

Abstract

Policymakers and citizens intensively use social media for expressing their opinions about public debates nowadays. Furthermore, if on the one hand web interactions allow users to access to diverse viewpoints, on the other hand they do not resolve conflicts, but they often contribute to further polarize the debate. Social media platforms such as Twitter make available to researchers a huge amount of user-generated contents. To explore the public opinion and to investigate how individuals communicate with each other is now possible as never before. Interest in automatically detecting the opinions expressed in social media texts has grown significantly in the recent years. Natural language processing methods based on machine learning algorithms or deep learning approaches have been proposed for detecting users' opinion and stance towards a specific topic (person, organization, movement, policy, etc.) discussed in social media. Moreover, several works suggested that ideological segregation exists in social media despite they potentially expose users to a larger range of different point of views. In this thesis, we address the problem of stance detection in social media focusing on polarized political debates in Twitter. Stance detection consists in automatically determine whether the author of a post is in favor or against a target of interest, or whether the opinion toward the given target can not be inferred. We deal with political topics such as electoral events (e.g., political elections or referendums) and consequently the targets of interest are both politicians and referendums. We also explore the communications which take place in these polarized debates shedding some light on dynamics of communications among people having concordant or contrasting opinions, particularly focusing on observing opinions' shifting. We propose machine learning models for addressing stance detection as a classification problem. We explore features based on the textual content of the tweet, but also features based on contextual information that do not emerge directly from the text. Using the English benchmark dataset proposed for the shared tasks on stance detection held at SemEval 2016, we explore the contribution on stance detection of investigating the relations among the target of interest and the other entities involved in the debate. We particularly focus on the 2016 United States presidential primaries for the Democratic and Republican parties main candidates. Results outperform the best ones obtained by the teams participating in the task. Our model takes advantage of knowing the relations among the target of interest and the involved entities for inferring the stance even when the target is not directly mentioned. Participating to the "Stance and Gender Detection in Tweets on Catalan Independence" shared task held at IberEval 2017, we proposed other textual and contextual based features for detecting stance on Spanish and Catalan tweets. Our system (iTACOS) ranked in as the first position among ten participating teams for both languages at the stance detection sub-task. With the main aim of facing stance detection

in a multilingual perspective and having an homogeneous setting for multi-language comparisons, we collected tweets in French and Italian also. We decided to select topics which are very similar to those of the benchmarks released by SemEval 2016 and IberEval 2017 for the purpose of making the novel datasets more comparable with them. The French dataset (E-FRA) consists in tweets about the run-off of the French presidential elections held in 2017. We gathered Italian tweets about the Italian Constitutional Referendum for creating the Italian corpus (R-ITA). The multilingual extension of our stance detection model (multiTACOS) shows that stance detection is affected by the different styles used by users for communicating stance towards target of different types (persons or referendum) more than the used language. With the aim of retrieving contextual information about the social network of Twitter’s users (the shared tasks usually release only the content of the tweet leaving aside information about the tweeter), we created other two datasets, one in English and one in Italian, respectively about the Brexit (TW-BREXIT) and the Italian Constitutional referendum (ConRef-STANCE-ita). In both the case studies, we show that users tend to aggregate themselves in like-minded groups. For this reason, the model takes advantage of knowing the online social community the tweeter belongs to and outperforms the results obtained by using only features based on the content of the post. Furthermore, experiments show that users use different type of communication depending on the level of agreement with the interlocutor’s opinion, i.e., friendship, retweets, and quote relations are more common among like-minded users, while replies are often used for interacting with users having different stances. Addressing stance detection in a diachronic perspective, we also observe both opinion shifting and a mitigation of the debate towards an unaligned position after the outcome of the vote. Then, we observe that accessing to a larger diversity of point of views can influence the propensity to change the personal opinion. We finally show that the usefulness of features based on a graph representation of a domain of interest is not limited to stance detection, but can be applied to different scenarios. Proposing another classification task that performs talent identification in sport, particularly focusing on the case study of table tennis, we show that networks metrics based on centrality are strong signal for talent and can be used for training a machine learning algorithm model for this task too.