

# Fake News on Multiple Online Social Networks

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**Abstract-** In the present decade, social media is taking over as a large ubiquitous platform to access and disseminate news. While some are official news sources, a majority of accounts on Online Social Networks are indulged into sharing fake news. Social media comprises of a large set of information which users can readily access to. The reliability of posts that user access, absorb and share is not well specified. In this paper, we review the transmission of fake news on multiple Online Social Networks (OSNs). We consider three most used social networks in the current era: Twitter, Facebook and Instagram. We study i) fake news taxonomy, actors and impacts, ii) how fake news radiates on social media, iii) nature of fake news on multiple platforms, iv) how multiple networks can be inter-related to check fake news and v) how propagation and detection works on each OSN individually. We have presented fake news statistics, taxonomies, exposure on social media, current trends on prevention and detection of fake news on multiple social media platforms. We have also discussed ways to limit the radiation of fake news.

**Keywords:** Online Social Networks, Fake news, Misinformation, Twitter, Facebook, Instagram.

## 1. INTRODUCTION

Social Media has become an important platform for the dissemination and consumption of information. Diffusion and intake of news is being widely done over Online Social Networks (OSNs). The credibility of every piece of news is not well defined and their sources are often unreliable. Users active on various social media can readily read, publish and share textual and visual information. The ease and readiness of communication contributes to increase in the spread of fake news. Majority of users share information, text and pictures without actually being confirmed if the news is true. Catchy headlines, interesting texts, pictures, videos of users' interests urge users to share such information with their peers and common interest groups.

While studying the propagation and detection of fake news, multiple OSNs come into the picture. It is equally important to study the propagation and user behavior on

various platforms collectively. A user may have accounts on various social networks, and he might be sharing similar information on each of them. Users share news either because it is of huge mental or emotional importance to them or simply because they come across an appealing headline or content. Malicious users have various intents of spreading rumors and fake news ranging from fun to propaganda aims. There is ongoing research over fake news spreading on Twitter and large datasets: LIAR [1] and FakeNewsNet [2] are being created to get deeper into the study. During the 2016 US elections, social platforms other than Twitter have been a bigger area for the spread of fake news altering the outcome of elections<sup>1</sup>. It has henceforth become necessary to study the ways of propagation of fake news and derive various detection methodologies for different social networking sites. Amongst 4.4 Billion users of internet all over the world, 3.5 Billion people are actively using these social media platforms (Table 1).

Table 1: Social Media Users

TOTAL POPULATION	7.7 Billion
INTERNET USERS	4.4 Billion
SOCIAL MEDIA USERS	3.5 Billion

Majority of social media users are active on more than one platform. It is crucial to know about the person's background, emotions, ideas and beliefs to get to know more about what kind of the information the user is mostly indulged into posting and sharing. This means extracting the meta-data of user profiles and their networks provides a great deal into detecting fake news and its propagation. As in Table 2, it can be seen that Facebook, WhatsApp and Instagram are the social networks being used largely and by a number higher than Twitter users. These are also the platforms over which fake news is widely propagating causing dire consequences in society. While users on Facebook mostly contribute to rumor and fake news by posting texts (self-written content) or sharing (similar to a retweet on Twitter), on Instagram, information is spread using images and on WhatsApp, fake news is broadly constituted by text messages and images and videos to

<sup>1</sup><https://www.thesun.co.uk/news/8001784/instagram-bigger-fake-news-facebook-us-election-misinformation/>

some extent. Facebook and WhatsApp allow users to share URLs that becomes a common mode of sharing clickbaits. URLs can be shared on Instagram by verified accounts only while other users share images, videos, and memes. A meme can be defined as an image with text written on it, mostly satire or humor related. Memes are prevailing over these social networks being not limited to just humor but also being used for propaganda purposes. These are being used as a weapon by various political persons, followers and leaders of specific support groups. There is a visible upsurge in the amount of political posts. Some of the major hashtags include #Namoagain and #Congresshaina<sup>2</sup>. Surveys and reports present that Facebook owned companies like Instagram and WhatsApp are the platforms most commonly and regularly being used by 14% to 19% of the world's population. The following table3 shows the comparable number of users on various Online Social Networks. These statistics show that Facebook, WhatsApp and Instagram are being used by a greater number of people as compared to Twitter users. Comparable to the number of people active on these platforms, the amount of propagation of fake news is also proportional.

