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Gabrielle Taylor

MultiPlan Inc
gabrielle.taylor@multiplan.com

Wenting Jiang

Oklahoma State University
kayla.jiang@okstate.edu

Xiao Qin

Auburn University
xqin@auburn.edu

Ashish Gupta

Auburn University
azg0074@auburn.edu

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Gabrielle Taylor¹, Wenting Jiang², Xiao Qin³ and Ashish Gupta³

¹*Multiplan, USA; gabrielle.taylor@multiplan.com*

²*Oklahoma State University, USA; kayla.jiang@okstate.edu*

³*Auburn University, USA; xqin@auburn.edu, azg0074@auburn.edu*

ABSTRACT

This survey highlights the evolution of techniques within misinformation detection. Misinformation has become increasingly prevalent on the Internet by the day and progressively more threatening. Individuals who are inaccurately informed tend to make misinformed decisions which have led to voting scandals, traffic accidents, and even health concerns. We are motivated to address a research gap by analyzing misinformation detection's overall progress and exposing the weaknesses that provide research opportunities. Our findings will further advance the work of misinformation detection and bring light to unique ways to tackle the issue. Notably, we discuss the significance of misinformation detection systems and present the problems resulting from misinformation, the techniques for detection, and open issues within this research. Misinformation is becoming an issue that requires more attention and improved systems. We believe that our systematic review and synthesis of state-of-art research will cultivate a path for these developments.

1

Introduction

Misinformation, which is simply inaccurate information, has become more pervasive on the Internet by the day. The term *post-truth* is a word that describes the world we live in today. Post-truth is an environment where the facts are irrelevant compared to emotional appeals and personal beliefs; these more than facts are now shaping public opinions. The dilemma that post-truth culture has created has become a critical issue since it has affected politics, voting, and the market. Publishing and sharing misinformation has constantly misled the viewpoints, beliefs, and opinions of online users. People today are more inclined to believe any information online, thereby making users vulnerable. As our society advances with technology and Internet interactions, misinformation detection systems will be vital so that individuals can distinguish legitimate information from misleading ones. James Gleick once said, “when information is cheap, attention becomes expensive” [87]. Therefore, we must be assiduous in our pursuit of detecting misinformation so that users can safely continue to use the Internet as a safe and effective tool. In this survey, we shed a bright light on cutting-edge techniques that can detect various types of misinformation on a wide range of platforms.

We start this study by categorizing the versatile types of misinformation, including fake news, fake reviews, misinformation in microblogs, rumors, satire, and clickbait. We also discuss an array of challenges and future research opportunities. More specifically, gathering data for fake news, fake reviews, and misinformation in microblogs can be challenging because we have to acquire a large ground truth dataset to train models to detect misinformation. Another issue is the lack of misinformation detection research in non-English languages. Building datasets and creating detection methods pose a difficult task. In Table 1.1, we list a few survey papers concerning misinformation detection and their areas of focus. These papers reviewed specific methods that can improve misinformation detection like psychological theories, detection on particular platforms, natural language processing, machine learning, and data mining techniques. Our survey gives an overview of the types of misinformation, classification strategies, strengths and weaknesses, and potential solutions for open issues. This comprehensive review is helpful for future research as a resource for successful solutions and possible ideas.

Table 1.1: Comparison of the related surveys.

Year	Investigator(s)	Area of Focus
2018	Xinyi Zhou and Reza Zafarani	This paper surveyed fundamental theories within psychology and social science that could potentially enhance fake news detection research [264]
2019	Rohit Kumar Kaliyar and Navya Singh	This paper is a comprehensive survey of misinformation detection on various social media platform like LinkedIn, Facebook, Twitter, and Reddit [116]
2014	Erik Cambria and Bebo White	This paper reviews the recent developments in NLP research and analyzes past, present, and future NLP techniques [44]
2019	Abdullah-All-Tanvir, Ehasas Mia Mahir, Saima Akhter, and Mohammad Rezwanul Huq	This paper compared five popular Machine Learning methods: Support Vector Machine, Naive Bayes Method, Logistic Regression and Recurrent Neural Networks [153]
2017	Kai Shu, Amy Sliva, Suhang Wang, Jiliang Tang, and Huan Liu	This paper surveyed data mining techniques used to detect fake news on social media, including fake news characterizations on psychology and social theories [218]

In Section 3 we first present more background information and identify the types of misinformation. We elaborate on the methods and compare the existing successful techniques from various perspectives in Section 4. In Section 5, we summarize the tools and datasets for

misinformation detection. In Section 6, we review the challenges and open issues of misinformation and make suggestions on how one can address those challenges. We conclude this work in Section 7 with our final thoughts on the areas of misinformation detection and our overall analysis of this field.

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