**Third deliverable to fulfill last assignment for IST 616**

Emerging Technologies for Information Systems

**How to measure influence on Twitter – A Paper Review**

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# Abstract

Twitter is a famous social community carrier that's constantly growing. Because Twitter has grown to be a green platform for marketing and marketing groups as a brand new enormous medium, it's miles apparent that locating influential Twitter customers and measuring their influence are important. There are currently over 175 million Twitter accounts in use around the world, making Twitter one of the most popular and well-known social media platforms. But Twitter isn't so much a social network that facilitates the exchange of personal information as it is a social network that isn't very social at all, according to recent surveys, with many inactive accounts and a low motivation to engage in dialogues. So, the purpose of this paper review is to determine twitter trends among the social media platform and measure the influence of twitter users. This paper also shows the different techniques and surveys to measure the influence of twitter around the globe. In this research paper review we will discuss the following: introduction, overview, background, Twitter as social media, features, The distribution of Twitter users, Tweets, Twitter Services and API, Profile Specifications Twitter Data, Influence of Twitter, predicting individual influence, Twitter accounts’ influence, Ranking user, Analytical Tools for Estimating Twitter Influence and Social Influence of Twitter.

**Key words:** Twitter; user influence; twitter data; social media; data analysis; Tweets; Social Influence; Twitter Services; data collection.

# Introduction

Social media has evolved into a fantastic platform for self-reporting on live events and for people to share their perspectives on a variety of topics. Social Media content is a proxy for public opinion and a source for e-Reputation tracking because of its real-time and personal nature. Twitter is undoubtedly the most popular of these media (Cossu et al., 2021). On the microblogging platform Twitter, valuable information spreads through a series of super hubs, influencers, or alpha users who reach a large audience of attentive and engaged users (Anger & Kittl, 2011).

An empirical analysis of influence patterns in a popular social medium is presented in this paper. We compare three different measures of influence, indegree, retweets, and mentions, using a large amount of data gathered from Twitter. We look at how the three types of influential users did in spreading popular news topics by focusing on different topics (Cha, 2010).

# OVERVIEW

## What exactly is Twitter? Twitter is by far the most widely used microblogging platform. In 2006, Jack Dorsey, Biz Stone, and Evan Williams founded it (Sagolla, 2009). The primary function of Twitter is to allow users to send short messages to their friends. The message is known as a tweet, and it can be up to 140 characters long (Zhang, 2010). Twitter is one of the top ten most visited websites in the world, and it is widely regarded as the most popular microblogging platform (Ćurlin et al., 2019). Twitter is the fifth most popular social media platform among Americans, according to a recent Pew Research Center study. According to the study, roughly one-quarter of online American adults use Twitter, with younger internet users being more active than older groups on the platform (Malik et al., 2019). Because of the availability of the Twitter streaming API, Twitter can be recommended as a good platform for obtaining user-uploaded data, as it allows the data to be streamed successfully and easily to the model (Rathnayaka et al., 2021).

## Background

Twitter is a microblogging service that was launched in early 2006 to allow users to send short text messages known as "tweets" to other users. The maximum length of a tweet is 140 characters because the system was originally designed for tweets to be shared via SMS. Even though the service expanded to include more features beyond SMS, such as web and desktop clients, this limitation remained and was re-narrated as a feature. "Creativity comes from constraint," says Twitter's Creative Director Biz Stone (Boyd et al., 2010). Twitter is a popular short messaging service that can be accessed via a Web page, desktop software, or mobile apps. It has evolved rapidly through user innovation, with the retweet (RT) reply (), and hashtag (#) makes being introduced by consensus and community behavior. It was built on a limited set of features, including public timeline messages and private direct messages. Critique, attempts to define "best practice," end—user motivations, and content classifications have all been the focus of previous Twitter research (Dann, 2010).

## Twitter as social media

Social media has established itself as an important platform for everyday public communication, allowing a wider range of participants to participate in public debate, from ordinary citizens to cultural, economic, and political leaders. Twitter, one of the most popular international social media platforms, now has 271 million unique monthly active users, with over 750 million registered accounts. However, the use of Twitter as a communication platform is still unevenly distributed across and within societies: while a large percentage of the population in countries like the United States and Australia now has Twitter accounts, Germany, and Austria lag. Furthermore, the demographics of the Twitter userbase vary greatly by country, and reliable statistics are rare (Bruns & Stieglitz, 2014).

Twitter, Facebook, and other social media sites encourage users to express their thoughts, opinions, and random details about their lives on a regular basis. Important events to inane comments are covered in tweets and status updates. Although most messages are of little informational value, the accumulation of millions of messages can yield significant knowledge. Several studies on Twitter have shown that aggregating millions of messages can provide useful information about a population (Paul & Dredze, n.d.). Social media, a two-way form of media in which users construct personal identities through self-presentation and dialogue, has gotten a lot of press because of how it empowers public relations, provides tangible measurement metrics, and facilitates environmental scanning while "helping humanize the firm" (Smith, 2010). Twitter is a public version of Facebook's now-famous status update feature. Twitter is similar to chat rooms in that it uses the at-sign to allow users to communicate with one another (Murthy, 2012). Social media, particularly Twitter, provides a platform for creating and disseminating large amounts of content. Aside from the advantages of receiving information faster and consuming event-related information in real-time, recipients are faced with the ever-present question of information credibility (Meinert et al., 2019).