Table 2: Number of Users on OSNs

SOCIAL NETWORK	NUMBER OF USERS	WORLD'S PERCENTAGE
Facebook	2.23 Billion	28.57%
YouTube	1.9 Billion	24.67%
WhatsApp	1.5 Billion	19.48%
Instagram	1.0 Billion	12.98%
Twitter	335 Million	4.35%
Reddit	330 Million	4.28%

## 2. FAKE NEWS

Fake news [3] is a piece of information that deliberately contains false information to mislead a group of people. Such kind of information is spread through traditional news media or OSNs. Such kind of false information is created and propagated to manipulate people's ideas and views, to spread political agenda or to modify business transitions. Anything that is untrue and has been proved as false is classified under fake news. Some major examples of fake news are US Presidential Elections [4] and Pizzagate [5].

### 2.1. Types of Fake News

Here we classify fake news into 9 categories [6]:

1. **Satire/Parody:** Humor posts, sarcasm or imitations of public figures.
2. **Mis-information:** Deliberate false information, rumors, hoaxes.
3. **Disassociation:** False connection of post with headlines, false context.
4. **Imposter:** Impersonation of official accounts and websites (e.g.: aajtak.com impersonated as aajtak.com.co).

5. **Manipulated Content:** Half-truth, forged images with manipulated headlines.
6. **Fabricated:** Hypothetical, self-created fake news.
7. **Advertisements/PR:** Ads with fake claims to attract people.
8. **Clickbait:** Links redirecting to false information pages.
9. **Propaganda:** Misleading news promoting political causes.



Figure 1: Types of Fake News

### 2.2. Fake News Motives

The reasons why people spread fake news range from the idea to harm someone to simply fun. The motive of transmitting fake news depends upon the actor i.e. the person or entity that is spreading it. Here, we present five broadly classified intents or motives [7] of why people spread fake news:

1. **Malicious Intent:** To defame a person, entity or an organization.
2. **Political Influence:** To manipulate people's ideas towards or against specific political persons and parties to alter the outcomes of elections.
3. **Profit:** To increase monetary gains and enhance business.
4. **Popularity:** To increase traffic on specific websites and accounts, become famous.
5. **Fun:** To create humor and entertainment.

### 2.3. Fake News Actors

Users of media platforms who unconsciously or maliciously (with intent) spread fake news are termed as fake news actors. We, in Figure 2, provide types and subtypes of such actors who in any manner contribute into spread and increase in fake news on various platforms.

<sup>2</sup><https://economictimes.indiatimes.com/tech/internet/fake-news-makes-it-to-instagram-now/articleshow/68915164.cms?from=mdr>

## 2.4. Fake News Impacts<sup>3</sup>

Users of media platforms who unconsciously or maliciously (with intent) spread fake news are termed as fake news actors. We, in Figure 2, provide types and subtypes of such actors who in any manner contribute into spread and increase in fake news on various platforms.

<b>BOTS</b>	<ul style="list-style-type: none"> <li>• Bots for Fun</li> <li>• Malicious Bots</li> </ul>
<b>TROLLS</b>	<ul style="list-style-type: none"> <li>• Targeting specific person /cause</li> <li>• Memers</li> </ul>
<b>CRIMINALS</b>	<ul style="list-style-type: none"> <li>• Terrorists</li> <li>• Criminals with a cause</li> </ul>
<b>MICROTARGETERS</b>	<ul style="list-style-type: none"> <li>• Political Persons</li> <li>• Paid/Sponsored Actors</li> </ul>
<b>JOURNALISTS</b>	<ul style="list-style-type: none"> <li>• Attention Seekers</li> <li>• Biased Reporters</li> </ul>
<b>SOCIETY</b>	<ul style="list-style-type: none"> <li>• Youth</li> <li>• Adults</li> </ul>

