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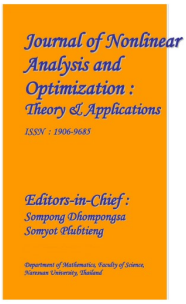

PUBLIC BROADCASTING AND MISLEADING INFORMATION IN A DEMOCRACY: A MECHANISM DESIGN APPROACH

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ABSTRACT

In this paper, we present a resource allocationmechanism for the problem of incentivizing filtering among a finite number of strategic social media platforms. We consider thepresence of a strategic government and private knowledge of how misinformation affects the users of the social media platforms. Our proposed mechanism incentivizes social media platforms to filter misleading information efficiently, and thus indirectly prevents the spread of fake news. In particular, we design an economically inspired mechanism that strongly implements all generalized Nash equilibria for efficient filtering of misleading information in the induced game. We show that our mechanism is individually rational, budget balanced, while it has at least one equilibrium. Finally, we show that for quasi-concave utilities and constraints, our mechanism admits a generalized Nash equilibrium and implements a Pareto efficient solution.

INTRODUCTION

For the last few years, political commentators have beenindicating that we live in a *post-truth* era [1], wherein the deluge of information available on the internet has made it extremely difficult to identify facts. As a result, individuals have developed a tendency to form their opinions based on the *believability* of presented information rather than its truthfulness [2]. This phenomenon is exacerbated by the business practices of social media platforms, which often seek to maximize the *engagement* of their users at all costs. In fact, the algorithms developed by platforms for this purpose often promote conspiracy theories among their users [3]. The

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sensitivity of users of social media platforms to conspiratorial ideas makes them an ideal terrain to conduct political misinformation campaigns [4], [5]. Such campaigns are especially effective tools to disrupt democratic institutions, because the functioning of stable democracies relies on *common knowledge* about the political actors and the process they can use to gain public support [6]. The trust held by the citizens of a democracy on common knowledge includes: (i) trust that all political actors act in good faith when contesting for power, (ii) trust that elections lead to a free and fair transfer of power between the political actors, and (iii) trust that democratic institutions ensure that elected officials wield their power in the best interest of the citizens. In contrast, citizens of democracies often have a *contested knowledge* regarding who should hold power and how they should use it[6]. The introduction of *alternative facts* can reduce the truston common knowledge about democracy, especially if they become accepted beliefs among the citizens. Such disruptions on the trust on common knowledge can be found in the 2016 U.S. elections [7] and Brexit Campaign in 2016 [8], where the spread of misinformation through social media platforms resulted in a large number of citizens mistrusting the results of voting. To tackle this growing phenomenon of misinformation, in this paper, we consider a finite group of social media platforms, whose users represent the citizens in a democracy, and a democratic government. Every post in the platforms is associated with a parameter that captures its informativeness, which can take values between two extremes: (i) completely factual and (ii) complete misinformation. In our framework, posts that exhibit misinformation can lead to a decrease in trust on common knowledge among the users [9]–[12]. In addition, social media platforms are considered to have the technologies to *filter*, or label, posts that intend to sacrifice trust on common knowledge. Thus, the government seeks to incentivize the social media platforms to use these technologies and filter any misinformation included in the posts. Motivated by capitalistic values, we induce a *misinformationfiltering game* to describe the interactions between the social media platforms and the government. In this game, each platform acts as strategic player seeking to maximize their advertisement revenue from the engagement of their users [7], [13]. User engagement is a metric that can be used to quantify the interaction of

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users with a platform, and subsequently, how much time they spend on the platform.

Recent efforts reported in the literature on misinformation in social media platforms have indicated that increasing filtering of misinformation leads to decreasing of user engagement [14]. There are many possible reasons for this phenomenon. First, filtering reduces the total number of posts propagating across the social network. Second, the users whose opinions are filtered may perceive this action as dictatorial censorship [15], and as a result, they may chose to express their opinions in other platforms. Finally, misinformation tends to elicit stronger reactions, e.g., surprise, joy, sadness, as compared to factual posts [16], which may increase user engagement. Thus, each platform is reluctant to filter misinformation. In our framework, we consider that the government is also a strategic player, whose utility increases as the trust of the users of social media platforms on common knowledge increases. Consequently, increasing filtering of misinformation by the social media platforms increases the utility of the government. Thus the government is willing to make an investment to incentivize the social media platforms to filter misinformation. In our approach, we use mechanism design to distribute this investment among the platforms optimally, and in return,implement an optimal level of filtering.Mechanism design was developed for the implementation of system-wide optimal solutions to problems involving multiple rational players with conflicting interests, each with private information about preferences [17]. Note that this approach is different from traditional approaches to decentralized control with private information [18]–[21] because the players are not a part of the same time, but in fact, have private and competitive utilities. The fact that Mechanism design optimizes the behaviourof competing players has led to broad applications spanning different fields including economics, politics, wireless networks, social networks, internet advertising, spectrum and bandwidth trading, logistics, supply chain, management, grid computing, and resource allocation problems in decentralized systems [22]–[28].

