Comparative Analysis of the Efficiency of Techniques for Detecting Misinformation in Healthcare Data

Engineering Methods 2023/2024

Alžbeta Žiarovská

Faculty of Informatics and Information Technologies
Slovak University of Technology in Bratislava

November 28, 2023

Table of Contents

Introduction

- Why are we here?
- What is the article about?

Motivation, problem and my contribution

- Motivation
  - Personal interest in misinformation
  - Learning about machine learning techniques
- Problem
  - Perception of healthcare information found on the Internet
- My contribution
  - Summarizing use of machine learning techniques for healthcare information retrieval
  - Possible use in everyday life for medical misinformation recognition

Related Work

- Machine learning techniques used for information retrieval
  - Naive Bayes [1][2]
  - Support Vector Machine [3][4]
- Misinformation
  - Misinformation vs. disinformation[5]
  - Medical misinformation[6]

Methodology

- Finding and understanding the sources
- Extraction of relevant data for the topic
- Creating a comparison of the efficiency of machine learning techniques
- Analyzing the results

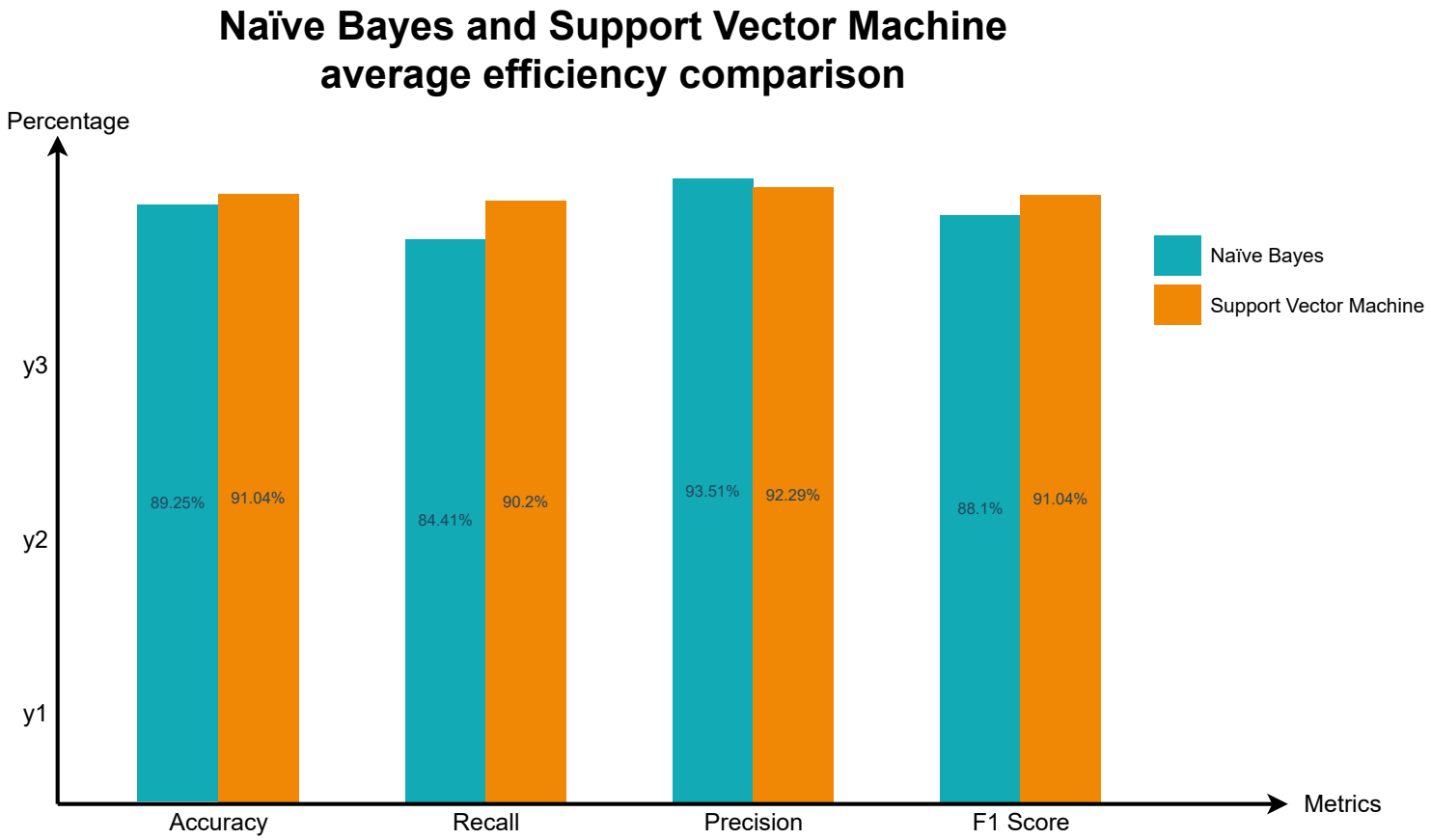
Results and Analysis

	Accuracy			
Naive Bayes	88.37%[1]	98.71%[2]	85.85%[3]	84.06%[4]
Support Vector Machine	84%[1]	94.17%[2]	90.95%[3]	95.05%[4]
	Recall			
Naïve Bayes	84%[1]	98.70%[2]	–%[3]	70.53%[4]
Support Vector Machine	84%[1]	92.87%[2]	–%[3]	93.73%[4]
	Precision			
Naïve Bayes	84%[1]	99.56%[2]	–%[3]	96.98%[4]
Support Vector Machine	85%[1]	99.31%[2]	–%[3]	92.56%[4]
	F1 score			
Naïve Bayes	83.5%[1]	99.13%[2]	–%[3]	81.67%[4]
Support Vector Machine	84%[1]	95.98%[2]	–%[3]	93.14%[4]

Table: Efficiency metrics (accuracy, recall, precision, F1 score) of machine learning techniques in misinformation detection according to various researches, 1 - [4], 2 - [3], 3 - [2], 4 - [1]

Results and Analysis

- Harmonic average of each category according to the sources
- Graphical visualization of the data



Discussion and conclusion

- Conclusion of results
- Comparing efficiency
- Limitations
- Future work

Jasmine Shaikh and Rupali Patil.
Fake news detection using machine learning.
In *2020 IEEE International Symposium on Sustainable Energy, Signal Processing and Cyber Security (iSSSC)*, pages 1–5. IEEE, 2020.

Karishnu Poddar, KS Umadevi, et al.
Comparison of various machine learning models for accurate detection of fake news.
In *2019 Innovations in Power and Advanced Computing Technologies (i-PACT)*, volume 1, pages 1–5. IEEE, 2019.

Yashoda Barve and Jatinderkumar R Saini.
Healthcare misinformation detection and fact-checking: a novel approach.
International Journal of Advanced Computer Science and Applications, 12(10), 2021.

Garima Chaphekar.

Unmasking Medical Fake News Using Machine Learning Techniques.
PhD thesis, San Jose State University, 2022.


Andrew M Guess and Benjamin A Lyons.
Misinformation, disinformation, and online propaganda.
Social media and democracy: The state of the field, prospects for reform, 10, 2020.


Yuxi Wang, Martin McKee, Aleksandra Torbica, and David Stuckler.
Systematic literature review on the spread of health-related misinformation on social media.
Social science & medicine, 240:112552, 2019.