Figure 2: Fake News Actor

1. **Political Effect:** Changes outcomes of elections, hampers democracy, disrupt normal political proceedings.
2. **Fear:** Fake stories about situations incorporate fear in minds of citizens like fake news about occurrences of natural disasters- tsunami, earthquakes etc. might create havoc in general public.
3. **Racist Ideas:** Fake news about societies that promote communalism and racism and lead to social discrimination towards a specific societal group.
4. **Image Violation:** Disregards status of celebrities, political leaders, business organizations and brands.
5. **Riots:** Creates war-like situations between states, nations, communities. For instance, Hindu-Muslim uprisings.
6. **Stock Variations:** Fake news about particular brands alter the sale and purchase of items and hence change their stock prices. Fake news causes a great impact in stock market.
7. **Mislead:** Fake news about vacancies, advertisements of products mislead people into joining fraudulent companies, buying wrong products affecting people's lives in several ways.
8. **Health Issues:** Fake medicinal vitae posted on social media by people not certified in medicine cause health issues to people who follow and act on such content.

## 3. DEPENDENCE ON SOCIAL MEDIA

The world of information is shrinking into an online space. From amongst 4.4 Billion internet users, 68% people get their news from social media rather from traditional news media. This news could be shared by authentic news media or by general public. Figure 4 shows the percentage of people in US dependent upon OSNs for news according to data collected by Pew Research Center.

## Facebook is a pathway to news for around four-in-ten U.S. adults

% of U.S. adults who get news on each social media site

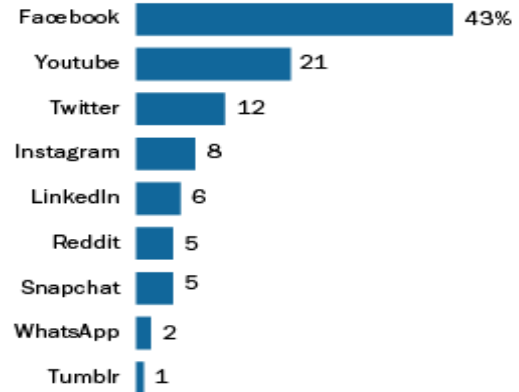


Figure 3: Percentage of people dependent on OSNs  
Source: Pew Research Centre

News on OSNs appears to be relatable and interesting to the age groups (12-30) of most users. Consuming news from social platforms is much easier and feasible [8]. It is easily and directly approachable. It equips people with diversity of news by just a tap of a finger, without dedicating extra time to approach to traditional media news. Social media provides a platform to debate. While

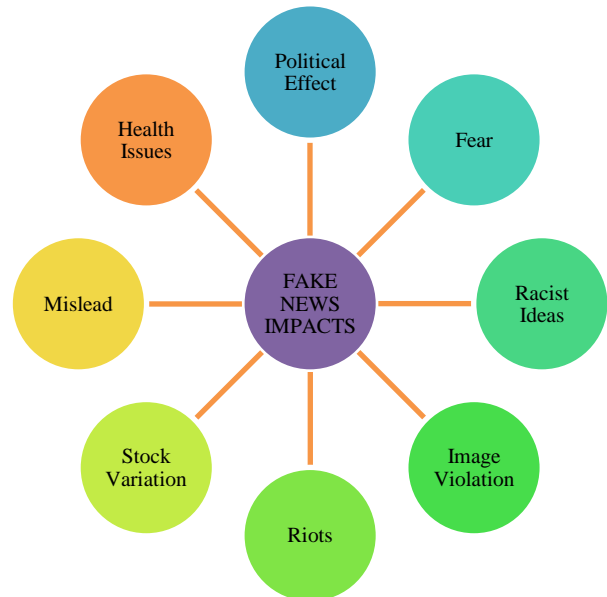


Figure 4: Effects of Fake News

in traditional news mediums, people can just read, view or listen to news, OSNs provide users also to react and express their opinions and emotions towards the news. It is in short an interactive platform. It stays as the restraint of users to verify using their conscience, the legitimacy of

<sup>3</sup><https://30secondes.org/en/module/impacts-of-fake-news/>

the post. Users need to keep an open mind to perform such classification. Cognitive Bias, Continued Effect and Selective Exposure [9] are the limitations in classifying information as true or fake.