EXISTING SYSTEM

social media in particular, has generated extraordinary concern, in large part because of its potential effects on public opinion, political polarization, and ultimately democratic decision making. Recently, however, a handful of papers have argued

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that both the prevalence and consumption of "fake news" per se is extremely low compared with other types of news and news-relevant content. Although neither prevalence nor consumption is a direct measure of influence, this work suggests that proper understanding of misinformation and its effects requires a much broader view of the problem, encompassing biased and misleading—but not necessarily factually incorrect—information that is routinely produced or amplified by mainstream news organizations. In this paper, we propose an ambitious collective research agenda to measure the origins, nature, and prevalence of misinformation, broadly construed, as well as its impact on democracy. We also sketch out some illustrative examples of completed, ongoing, or planned research projects that contribute to this agenda.

Disadvantages

1) The system doesn't have facility to train and test on large number of numbers.

2) The system doesn't facility for analyzing the Nash-implementation.

PROPOSED SYSTEM

To tackle this growing phenomenon of misinformation, in this paper, we consider a finite group of social media platforms, whose users represent the citizens in a democracy, and a democratic government. Every post in the platforms is associated with a parameter that captures its informativeness, which can take values between two extremes: (i) completely factual and (ii) complete misinformation. In our framework, posts that exhibit misinformation can lead to a decrease in trust on common knowledge among the users [9]–[12]. In addition, social media platforms are considered to have the technologies to filter, or label, posts that intend to sacrifice trust on common knowledge. Thus, the government seeks to incentivize the social media platforms to use these technologies and filter any misinformation included in the posts.

In our framework, we consider that the government is also a strategic player, whose utility increases as the trust of the users of social media platforms on common knowledge increases. Consequently, increasing filtering of misinformation by the social media platforms increases the utility of the government. Thus the government is willing to make an investment to incentivize the social media platforms to filter misinformation.

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ADVANTAGES

- feasible,
- budget balanced,
- Individual rational, and
- strongly implementable at the equilibria of the induced game. We prove the existence of at least one generalized Nash equilibrium and show that or mechanism induces a Pareto efficient equilibrium.

MODULES

Service Provider

In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations such asLogin, Browse and Train & Test Data Sets, View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy Results, View Predicted Social Media News Type Details, Find Social Media News Type Ratio, Download Predicted Data Sets, View Social Media News Type Ratio Results,, View All Remote Users.

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

Remote User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user

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will do some operations like REGISTER AND LOGIN,PREDICT SOCIAL MEDIA NEWS TYPE, VIEW YOUR PROFILE.

CONCLUSIONS AND FUTURE WORK

Our primary goal in this paper was to design a mechanism to induce a GNE solution in the misinformation filtering game, where (i) each platform agrees to participate voluntarily, and (ii) the collective utility of the government and the platforms is maximized. We designed a mechanism and proved that it satisfies these properties along with budget balance. We also presented an extension of the mechanism with weaker technical assumptions. Ongoing work focuses on improving the valuation and average trust functions of the social media platforms based on data. We also consider incorporating uncertainty in a platform's estimates of the impact of their filter. These refinements of the modeling framework will allow us to make our mechanism more practical for use in the real world. Future research should include extending the results of this paper to a dynamic setting in which the social media platforms react in real-time to the proposed taxes/subsidies. In particular, someone could develop an algorithm that the players can use to iteratively arrive at the Nash equilibrium. In such an algorithm, the social planner can receive additional information from theplayers while they iteratively learn the GNE. Then, she canuse this information to change her allocations dynamically, allowing us to relax either Assumption 5 on monitoring of Maverage trust, or Assumption 6 on the excludability of the platforms.

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