Defensive Modeling of Fake News Through Online Social Networks

ABSTRACT

Online social networks (OSNs) have become an integral mode of communication among people and even nonhuman scenarios can also be integrated into OSNs. The ever growing rise in the popularity of OSNs can be attributed to the rapid growth of Internet technology. OSN becomes the easiest way to broadcast media (news/content) over the Internet. In the wake of emerging technologies, there is dire need to develop methodologies, which can minimize the spread of fake messages or rumors that can harm society in any manner. In this article, a model is proposed to investigate the propagation of such messages currently coined as fake news. The proposed model describes how misinformation gets disseminated among groups with the influence of different misinformation refuting measures. With the onset of the novel coronavirus-19 pandemic, dubbed COVID-19, the propagation of fake news related to the pandemic is higher than ever. In this article, we aim to develop

a model that will be able to detect and eliminate fake news from OSNs and help ease some OSN users stress regarding the pandemic. A system of differential equations is used to formulate the model. Its stability and equilibrium are also thoroughly analyzed. The basic reproduction number (*R*0) is obtained which is a significant parameter for the analysis of message spreading in the OSNs. If the value of *R*0 is less than one (*R*0 *<* 1), then fake message spreading in the online network will not be prominent, otherwise if *R*0 *>* 1 the rumor will persist in the OSN. Realworld trends of misinformation spreading in OSNs are discussed. In addition, the model discusses the controlling mechanism for un trusted message propagation. The proposed model has also been validated through extensive simulation and experimentation.

**EXISTING SYSTEM**

* The improved SIR model has been discussed by Zhang *et al.* [29] who considered the variable rate of infection and the resultant function for infected individuals and nonlinear Ordinary Differential Equation (ODE) is developed. This model also discusses the crowding effect on OSN and also derives an expression for the basic reproduction number. This model has been used for the analysis of rumor spreading dynamics in social network and predicts the spreading behavior of rumor. They discussed the control strategies of rumor spread in social networks.
* Zhu *et al.* [41] proposed an epidemic SIRS model, in which they described joining and leaving of users in OSNs. This article considers the dynamics of demography and the model is validated by simulation. More epidemic models are discussed related to rumors. Some of the researchers examined the temporal dynamics using the ODE [47]. Singh and Singh [48] discussed the spatial and temporal dynamics of rumor propagation and developed a strategy for countermeasures using. They used partial differential equation for the study of rumor propagation dynamics in the social network. Huang and Su [44] proposed an epidemic model for the study of news propagation on OSN and also suggested a method for controlling the rumor. They explained the effects of rumor spreading on ONS. For the study of rumor spreading in OSN, they evaluated the value of basic reproduction number and observed that if its value is less than one then the OSN will be free from unauthenticated news, otherwise unauthenticated news will be present in the OSN forever. The result of the proposed model has been verified by numerical calculation as well as simulation results.
* Dong *et al.* [49] analyzed the rumor spreading dynamics on OSN by SEIR epidemic model. They considered the varying user’s number on OSN with time. The joining and deactivation rate of user in this model is discussed. They also found the basic reproduction number and exact equilibrium points of the model. The effect of user variation on rumor spreading in OSN is explained. They found that the new incoming users influence the rumor spreading rate in OSN. The proposed model is verified by simulation results.
* Furthermore, Zhu *et al.* [50] using the same model as in [49] obtained a local and global equilibrium as well as calculated the basic reproduction number using the next generation matrix concept. The authors explained the effect of time delay on rumor propagation and developed an effective control mechanism. A hesitating mechanism-based SEIR model is proposed by Liu *et al.* [51] for the study of rumor spreading in OSN. They used mean field theory for analysis of rumor spreading in OSN. They discussed the rumor-free equilibrium condition and global stability of the OSN and also obtained the value of basic reproduction number. They also analyzed the effects of feedback method on rumor spreading. They established the analysis feedback mechanism to reduce the rate of rumor spreading but were not able to reduce the value of basic reproduction number.

Disadvantages

* + In the existing work, Identify when the user after the spreading rumor in the network.
  + This system is less performance due to the standard susceptible-infected-recovered (SIR) model which is not used primarily to its generalization and efficacy.

**PROPOSED SYSTEM**

The key objectives of the proposed model are to monitor the presence of fake news/misinformation as well as spreaders in OSNs and apply a suitable corrective method for blocking and/or removal of these types misinformation and spreaders. Our contributions can be summarized as follows:

1) Formulate a mathematical model for monitoring fake news/misinformation as well as spreaders in OSNs and develop a method to prevent spreading of fake news;

2) Suggest the concept of verification through verified state for verification of users in OSNs;

3) analyze the effect of a verified state on a given OSN’s responsiveness and investigate its role in the prevention of fake news spreading in OSNs;

4) analyze the effectiveness of a recovered state (blocking/ removing/leaving of a spreader group) on fake news as well as a spreader in OSNs;

5) Investigate social network stability under various conditions and verify theoretical findings through extensive simulation results.

**Advantages**

* For detection and controlling of misinformation (rumor) in OSN, a susceptible-verified-infected-recovered (SVIR) model is proposed which is more effective.
* The system is more effective due to presence of the mechanisms for the removal of rumors (an “infection of the mind”) has been used.

**SYSTEM REQUIREMENTS**

➢ **H/W System Configuration:-**

➢ Processor - Pentium –IV

➢ RAM - 4 GB (min)

➢ Hard Disk - 20 GB

➢ Key Board - Standard Windows Keyboard

➢ Mouse - Two or Three Button Mouse

➢ Monitor - SVGA

**SOFTWARE REQUIREMENTS:**

* **Operating system :** Windows 7 Ultimate.
* **Coding Language :** Python.
* **Front-End :** Python.
* **Back-End :** Django-ORM
* **Designing :** Html, css, javascript.
* **Data Base :** MySQL (WAMP Server).