Social Media such as Facebook and Instagram provide users with posts according to their interests. People are exposed to news and posts only from pages they follow and the accounts they have befriended. This limits the users' exposure to information that coincides with their faiths and beliefs. Users avoid any posts that contradict their preset views. To confirm the legitimacy of a post, users usually rely upon the number of followers of the account sharing the information, number of likes, shares and comments on the post. The nature of comments and reactions to a post allow discerning its authenticity.

Users share what they believe to be true, not what is actually true. Fact-checking before sharing is necessary. A thing of concern is whether bots or malicious users are posing as authentic news sources to spread propaganda or misinformation. Users do not want to input their efforts to grab news but would consume it if it is readily available in front of them without investing much of their time. They would surely read a catchy headline that pops up on their mobile phones but would not care to go through the entire article. This prevents them to know the factual information beyond the headlines and they do not fact-check the authenticity.

#### 4. FAKE NEWS ON MULTIPLE PLATFORMS

##### 4.1. Fake News on Twitter

Fake news on Twitter displayed a heavy upsurge during the 2016 US presidential elections. It was the 2016 elections that the term "Fake News" began to come more clearly into picture. A great deal of fake news spread through sharing URLs on the platform. Other sources included bots, trolls and cyborgs [10]. Bots are web robots that automatically run a script whereas trolls are humans using accounts on the platform. Cyborgs combine human-generated content with automatic posting. Twitter reported that it had identified 36,746 accounts that generated automated, election related content and 3,817 automated accounts. Bots on Twitter contribute a lot in increasing fake news. Figure 5 shows some of the features that help in identification of a social bot. Twitter itself allows users to create bots using developer options in Twitter API. This makes the creation of bots easily facilitated for malicious users and also easier for the research community to study the trends of fake news on the platform. The limitation is the post length i.e. maximum 280 characters per post. We are able to fetch data with variety but with limited content due to Twitter's short-statement policy. There is also a lack of labeled datasets in the research community. To analyze data extracted from Twitter and study the nature of fake news, techniques used are stance detection, argument mining, sentiment analysis [11], rhetoric analysis and various other machine learning techniques.

##### 4.2. Fake News on Facebook

Facebook is a medium of one-to-many communication. Users use Facebook at least 30 minutes a day at an average. Facebook adds 6 new profiles every second. 51% of US

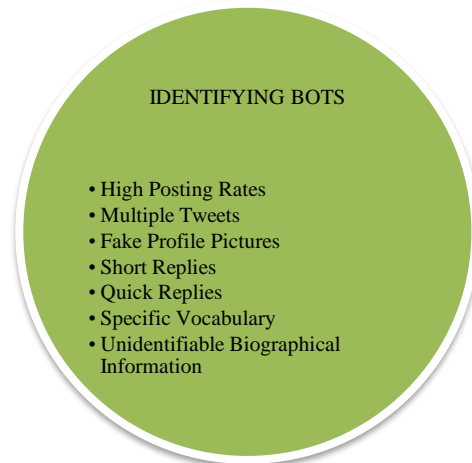


Figure 5: Bot Identification Features

adults use Facebook several times a day. This includes using the application to communicate with their friends and followers through messages or feed. Users are indulged in posting content rather than observing. Posts are shared without giving much thought about its content, relevance and consequences. Media shared on Facebook include self-written posts, self-clicked images, videos, shared posts, images and videos and URLs to articles and posts. These posts occur in News Feed of the users' friends and followers. A user on Facebook has around 338 friends on an average<sup>4</sup>. People who do not use Facebook are friends with or live with people who have an active Facebook account and grab information from their news feed. This large user set gets their daily news and the information about the happenings around them from Facebook. An estimate 81 million Facebook profiles are fake accounts. These are impersonating accounts, accounts used by people providing a non-existent identity and bot accounts. The nature of influence of users is dependent upon their post reach. How a post affects people depends upon how many people view that post. Getting deeper, it lies on if people are really reading the post or watching the video or merely scrolling down when they come across the post. This is attributed by the reactions of viewers i.e. how they respond to the post, by liking, reacting, commenting and sharing. Not all users read the entire length of the post or article shared on online platforms. Users read the headlines and frame the entire news in their minds. If the post or article matches to their interest, there is a possibility of clicking on the link and reading the entire article or post. It can be calculated how long a user stays on a page to read an article or how long he views a video. If a video is watched only for 3 seconds, it is counted as a view on Facebook and Instagram. This displays that users form assumptions of the news based on a half-read article or half-viewed video. The profile of a user on a social platform expresses his identity and interests. Data of a user

