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An Intelligent Approach for Extremism Detection Through Social Networks (For the English Language).

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Abstract

Recent research indicates that extremist groups are excruciating using most social networking platforms on the Internet such as Twitter, Facebook, YouTube,.....etc. to spread their ideologies and beliefs via inciting extremism and recruiting members through creating virtual online groups [1][2]. Social networking online extremism have attracted of artificial intelligence approaches, Machine Learning to classify and predict online extremism [3]. Several algorithms, techniques and approaches have been studied in the literature to counter, combat extremism and predict relevant events (table:01). In the present paper, we will highlight the problem of our research case study, the objectives to be achieved and the proposed research plan. It is within this category of applications and in the continuity of previous work that we wish to place our position, Develop the necessary features to identify negative and positive evaluations on the social web. Specifically, we are interested in characterizing the words, describing the extreme words and expressions that are expressed from a collection of comments and tweets on social networks on the web.

Keywords: Extremism, Social Networks, Machine Learning, Classification, Features.

1. Approach

Predicting extremism in social networks via the Internet is a difficult task. Our work based on the exploitation of many methods of Machine Learning, which is consisted in carrying out a classification algorithm, to predict violence, political and intellectual extremism. For this, we are planning to model our own set of features from English language and from the publication of tweets on social networking.

1.1. Linear Support Vector Classification

This class is based on both multiclass support handled according to a one-vs-the-rest scheme and dense and sparse input. Should scale better to large numbers of samples. Similar to SVC with parameter kernel='linear', but implemented in terms of liblinear rather than libsvm, [4].

1.2. Random forest classifier

Random forest is a meta estimator that fits a number of decision tree classifiers on various sub-samples of the dataset. Features are always used randomly in all sub-samples [5].

1.3. Logistic Regression (aka logit, MaxEnt) classifier

That algorithm applied by default; it can handle both dense and sparse input. If the 'multi_class' option is set to 'ovr' the training algorithm uses the one-vs-rest (OvR) scheme, and uses the cross-entropy loss if the 'multi_class' option is set to 'multinomial' [6].

1.4. Naive Bayes classifier for multinomial models

The multinomial Naive Bayes classifier is an algorithm that aligns with a separate features classification (e.g., word counts for text classification). It usually requires integer feature counts [7].

1.5. Convolutional neural network

In machine learning, a convolutional neural network or convolutional neural network is a type of acyclic artificial neural network. Have broad applications in image and video recognition, recommendation systems and natural language processing [8].

We are going to create our own proposed system where we are collecting and labelling a data set from social media, and then we will apply a set of machine learning algorithms and / or deep learning, for evaluating our proposed system, and trying to analysing the existed data.

2. Obstacles encountered

- Difficulty finding the data set, especially for political and intellectual extremism.
- The adoption of the English language as universal language in research area makes it difficult task to know the ideologies from social media users.

3. Related work

A table that includes some literature related our work:

| N | Title of article or research | Name of the researcher (s) | Year | Most important elements research |
|----|--|--------------------------------------|------|--|
| 01 | Applying social media intelligence for predicting and identifying on-line radicalization and civil unrest oriented threats | Swati Agarwal and Dr. Ashish Sureka. | 2015 | Statistics of literature that use social media platforms as data source for conducting experiments. Each dimension is further classified in sub-categories and have their properties associated with them. These dimensions are as follows(Data Source, Techniques, Features, Evaluation, Type of Analysis, Language, Genre, Region (only for online radicalization)) |
| 02 | Using machine learning to identify jihadist messages on twitter | Enghin Omer | 2015 | Presented an approach to classify tweets as having root content or not. Using three different types of features: style-based features, time-based features and emotion-based features. Results of experiments have shown that together these features perform better each one separately. Use three different compilations: SVM, Naive Bayes, and AdaBoost. His results indicate that ranking is a viable way to discover radical content on social media, especially on Twitter. |
| 03 | Detection and Analysis of Online Extremist Communities | Matthew Curran Benigni | 2017 | Simulating OSN Data: Synthetic Graph Generation Through Modularity-Based Recursive Stochastic Block Modelling. Simulation Approach <ul style="list-style-type: none"> • Community structure while maintaining the graph's topology. Such a method would enable researchers to test algorithms for their ability to detect changes in subgraph modularity where the degree of change is known. • Use Louvain grouping to discover latent community structure within M Blondel et al. • Alter community structure in M in a manner where stylistic qualities of the graph are retained. |
| 05 | Contextual Semantics for Radicalisation Detection on Twitter. | Miriam Fernandez and Harith Alan | 2018 | Building classifiers based on n-grams and test them against classifiers that incorporate as additional features the extracted contextual information. To train these classifiers we make use of a dataset of posts $C = (\text{pro-ISIS}, \text{non pro-ISIS})$. <ul style="list-style-type: none"> ○ Show how different contextual information for the same extremism , Terms in the two data sets ○ The workbooks he created to test this hypothesis outperform contextual information. |
| 06 | Detection and classification of social media-based extremist affiliations using sentiment analysis techniques | Shakeel Ahmad and all | 2019 | The method implements and evaluates the performance of long short-term memory with Convolutional Neural Network (CNN) model to identify tweets/reviews containing content with extremist clues. Train the neural classifier, for the classification of extremist affiliation content. |

