Replication of the Reliability Prediction for Health-Related Content: A Replicability Study

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This study aims to replicate the work of Sondhi and his colleagues, who proposed a method for determining the reliability of online health-related content using support vector machines based on a set of linguistic and web-specific features extracted web sites. Our replication study made use of the code provided by the authors and aimed to make it more reproducible by updating outdated libraries and replacing custom implementations with standard ones. We were able to obtain results that were consistent with the original study, and our replication effort has resulted in a refactored version of the original code that is now also available to the research community. Our replication effort confirmed the conclusions of the original study and highlighted some challenges involved in replication of research.

Additional Key Words and Phrases: support vector machine, natural language processing, reliability prediction, health, machine learning, reproducibility

1 THE REPRODUCED PAPER

The paper "Reliability Prediction for Health-Related Content: A Replicability Study" [1] presents a method for determining the reliability of online health-related content using standard classification technology and a set of linguistic and web metadata features. The main goal of the original paper is to build a document-level classifier using a supervised learning approach to detect false information on the internet.

1.1 Methods used in the reproduced paper

1.1.1 Dataset used in the reproduced paper. The authors manually created a fully balanced dataset with reliable and unreliable web pages that was used in the replicability task. The dataset consisted of positive pages from websites accredited by HON (Health On The Net) and negative pages from a web search using hand-crafted queries.

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1.1.2 Features generated in the reproduced paper. The features used include link-based features (number and type of links, presence or absence of privacy policy information or contact links), commercial features (presence of commercial interest and advertisements) and linguistic features (type-token ratio, average sentence length, etc).

1.1.3 Classification approach chosen in the reproduced paper. In the original paper, support vector machines are used to build a classifier to detect false information on the web.

1.2 Original results from the reproduced paper

2 PROJECT SETUP

The original paper provided a link to a GitHub repository containing the code used to run the experiments. The code was all in one file called train.py and was designed to be run using the command "python3 train.py" with multiple parameters for the training, such as the dataset, features, and standardization. A requirements.txt and readme file were also provided, which made it appear easy to run the experiment as is.

3 CHALLENGES

Running the code on different machines presented several challenges. One issue was the use of the name "aux" as a directory for storing intermediary training data. This keyword is forbidden in Windows, making it impossible to run the code on a Windows machine.

Another challenge was the dependencies in the code itself, which needed to be installed and run before the experiment. These included libraries that needed to be installed using pip commands, a library called svmlight that needed to be installed by downloading and manually extracting it on Linux, and tokenizers for punctuations and stop words that needed to be downloaded for the library nltk.

4 EXPERIMENT CHANGES

4.1 Changes made to File paths

The name of the directory used for storing intermediary training data was changed from "aux" to "train_data" to make the code runnable on Windows machines.

4.2 Changed libraries and implementations

The code was refactored into one Jupyter notebook. This way, the rather complex project setup could be performed and documented in one place. This included the installation of various libraries using pip, the download of the tokenizers.

The most notable change compared to the original code is the used implementation of the support vector classifier. It was switched to the more modern implementation found in sklearn and could therefore be used without a separate manual installation. With the change of the svc dependency, a custom implementation of the confusion matrix function was removed, since it is already present in the sklearn package.

5 REPRODUCED RESULTS

6 INTERPRETATION OF THE RESULTS

7 SUMMARY

REFERENCES

[1] Marcos Fernández-Pichel, David E. Losada, Juan C. Pichel, and David Elsweiler. 2021. Reliability Prediction for Health-Related Content: A Replicability Study. In *Advances in Information Retrieval*, Djoerd Hiemstra, Marie-Francine Moens, Josiane Mothe, Raffaele Perego, Martin Potthast, and Fabrizio Sebastiani (Eds.). Springer International Publishing, Cham, 47–61.