<sup>4</sup><https://www.brandwatch.com/blog/facebook-statistics/>

like his basic information, friends, likes, interests, political orientation, types of groups he is involved in and the likes can be derived manually by analyzing user's profile. The platform uses third party authenticators to fact check the news. These are websites or agencies solely dedicated to manually validate the credibility of social media posts and classify news as true or fake.

### Actions Taken by Facebook<sup>5</sup>

To reduce the amount of fake news on the platform, below are the actions Facebook is taking to check fake news:

1. **Fact-checking**<sup>6</sup>: Facebook is performing fact-checking of highly shared posts by third party authenticators.
2. **Related Posts**: Facebook now lists related posts along with probable fake news. This is done so that when a user comes across a post that is probable to be false, he also sees posts with similar headlines and similar content. This is intended to provide maximum valid information so that the users can differentiate themselves amongst news and fake news by their conscience.
3. **Page Information**: For each page, information is provided about the page, its category, types of posts, what it aims to share and other basic details. Users can direct to this section to know about a particular page.
4. **Tips and Tools**: To detect and report fake news, users can navigate to Tips and Tools page on his account and report any probable fake news.
5. **Breaking Economic Induction**: Advertisements and news financially funded become the source of most of the fake news on the platform. Reduction is being brought into paid content and news.
6. **New Tools**: The platform is making new tools and algorithms to counter fake news.
7. **Creating Awareness**: It is taking actions to make people conscious of fake news and help them make wise decisions when they encounter information as such.

### Fake News Flagging 2016

In 2016, Facebook implemented a flagging method to flag posts as fake according to some flagging websites with this sole responsibility of confirming the authenticity of posts. However, it was said that the "Red Flag" classifying the post as fake offended people's beliefs. The idea was later turned down and replaced by showing related articles to the post. Facebook does not completely remove a post reported as fake, but just reduces its visibility in the news feed. Users may still view the post if not in their feed. It, therefore, again stays as the job of users to use his judgment before believing news as truth. Showing fact-checked related articles has led to decreasing the number of shares of fake articles. Facebook yet allows users to report for inappropriate posts. The platform shows a pop-up to the user who attempts to share a post that has been

reported as fake news. This improves the possibility that the user is less likely to share such news if there is a warning. There is no flagging for true news. The action of Facebook in combating fake news relies upon users. If no user spots a fake post or no one reports such news, there is no action taken. Facebook does not fight fake news for unreported posts.

### Anti-Clickbait Algorithm

Clickbait is a hyperlink which when clicked directs users to a page with the sole aim of attracting more traffic to the link or website. It misleads people with false headlines or images to grab attention and gain visitors.

#### Man Tries to Hug a Wild Lion, You Won't Believe What Happens Next!



Figure 6: Example of a Clickbait

Clickbait or malicious url is one amongst the foremost complained concerning components of the News Feed on Facebook. The platform initiated modifications in Anti-Clickbait Algorithm in 2014<sup>7</sup>. The algorithm constantly supervises users' behavior: how people reciprocate to clickbaits, how often are these links clicked and shared, how long do people stay on the page after clicking on the link, how early do they leave the page. The new algorithm identifies URLs as clickbaits if the headlines of post overemphasize or manipulate some information. Facebook aims at reducing the appearance of such posts in the News Feed so lesser people come across such posts. The algorithm has been manually trained over a dataset of headlines such as "WHAT THIS ACTRESS DID WILL BLOW YOUR MIND!!!" and "KENDALL JENNER TALKS SELFIES: YOU WON'T BELIEVE WHAT SHE SAID! (WATCH!)" . It matches the structure of headlines; the words and punctuations used to actual news headlines and compare them to detect clickbaits. On the basis of classification, the algorithm provides a score of how abhorrent the news is and how badly it can affect the readers. If a post from an account or website is found to be a clickbait, algorithm observes if the user has regularly posted clickbaits. If there is a large number of such content by that account, his posts are automatically made less visible on the platform. If the account ceases posting clickbait, he shall have his traffic back and posts will again begin to appear in the News Feed. Facebook says, it shall be open to sharing their actions to any social platform that wishes to fight clickbait but would not

