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Role of Artificial Intelligence in Identifying and Preventing fake reviews in E-commerce Websites

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Abstract—with the advancement of internet and specially web 2.0 in which peer to peer interaction were encouraged, reviews from the consumers become very important for a new potential customer.

Now these days almost all the e-commerce websites not only post these reviews but also encourage other customers to post their reviews of the products they are using. While it may seem prudent from a cursory glance, another problem is gripping this industry and that is fake reviews. Fake reviews has become a big billion dollar industry, and it is threatening the democratic and reliable nature of user reviews.

This paper deals with the use of Artificial Intelligence to combat the growing menace of fake reviews.

Keywords—Fake reviews, Deep Data Analysis, Machine Learning, Artificial Intelligence, E-commerce websites.

Introduction

1.1 Growth of E-commerce Websites

The term e-commerce was coined by Dr. Robert Jakobson who was working as a consultant to the California state assemblies committee in 1984.

By the definition itself, electronic commerce or in short e-commerce use the internet for transactions using multiple Pay systems such as debit cards, credit cards, net banking et cetera.

E-commerce transactions has plethora types of uses such as music downloads, online retailing, electronic markets, second-hand product markets, business to business trades.

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Initially electronic commerce was successful in the countries where data charges were low while there hardware systems were in place such as Europe and USA as evident from the reports that in 2010 UK was highest user of electronic commerce followed Czech Republic.

But after few years, Asian countries begin to dominate electronic commerce. China, Malaysia, Japan, and India or now the pioneer of electronic commerce in the world.

Chinese retailers used electronic commerce websites to such extent that from 2.3 trillion yuan in 2012, the electronic commerce extend it and boomed into 90 trillion yuan in 2016.

A recent report published in economic Times suggested that India's e-commerce market size, which is just 13 billion dollar in 2015, is going to become 120 billion dollar by 2026.This is almost a 10 times increase.

The experts of the industry are predicting that in near future, the Indian e-commerce market will go leaps and bounds and specially the mobile commerce industry will be an attractive sector to look into.

The arrival of economic value for money 4G services in India has changed the perspective of ecommerce and big tech giants used this opportunity judiciously.

Consumers which were earlier reluctant to use electronic commerce to place their orders, are now very much familiar with the whole process and thanks to various pay method systems such as cash on delivery, electronic commerce has boomed in India and other Asian countries despite the very low penetration of credit card and debit cards.

The acceptance rate of the e-commerce or popularly known as online purchase is very high among young generation.

1.2 Importance of user reviews in online purchases

Today most of the e-commerce websites also posts the user reviews of their respective products and services and in contextual basis, potential users have been using this reviews to form an opinion about the products and services and later on these opinions convert into purchases.

This facility serves two fold purposes, first it enhances the visibility and credibility of the website and secondly it also provides extra information or additional information about the products and services to the potential user.

For example a smart phone review might tell the user about the user interface experience that has not been posted by the official websites or some features that have been discovered by previous users, that have not been informed by the official website and official communication channels of that smartphone maker company.

The Menace of Fake reviews

Because of the popularity of these user reviews, some start-ups and businesses started abusing this system by creating fake user reviews and giving positive feedbacks of the product to such an extent that an average potential user finds them mesmerizing and buying these products only to discover that the quality is compromised.

The methodology off this system is very simple. Most often a group will be created by some person most likely a 3rd party anda group will be created in the social media (WhatsApp, Facebook, twitter, Instagram) and people will be lured into this group by giving them offers and moneybacks in return they are encouraged to write positive reviews of the product/services and write derogatory or critical reviews of the products and services of the rival group.

For A seller positive reviews are very important as the higher visibility help them to break even on his investment but for a e-commerce platform, this industry has become an evil.

Fake reviews are a problem of multiple magnitude. First the potential users are flabbergasted by the sheer number of the genuine looking (but fake reviews) and they assume that products or services are good and hence they buy these.

Secondly the fake reviews create mistrust between e-commerce websites such as amazon, flipkart etc and the genuine users and buyers.

