

Framing Internet Memes using Crowdsourcing

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Context

Internet memes (IM) are pieces of creative media that typically include textual and visual elements that people create and share online to describe a situation using another existing one to which they relate.

As potential vectors for misinformation [17] and political propaganda [20], but also as a novel digital medium for expressing complex and relatable ideas [5], IMs have been of interest to cognitive linguistics [5], psychology [13], and neuroscience [19]. Recent computer science research on IMs focuses on analyzing their spread (i.e., “virality”) [18,21,16] or their relation to hate speech in fringe communities [14,15,22].

However, current machine learning models cannot dissect or understand what an internet meme means, because most of the datasets focus on specific use cases (e.g., hate-speech[4], emotion recognition [6], and offensive content [7]), instead of codifying its meaning. This information exists, but it is scattered in different places (e.g, KnowYourMems, imgflip, Reddit) and it’s written in natural language.

In the context of frame semantics [1], frames are descriptions of a type of event, relation, or entity and the participants in it. For example, the concept of cooking typically involves a person doing the cooking (Cook), the food that is to be cooked (Food), something to hold the food while cooking (Container), and a source of heat (Heating_instrument).

Semantic frames are the ideal solution to describe the meaning of a meme because they allow us to describe a meme in a machine-readable way.

Objectives

Currently, there are no automatic methods (e.g., machine learning models) to detect the semantic frame concepts from memes and create such annotations. and aligning the internet memes to semantic frames can be tedious and complex work for a single person.

However, crowdsourcing - i.e., involving a large group of participants to perform a task - has been successfully used in the past to annotate large quantities of data in different domains [8, 10, 11, 12].

On the other hand, crowdsourcing has its challenges. Crowdworkers are typically non-experts, and often are motivated just by the monetary results - and they tend to finish their task as fast as possible to receive the reward.

The objective of this work is to design a crowdsourcing application to allow crowd workers to annotate internet memes with the concept of semantic frames. The idea is to make the

worker analyze the textual description of a meme in KnowYourMeme and highlight the part of the text that corresponds to a semantic frame (as described in FrameNet2)

The designed application has to consider all the problems related to the involvement of the crowd in the annotation task - such as: identifying low-quality responses, making the task more engaging, etc.

Methodology

- Familiarize yourself with the concepts related to crowdsourcing [2, 8, 10, 11, 12], the internet meme knowledge graph [3], and framenet [1].
- Familiarize yourself with the crowdsourcing platform <https://www.prolific.co/>
- Design the crowdsourcing application in terms of the type(s) of task the worker will need to perform, quality check(s), and how to aggregate the results (e.g., what happens when multiple workers disagree).
- Run the crowdsourcing application and collect the results. According to the state of the works, we will decide if it's the case to just run a pilot study or to use the real platform.
- Define evaluation metrics (and/or evaluation tasks) to quantify the quality of the framing of the memes, and apply them to the results obtained from the crowd

References

[1] Fillmore, C.J., Baker, C.F.: A frames approach to semantic analysis. In: The Oxford handbook of linguistic analysis. pp. 313–339. Oxford University Press (2012)

[2] Bozzon, A., Brambilla, M., Ceri, S., Mauri, A., & Volonterio, R. (2014). Pattern-based specification of crowdsourcing applications. In Web Engineering: 14th International Conference, ICWE 2014, Toulouse, France, July 1-4, 2014. Proceedings 14 (pp. 218-235). Springer International Publishing.

[3] Tommasini, R., Ilievski, F., & Wijesiriwardene, T. (2023, May). IMKG: The Internet Meme Knowledge Graph. In European Semantic Web Conference (pp. 354-371). Cham: Springer Nature Switzerland.

[5] Dancygier, B., Vandelanotte, L.: Internet memes as multimodal constructions. *Cognitive Linguistics* 28(3), 1515–2017–0074 (2017)

[6] Memotion7k. "SemEval - 2020 Task 8: Memotion Analysis-the Visuo-Lingual Metaphor!". In *SemEval 2020*. 759–773.

[7] MultiOFF. "Multimodal meme dataset (MultiOFF) for identifying offensive content in image and text". In *Proceedings of the second workshop on trolling, aggression and cyberbullying*. 32–41. 2020

[8] Deng, J., Dong, W., Socher, R., Li, L. J., Li, K., & Fei-Fei, L. (2009, June). Imagenet: A large-scale hierarchical image database. In *2009 IEEE conference on computer vision and pattern recognition* (pp. 248-255). Ieee.

- [11] Oosterman, J., Nottamkandath, A., Dijkshoorn, C., Bozzon, A., Houben, G. J., & Aroyo, L. (2014, June). Crowdsourcing knowledge-intensive tasks in cultural heritage. In Proceedings of the 2014 ACM conference on Web science (pp. 267-268).
- [13] Johann, M., Bülöw, L.: One does not simply create a meme: Conditions for the diffusion of internet memes. *International Journal of Communication* 13(0) (2019)
- [14] Kiela, D., Firooz, H., Mohan, A., Goswami, V., Singh, A., Ringshia, P., Testuggine, D.: The hateful memes challenge: Detecting hate speech in multimodal memes (2021)
- [15] Kirk, H.R., Jun, Y., Rauba, P., Wachtel, G., Li, R., Bai, X., Broestl, N., Doff-Sotta, M., Shtedritski, A., Asano, Y.M.: Memes in the wild: Assessing the generalizability of the hateful memes challenge dataset. *arXiv preprint arXiv:2107.04313* (2021)
- [16] Ling, C., AbuHilal, I., Blackburn, J., De Cristofaro, E., Zannettou, S., Stringhini, G.: Dissecting the meme magic: Understanding indicators of virality in image memes. *Proceedings of the ACM on Human-Computer Interaction (CSCW)* (2021)
- [17] Lynch, M.P.: Memes, misinformation, and political meaning. *The Southern Journal of Philosophy* 60(1), 38–56 (2022)
- [18] Marino, G.: Semiotics of spreadability: A systematic approach to internet memes and virality (2015)
- [19] McNamara: Can we measure memes? *Frontiers in evolutionary neuroscience* (2011)
- [20] Niebuurt, J.T.: Internet memes: leaflet propaganda of the digital age. *Frontiers in Communication* 5, 547065 (2021)
- [21] Taecharungroj, V., Nueangjamnong, P.: The effect of humour on virality: The study of internet memes on social media. In: 7th International Forum on Public Relations and Advertising Media Impacts on Culture and Social Communication. Bangkok, August (2014)
- [22] Fersini, E., Gasparini, F., Rizzi, G., Saibene, A., Chulvi, B., Rosso, P., Lees, A., Sorensen, J.: Semeval-2022 task 5: Multimedia automatic misogyny identification. In: Proceedings of the 16th International Workshop on Semantic Evaluation (SemEval-2022). pp. 533–549 (2022)