<sup>5</sup><https://www.facebook.com/facebookmedia/blog/working-to-stop-misinformation-and-false-news>

<sup>6</sup><https://www.theverge.com/2018/10/19/18001288/facebook-fake-news-hunt-spread-blog-election-misinformation>

<sup>7</sup><https://techcrunch.com/2016/08/04/facebook-clickbait/>



publicly post their source codes to prevent reverse engineering.

### 4.3. Fake News on Instagram

Due to the upsurge of politics related fake news on platforms such as Facebook and Instagram, there is an ongoing concern whether the Election Commission is inspecting these platforms for abhorrent political news. It is ambiguous if Instagram is under surveillance. Instagram accounts spreading fake political news and misinformation have followers in the range of a few hundreds to thousands. An account referred to as NarendraModi.Indian claimed that as per a BBC report, eighty nine percent of PM Modi's 2014 guarantees are consummated or ongoing. The BBC has not revealed such a report. Hashtags like Narendra Modi, Congress, BJP and Rahul Gandhi have generated more than 16 lakh posts. Around 500 objectionable posts and URLs had been removed from social platforms before the 2019 Lok Sabha Elections but there was no such response to fake news on Instagram.

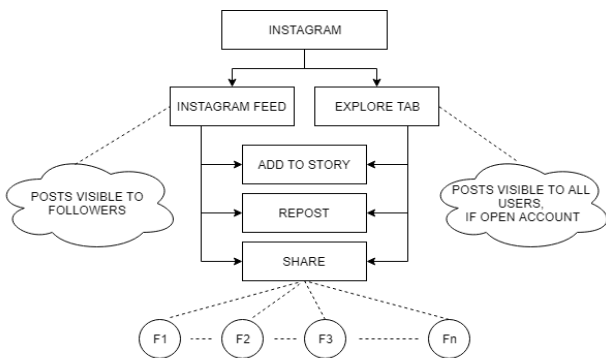


Figure 7: Instagram Structural Flow

To check for fake news on Instagram, it is more work to extract text from images and fact check it. Most of the objectionable content on Instagram is in the form of images, videos and memes. The posts are accompanied by hashtags, captions and mentions. Instagram has attracted less attention from the research community and no monitoring is done for the posts and content on the platform. A much larger number of fake news and propaganda is known to have spread on Instagram than Twitter and Facebook during the 2016 US elections. The platform is being used by e-commerce websites to make money, propaganda accounts to spread fake news about politicians and gathering information of voters and manipulating their views and direction of action. A simple way to detect if the post is fake is by checking for the username of the account posting news if it contains words like fake, false, news, true, gossip, viral, fact etc. Similarly, the accounts are to be crawled for such bio, captions, hashtags and mentions. In Figure 7, we present a structural flow of Instagram that displays how posts on the platform can be accessed and shared amongst people.

### Types of Posts

We shall only consider image data under posts on Instagram. We have classified the types of images users

post on Instagram into 12 categories, also illustrated in Figure 8: self-portraits, friends, pets, memes, activities, fashion, text images, gadgets, food, scenery, public figures and promotional content.

