**Automatic fake news detection state of the art**

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1. **Introduction**

The online Cambridge Dictionary defines “fake news” as “*false stories that appear to be news, spread on the internet or using other media, usually created to influence political views or as a joke*”.

Considering that internet users spent an average of 2 hours and 22 minutes per day on social networks in 2019[[1]](#footnote-0), we can conclude that reading the news on this platform became a habit. The problem in the online environment is that anyone can post or share something false without being responsible for the consequences of their action.

Another problem is when an information goes viral, people just assume that it is real and spread it further resulting in a snowball effect, the number of shares increasing constantly.

Since the 2016 U.S. presidential election, a new trend started: the deliberate spread of online misinformation, in particular on social media platforms such as Twitter and Facebook, that target people in order to influence certain beliefs so that certain entities can achieve their goals.

Some people might think that false information doesn’t have an impact on our lives, but it harms our communities, by spreading hate through misleading claims, it hurts our democracy, by damaging trust in politicians and political processes and decreases trust in public institutions, and it leads to bad decisions, by disrupting public debate on the issues that most affect us, including climate change and public spending.

We decided to find a solution to this problem since it’s an actual issue present in our daily life that is affecting everyone regardless of the country they live in, age, beliefs, etc.

1. **Similar applications**

OIGETIT is an award-winning news app that uses its proprietary AI-powered fake news filtering technology to deliver trusted news to your mobile phone, laptop, desktop, and tablet.

Strong points:

* It has a lot of sources (approximately 100.000),
* Every article is processed through their artificial intelligence system based on facts and has assigned a trust rating,
* Available in English and spanish, soon simplified chinese,
* Mobile and desktop versions available, not on IOS.

Weak points:

* It doesn’t have the ability to filter by region and/or country,
* Most of the users disagree with the percentage of the truth.

Full Fact is building scalable, robust, automated fact checking tools to be used in newsrooms and by fact checkers all over the world. On this site it’s presented how they establish if a news it’s true or not. The steps made are: Identifying and labelling claims, Matching claims, Taking matching and identifying a step further, Real time checks.

Strong points:

* It knows the most important thing to be fact checking each day,
* It assumes that when someone repeats something they already know to be false,
* It checks things in as close to real-time as possible,
* It’s free and has examples of how they filter the news.

Weak points:

* It requires to complete a form to register, if you want to use their tools,
* Isn’t easy to access it or use it.

1. **Classification Method**

We can try to solve the fake news detecting problem in 2 different ways, one involving machine learning and one involving social networks.

**III.1 Detecting fakes news using Machine Learning**

First off, we will need a method to represent our data, a good way of doing that is by seeing every sentence as a “bag of words”, every word is seen as an entity of equal importance and is connected to the related words. After establishing the model we can add labels on the words to provide additional info ( lexical info etc ). We can deduct the nature of the news article by using this relationship. This data representation method can be a good choice because of its simplicity, but it also has some drawbacks, like it being unable to provide valuable context information. In practice, this model was successful when paired with additional ways of validation and classification.

After the data model is set and some basic analysis has been implemented we can try using more advanced methods. We can analyze more complex syntax structures, the text will be written as a set of rules until a parsing tree with an added probability is obtained. This model has a 85-91% success rate.

To deduce if an article is fake or not we can also employ some semantic analysis. Any inaccuracy found in the information presented in the article can be a sign that it is fake. We can check the text to see if the objective facts ( like historical dates ) and common sense knowledge are valid.

Another layer of validation that can be added is Speech Analysis, we can analyze the coherence of the speech and the rhetorical structures used. For example, the frequent use of rhetorical structures can denote a lie.

Classifiers like Naïve Bayes can be used to give a verdict, they can be trained to deduce if a news article is fake either by syntax analysis or by feelings analysis.

**III.2 Detecting fakes news using Social Networks**

This way of detection proposes a method that also takes into consideration the author of the article and uses his other posts to deduce if he has a high chance of lying or not. The social component could make a difference and could really improve the accuracy of the detection when paired with content analysis.

In conclusion, both methods are great at detecting fake news and have seen huge progress in recent years, they are really good ways of determining if the author is lying or not, especially when used together.

1. **Topic-related Articles and Books**

The first example is called “How can we identify fake news? A short practical guide” 4 (in romanian: “Cum putem identifica știrile false? Un scurt ghid practic”) which is a fine article written based on a pattern: before the introduction, there’s a short description of the problem. It makes it clear that the words associated with the term “fake news” are propaganda, manipulation, ideology, money and so on. The next section takes it further, giving the reader an explanation as to why some people resort to spreading fake news. The main two reasons would be of financial and ideological nature. When they are doing that, it either brings them a significant amount of publicity, and therefore, considerable currency, or their aim is to grow an advantage on something, be it a person, event or situation. The last section provides information on how to recognize this type of articles. From those methods, we should mention: checking if the website is legit, if the so-called news has more than one source of verification, if the authors have signed their names, if the title is shocking or if the article presents a solid, rational argumentation or is it made of personal opinions.

Also known as “*A Field Guide to Critical Thinking”,* the book written by Daniel J. Levitin is a book written for people who want to learn ways to examine the veracity of information that is a part of their everyday life through the media. Levitin realizes that people have a tendency to access their critical thinking only with subjects they disagree with and takes advantage of that for proving that anybody can be "fooled and misled by numbers and logic". Moreover, he gives alternatives to checking the authenticity of news. Some of the key ideas would be:

1. Separating fact from fiction is not as easy as it seems. We shouldn’t take everything we read on trust. Although information is more accessible than ever, this doesn’t mean its veracity is one to be trusted. Precisely because we have access to everything we would like to look up, we should be aware of how easy it is to make falsities become facts.
2. Graphs and statistics should not be feared, nor ignored. It’s easy to skip these parts since they present less interest than the written text. However, the author explains that it’s the exact opposite that we should do. He explains the difference between mean, mode and median average and how they can be manipulated, making it unclear for the reader to understand it correctly.
3. Know the context to understand the conclusion. Daniel J. Levitin emphasizes on the fact that it is more than important to be aware of the methods the author of the article used to obtain the information, since the details that are left unsaid tend to be the most vital. It is necessary for one to see the bigger picture, in order for the news to be considered a well-argumented topic. The factors of understanding if it is made of true statements or is an opinionated text become more obvious.
4. **Bibliography**

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