Table 01: Some literature related to our work.

4. Graphical abstract

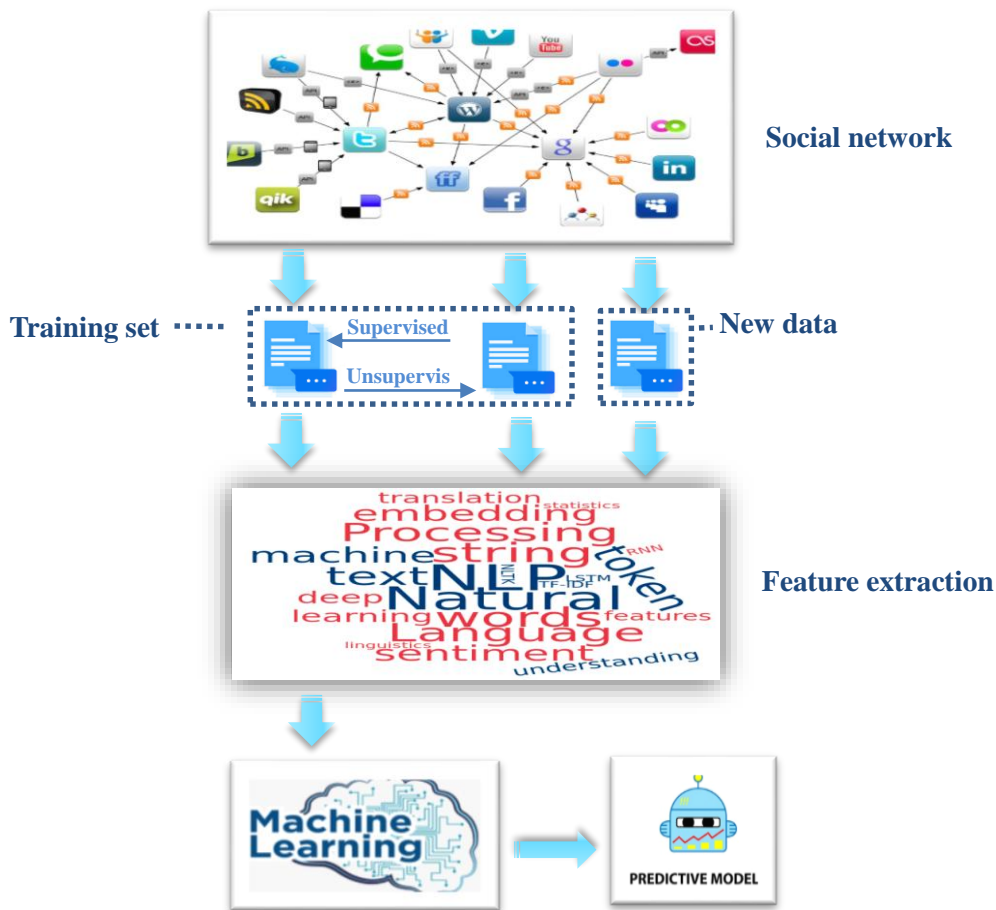


Figure 01: A graphical abstract showing classifying and predicting extremes on social networks.

5. References

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