Sentiment/Month | March | April | May | June | July | August | Total |
|-----------------|-------|-------|-----|------|------|--------|-------|
| Neutral         | 228   | 565   | 816 | 1458 | 1477 | 907    | 5451  |
| Positive        | 105   | 401   | 441 | 215  | 396  | 213    | 1771  |
| Negative        | 54    | 205   | 349 | 749  | 1105 | 448    | 2910  |
| Total           | 387   | 1171  | 1606| 2422 | 2978 | 1568   | 10132 |

...the Albanian language, then words with the same meaning can appear multiple times in different constructs (such as: raste - rastet, virus - virusi).

To assess the accuracy of the manually labeled data, we used a quality assurance method called Annotation Redundancy with Targeted Quality Assurance [18]. Three annotators have annotated the same data samples independently and an inter-annotator disagreement is calculated using Pearson correlation. Correlation values between the three annotators are shown in Table 5. The annotators 1 and 3 have the strongest agreement with a correlation of 0.62.

In addition to Pearson correlation, we have calculated the reliability of the agreement between the annotators using Fleiss’s Kappa statistical measure.

Table 6 shows the ranks which determine the type of agreements between annotators. Fleiss’s Kappa coefficient for our three annotators is 0.60, which is considered a moderate agreement.

The number of comments in each sentiment class, distributed over months is shown in Table 7. The maximum number of neutral and negative comments is reported in July. The highest number of positive comments is in May.
2. Experimental Design, Materials and Methods

The workflow for creating the dataset is depicted in Fig. 3. The initial step is extraction of the comments from Facebook using the Comment Exporter tool. The entry point of the Comment Exporter tool is the Facebook post URL, while the output is an Excel file containing all the comments from the given post. In addition, the Excel file is enriched with four other attributes and metadata related to the Facebook post.

In the second step, five other attributes related to the Covid-19 statistics are added by reading the content of the Facebook post. The third step entails the merge of all Excel files for each Facebook post into a single Excel file. Next the aggregated data set has been processed by anonymizing and removing duplicates as well as profanity language. During the fifth step, three researchers have independently assessed the sentiment of the comments in the dataset. Assessment has been done using three sentiment polarities: positive, negative, and neutral. The final sentiment of each comment is assigned using a majority voting scheme. This step finalized our dataset as a CSV file.

The dataset covers comments from a sole social media platform, i.e. Facebook, over several months timespan. It could in the future be extended to contain comments from other social media platforms like Twitter, Instagram, and so forth, spanning longer period of time. Future research using the dataset presented in this article might extend to other domains like detecting emotions or other multi-class text mining tasks (e.g., review of items in the scale 1 to 10) in the Albanian Language.

Ethics Statements

Data has been collected according to the data owner terms of service. The dataset described in this article is completely anonymized and does not contain any personal data, and thus we are complying with the regulations provided by the platform owner. This project required that we balance our research design with the protection of personal data while aiming to generate new valuable knowledge for the greater societal good [19]. Consequently, we have chosen our approach to protect the confidentiality of the personal data completely and thoroughly, while still leveraging the anonymised data for generating research results of a higher societal value.
Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

CRediT Author Statement

Fatbardh Kadriu: Methodology, Software, Writing – original draft; Doruntina Murtezaj: Software, Writing – original draft; Fatbardh Gashi: Software, Writing – original draft; Lule Ahmed: Conceptualization, Methodology, Writing – original draft; Arianit Kurti: Conceptualization, Validation, Writing – original draft, Supervision.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi: 10.1016/j.dib.2022.108436.

References

[1] Q.H. Vuong, Reform retractions to make them more transparent, Nature 582 (7811) (2020).
[2] P. Huston, V.L. Edge, E. Bernier, Open science/open data: Reaping the benefits of open data in public health, Can. Commun. Dis. Rep. 45 (11) (2019) 252.
[3] Q.H. Vuong, The (ir)rational consideration of the cost of science in transition economies, Nat. Hum. Behav. 2 (1) (2018) 5–5.
[4] A.S. Imran, S.M. Daudpota, Z. Kastrati, R. Batra, Cross-cultural polarity and emotion detection using sentiment analysis and deep learning on COVID-19 related tweets, IEEE Access 8 (2020) 181074–181090.
[5] H. Krishnan, M.S. Elayidom, T. Santhanakrishnan, A comprehensive survey on sentiment analysis in twitter data, Int. J. Distrib. Syst. Technol. (IJDST) 13 (5) (2022) 1–22.
[6] L. Yue, W. Chen, X. Li, W. Zuo, M. Yin, A survey of sentiment analysis in social media, Knowl. Inf. Syst. 60 (2) (2019) 617–663.
[7] M. Cieliebak, J.M. Deriu, D. Egger, F. Uzdilli, A twitter corpus and benchmark resources for german sentiment analysis, in: Proceedings of the 5th International Workshop on Natural Language Processing for Social Media, Boston MA, USA, Association for Computational Linguistics, 2017, pp. 45–51. 11 December 2017.
[8] N. Palm, Sentiment Classification of Swedish Twitter Data, Master’s Thesis, Uppsala University, 2019.
[9] R. Batra, Z. Kastrati, A.S. Imran, S.M. Daudpota, A. Ghafoor, A large-scale tweet dataset for urdu text sentiment analysis, Preprints 2021 (2021) 2021030572.
[10] S.L. Lo, E. Cambria, R. Chiong, D. Corinforth, Multilingual sentiment analysis: from formal to informal and scarce resource languages, Artif. Intell. Rev. 48 (4) (2017) 499–527.
[11] M. Biba, M. Mane, Sentiment analysis through machine learning: an experimental evaluation for Albanian, in: Recent Advances in Intelligent Informatics, Springer, Cham, 2014, pp. 195–203.
[12] N. Kote, M. Biba, E. Trandafili, An experimental evaluation of algorithms for opinion mining in multi-domain corpus in Albanian, in: Proceedings of the International Symposium on Methodologies for Intelligent Systems, Springer, Cham, 2018, pp. 439–447.
[13] M.P. Skenduli, M. Biba, C. Loglisci, M. Ceci, D. Malerba, User-emotion detection through sentence-based classification using deep learning: a case-study with microblogs in Albanian, in: Proceedings of the International Symposium on Methodologies for Intelligent Systems, Springer, Cham, 2018, pp. 258–267.
[14] Nurce, E., Keci, J., & Derczynski, L. (2021). Detecting abusive Albanian. arXiv preprint arXiv:2107.13592.
[15] Facebook for Developer - Platform Policy https://developers.facebook.com/policy/. Accessed on 03.06.2021.
[16] Z Kastrati, L Ahmedi, A Kurti, F Kadriu, D Murtezaj, F Gashi, A deep learning sentiment analyser for social media comments in low-resource languages. Electronics 10 (10) (2021) 1133. doi: 10.3390/electronics10101133.
[17] F. Kadriu, D. Murtezaj, F. Gashi, L. Ahmedi, A. Kurti, Z. Kastrati, Dataset of manually annotated social media comments in albanian language for sentiment analysis, Mendeley Data (2022) V4, doi:10.17632/bj2gyvkgvx.4.

[18] T. Tseng, A. Stent, D. Maida, “Best practices for managing data annotation projects”, ArXiv (2020) abs/2009.11654.

[19] A. Bechmann, J.Y. Kim, Big data: a focus on social media research dilemmas, Handb. Res. Ethics Sci. Integr. (2020) 427–444.