МИНОБРНАУКИ РОССИИ

Федеральный исследовательский центр «Информатика и управление» РАН
Национальный комитет при президиуме РАН по распознаванию образов и анализу изображений
Институт информационных технологий Национальной академии наук Азербайджана
Институт проблем передачи информации им. А.А. Харкевича РАН
Издательство «Наука и технологии»
Национальный исследовательский Томский государственный университет
Федеральный исследовательский центр «Карельский научный центр РАН»
Федеральное государственное бюджетное образовательное учреждение высшего образования «Юго-Западный государственный университет»

ОПТИКО-ЭЛЕКТРОННЫЕ ПРИБОРЫ И УСТРОЙСТВА В СИСТЕМАХ РАСПОЗНАВАНИЯ ОБРАЗОВ И ОБРАБОТКИ ИЗОБРАЖЕНИЙ

Распознавание – 2021

Сборник материалов XVI Международной научно-технической конференции

14–17 сентября 2021 года

Редакционная коллегия:
С. Г. Емельянов, В. С. Титов (отв. ред.),
Т. А. Ширабакина, Э. И. Ватутин,
В. С. Панищев

Курск 2021

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UDC 004

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DETECTION OF VULGARITIES IN WEB-CONTENT BASED ON NAIVE BAYES ALGORITHM

Protecting children from harmful information on the Internet is one of the most pressing issues. The article proposes an approach using machine learning methods to detect vulgar words, phrases and expressions.

Lately, hate speech, profanity, terror, cruelty, etc. on social networks forums, blogs and other sources of opinion the amount of meaningful content is growing. It is known that among the Internet users there are children and adolescents. Exposure to malicious content on the Internet negatively affects children's health and psychology. Based on these factors, there is a need to develop text detection methods to more accurately identify and filter malicious content on web pages [1, 2, 3].

The article offers an approach that can detect coarseness from text on web pages. Vulgarism is the Latin word «vulgaris», that is, vulgarism, which means «ordinary people,» is an international term used to describe rude (uncivilized) words or expressions that contradict the norms of literary language. The conceptual model of the proposed approach is shown in figure.

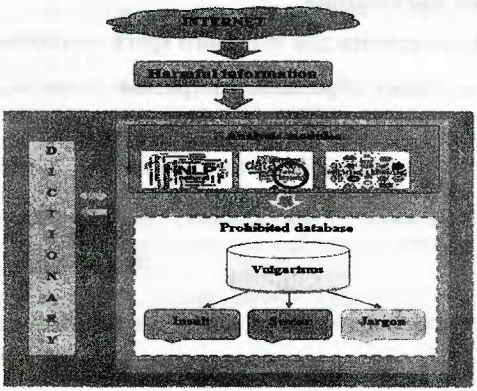

Fig. Conceptual model for the detection of vulgar words and expressions

As can be seen from figure, information obtained from the Internet is used to classify vulgar text that is harmful to children.

A dictionary of 249 words was created for the experiments. The database consists of three classes: Insulting words (0), Slang words and phrases (1), Swearing expressions (2). Once this class of words is identified from the texts, the detected content is collected in a prohibited database. Classification of texts is carried out using NB algorithms.

$$P(A \setminus B) = \frac{P(B \mid A)P(A)}{P(B)}.$$

During the experiments, the effectiveness of the classification was evaluated on the basis of Accuracy, Precision, Recall, F-Measure metrics. According to the results of the experiments done on N-gram=(1,1), N-gram=(2,2), N-gram=(3,3) indexes of the Naive Bayes algorithm, on N-gram=(1,1) indexes algorithm could recognize keywords in the class of «Insulting words» «Slang words and phrases» «Swearing expressions» by the 0.82, 0.96, 0.97 exactness.

When experiments were done on N-gram+Tfldf observation Gaussian Naive Bayes (GNB) algorithm on the index of N-gram=(1,1) showed more advanced results (tabl.).

Results of the classification of the GNB algorithm by the N-gram + Tfidf features

Algoritm	**N-gram range**	**Classes**	**Accuracy**	**Precision**	**Recall**	**F1-score**
GNB	N-gram=(1,1)	Insulting words	**0.82**	0.82	0.87	0.84
		Slang words and phrases	0.91	0.91	0.83	0.87
		Swearing expressions	0.95	0.95	1.00	0.98
GNB	**N-gram+Tfidf N-gram=(1,1)**	Insulting words	**0.94**	0.94	0.82	0.88
		Slang words and phrases	0.80	0.80	1.00	0.89
		Swearing expressions	0.93	0.93	0.93	0.93

As can be seen from Table, the proposed approximation-based classification results have been high for all classes. Thus, when the GNB algorithm recognizes words from the class «Insulting words» with an accuracy of 0.82 when N-gram = (1,1), When using the N-gram + Tfidf sign, the class recognized words with an accuracy of 0.94.

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UDK 004.056.5

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DEVELOPMENT OF ACOUSTIC SYSTEM FOR DETECTION OF DRONES BASED ON ENSEMBLES OF AUDIO FEATURES

One of the methods of detecting drones is the analysis of audio signals. In this case, spectral features were extracted from sound files by analyzing audio data. The Simple Neural Network Model (SimpleNN) and the Convolutional Neural Network Model (CNN) were built to classify the extracted audio features. As a result of experiments on real data, the Simple Neural Network showed superior results and achieved 98% detection accuracy.

The structure of the constructed SimpleNN model consists of 3 layers. 256 neurons were used in the first layer of the neural network, 100 in the second layer, and 64 in the third layer. The activation function of the model is Relu, the loss function is cross-entropy. Parameter optimization is based on the Adam function. An experimental study of the approach was conducted on the «Malicious UAVs Detection» dataset [1].

The database consists of four classes of audio data: Drones (0), Birds (1), Thunderstorms (2), Planes (3). Overall there are 1053 samples in the dataset. The recording of a sound file for each class in the dataset is shown in figure 1.

In this study, each audio file was converted into its corresponding spectrogram, and various features were extracted by applying acoustic methods to these spectrograms. Mel-frequency cepstral coefficients (MFCC), Spectral Centroid, Zero Crossing Rate, Chroma Frequencies, Spectral Roll-off signs were