Till recently the e-commerce websites were fighting with this menace with little success but the new research on artificial intelligence and machine learning might change the scenario.

2. Role of AI in preventing the Fake reviews

The term artificial intelligence was coined in 1956, but AI has become more popular today thanks to increased data volumes, advanced algorithms, and improvements in computing power and storage.

Artificial Intelligence is a process of making a computer software think and analyse the data, mimicking human brain. The process basically involves, studying the methods of a human brain and implementing them onto machine learning so that machine can think and act like a human mind.

Thanks to the advancements of the computing prowess, AI is now more capable identify fake reviews by using language processing methods to detect unusual patterns of text, writing style, and formatting.

For example, researchers at the University of Chicago in 2017 came up with a machine learning system, which was a deep neural network, and relied on the dataset of three million real restaurant reviews on Yelp(a website).

3.Methodology

The methods used by the AI in combating the evil of fake review rely on certain methods discussed below

3.1 Use of AI in Finding unusual pattern

The first and foremost AI system helps the organization to employs the language processing method to detect unusual patterns of text, writing style, and formatting.

An internal scoring methods then is being adopted by the companies to issue warnings to their data handling managers to look into the matter and pursue the authenticity of these reviews and remove them if they are found to be fake and malicious.

3.2 Use of AI in finding specific characteristics of user

AI helps to detect certain characteristics of these fake reviews by using neural languages.

Fake reviews usually display distinct features and AI helps the organizations to detect them. AI reads the fake reviews by focussing on

1. How old is the user's association with the website (whether the user an old customer of the website)
2. How many reviews, user has written in the past?
3. Is there a skewness in the reviews of the user (too positive or too negative)
4. How many words, the user writes
5. Does the language of the user display certain local flavours (e.g. Indian user will use nuances of Indian languages)
6. Does the user has some social media profile, if yes then AI will identify the pattern of user's written skills and matches them accordingly .

3.2 Use of AI in finding specific characteristics of websites

AI can also detect the fake websites by using pattern detection algorithms and focussing on

1. how many reviews are being written for the website in a single day
2. What is the ratio of the negative/positive reviews
3. What is the average size of the reviews (number of letters, words)
4. What is the diversity of the reviewers (ethnic diversity, language diversity, geographical diversity)
5. How old is the website and how old is the oldest user reviews.

4 Various tools to Detect Fake reviews

Some of the statistical tools that can be used to detect and identify the patterns are

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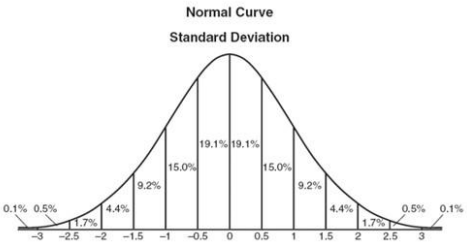
1 Standard deviation methods:- this method is based on the premise of the gaussian theorem and detect the expected deviations of the data sets .
The methodology is simple yet effective, the AI sorts the data and form a bell shaped curve and the unusual patterns can be identify by lookingand analysing the range.
The formula for the SD is given below

$$SD=(x1-xm)2+(x2-xm)2+....+(xn-xm)2n$$



2 Correlation Method:- this method correlate the authenticity of the user profile on various parameters, reviews written by him and language nuances used by him over a period of time .

3 ANOVA :- analysis of variance is also an excellent test to detect the abnormality of the data.

Conclusion

As discussed in the previous pages, the fake review industry is disrupting the basic premise of e-commerce which is honesty and transparency.

To curb this rampant issue is very challenging as it is very difficult for a human being to go through piles of data and user reviews and identify fake reviews.

AI helps the organization to fight against these fake reviews by employing various machine learning algorithms and deploying statistical tools.

The coming decade is going to be more crucial for the AI and its use in this scenario as more and more users will opt for online purchases.

More research is necessary to fine tune AI so that it can prevent the onslaught of fake reviews in early stage .

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