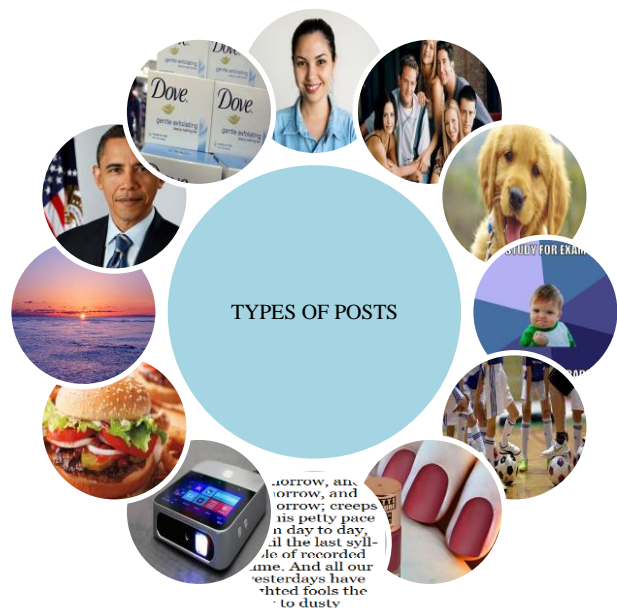


Figure 8: Categories of Posts on Instagram

### Fake News Flagging 2019

Like Facebook, Instagram, in August 2019, also started an option of flagging probable fake news. Instagram proposes to use these flags to perceive fake information on the platform and develop algorithms to detect such content. Instagram is using public feedback as signals as to which news or post is not credible. It monitors the time of posting and its relevance, users' previous behavior if he has posted similar content or false news previously, how often does he posts such news and how often has the users' posts been reported. This monitoring provides them with the decision if it is required to get the post reviewed by third party fact checkers. In order to flag a post or story, user has to click on the ellipsis (three-dots menu on the top right corner of the post) and choose from the available options: 'its inappropriate' → 'false news'. If Instagram finds that the post is actually misleading or false, the platform does not necessarily delete the post, but it shall be no longer displayed on the 'Explore' tab. The user who posted the content is not notified if his post is being fact-checked or has been declared false. Instagram is getting the posts constantly being reviewed by third-party authenticators that also review flagged Facebook posts.

## 5. PREVENTION FROM FAKE NEWS

### 5.1. Spotting Fake News

There currently is no flag that accurately states if a post is fake. Below are the ways a user can segregate fake news from real news:

1. Check if the post is humor or satire. Check the information of the user or page that has published the

post if it is a satirical source. Check the background of the author and the website.

2. Check if the source of information is credible enough. Check whether the post has been published by a reputed official account or an imposter.
3. Check if the headlines truly state what they say. Headlines of most of the fake news have been found to contain question marks, a lot of exclamation marks and emojis.
4. Affirm that the headline and the text accompanying it match. Check if the post really states what the headline does.
5. Browse the news on internet and read from multiple sources to confirm the authenticity of the post.
6. Fact-check the news on possible individual level, check if the news has been recently published or is old, if the factual information it provides is correct or not.
7. Check for the number of likes, comments and shares on the post. Check for negative and positive comments and reactions.
8. Check your biases.

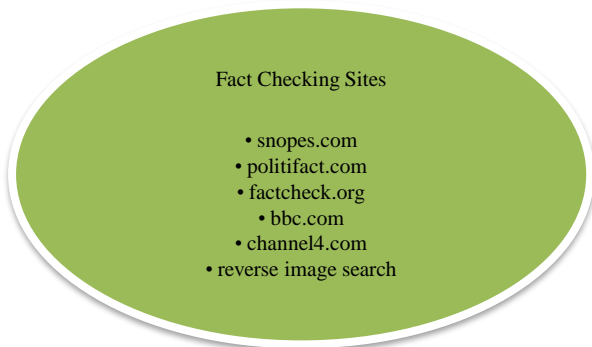


Figure 9: Fact Checking Websites

9. Verify the news from fact checking websites. Figure 9 provides the names of a few third-party authenticators.

### 5.2. Actions Taken by OSNs

Below is the summarization of steps online platforms are taking to combat fake news on their networks:

1. Filtering illegal content
2. Enhancing user-control features
3. Building reporting mechanisms
4. Suspending Accounts

### 5.3 Proposed Actions

1. Verifying identity of users at the time of account creation.
2. Following credible accounts.
3. Incorporating justification conscience.
4. There is no flagging for true news. Once the post has been fact-checked and verified by third party sites or official sources involved, the platform could provide a flag with the news ensuring its reliability. This would allow users to share trusted news and reduce the sharing of non-flagged information.

5. Developing and using fake news detection models and techniques [12].

## 6. CONCLUSION

With rise in information on the internet, fake news tends to increase. It has led to dire consequences on the society. Social media has evolved as the largest platform dissemination of fake news and misinformation. This paper provides detailed information on fake news, its types, actors, impacts, nature on various platforms and how it can be dealt with.

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