***Features***

Twitter has grown into a massive social media platform with millions of users contributing every day. The success of Twitter is due to two factors: (1) the shortness of tweets, which cannot exceed 140 characters, which allows for the creation and sharing of messages in a matter of seconds, and (2) the ease with which those messages can be spread to a large number of users in a short amount of time (Zubiaga et al., 2014). When users log in to Twitter, the first thing they see is a stream of tweets from the people they follow, listed in reverse chronological order. Participants use various strategies to choose who they follow—some follow thousands, while others follow a select few; some only follow people they know personally, while others follow celebrities and strangers they don't know but find interesting (Boyd et al., 2010). Twitter also has some features that allow users to narrow down their search results. One way to do this is to use a hashtag (#), which users use to describe (or "tag" in Web 2.0 speak) tweets with a specific subject. Librarians are probably more familiar with this concept as a subject heading. The hashtag allows users to search for a tweet's subject rather than its content (Ovadia, 2009).

Table

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Figure 2 Definations of basic Twitter Lingo (Zhang, 2010)

**The distribution of Twitter Users**

We start by looking at the geographic distribution of Twitter users and comparing it to the entire population of the United States. Overall, the 3,279,425 Twitter users we were able to geolocate account for 1.15 percent of the population (as of the 2000 Census). When we look at the distribution of Twitter users by county, however, we see a very non-uniform pattern (Mislove & Lehmann, n.d.).

We identify the geographical coordinates of each of the 100 most populous counties in the United States (from the US Census) and create a geographical Twitter query (bounding box) consisting of a 50 square mile area centered on the county coordinates. Only about.02 percent of tweets come from areas with overlapping bounding boxes, so this approximation introduces very little noise (Mohammady & Culotta, 2014).

Since November 2010, the percentage of internet users who use Twitter has doubled, reaching 16 percent. People under the age of 50, particularly those aged 18 to 29, are the most likely to use Twitter. Both suburban and rural residents are significantly more likely to use Twitter than city dwellers (Duggan & Brenner, 2013). Adult Twitter users in the United States differ significantly from the general adult population. Most notably, Twitter users are much younger than the average American adult and are also more likely to have a college degree than the general population. Adult Twitter users in the United States are on average 40 years old, while the average American adult is 47 years old. To put it another way, the adult population of the United States is nearly evenly split between those aged 18 to 49 and those aged 50 and up. Twitter users, on the other hand, are nearly three times as likely to be under 50 (73%) than to be 50 or older (27 percent) (Wojcik & Hughes, 2019).

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**Figure** Internet user of Twitter (Duggan & Brenner, 2013)

**Profile Specification** on Twitter, anyone can be a user. These users can be divided into two categories: I realusers, and (ii) digital actors. Digital-actors represent automated computer programs, while real-users represent human beings (e.g., home users, business users, or professional users) (e.g., bots, online services, etc). Both types of users created Twitter profiles by entering information such as their name, website, description, and bio. Other information on a Twitter profile, such as created at, status count, and listed count, is automatically provided or manipulated by the Twitter platform and tends to change over time (e.g., number of followers change over time, listed count change over time) (Uddin et al., 2014).

Diagram

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**Figure** (Uddin et al., 2014)

**Tweets**

A tweet is a brief message sent by a user to their followers. In general, tweets are linked to blog posts in the same way that an SMS is linked to an email. Because of the limited space available for tweets, users must be concise and may have to resort to phrase abbreviations. Surprisingly, a rich and well-understood set of abbreviations exists that is surprisingly consistent across user groups and even across other electronic mediums like SMS and chatrooms. Twitter has its own set of abbreviations, such as "RT," which refers to a user retweeting a previous tweet, and "DM," which refers to a direct message from one user to another (Sankaranarayanan et al., 2009).

**Twitter Services and API**

Twitter provides the necessary infrastructure to ensure that a user's tweets are broadcast to all the user's followers and that tweets from the user's friends are delivered in a timely manner. The user can access this stream of tweets from a variety of places, including the official Twitter website and several other Twitter-related websites. These tweets are also available in Extensible Markup Language (XML) and JavaScript Object Notation (JSON) formats via the Twitter API service. Through three public feeds called the public timeline, spritzer, and GardenHose, Twitter also publishes different-sized samples of the entire set of tweets generated by all Twitter users (Sankaranarayanan et al., 2009). Twitter has a variety of access points (so-called firehoses and sprinklers from its own API), commercial collection vessels (Gnip and DataSift), and analytical tools (such as the network visualization software Gephi) that are commonly used for Web data analysis in general. Twitter is particularly appealing for research because of the ease with which tweets can be gathered and collections created, as well as the built-in tools for analysis, such as retweets for noteworthy tweets, hashtags for subject matter categorisation, @replies and followers-followees for network analysis, and shortened URLs for reference analysis (Weller, 2013).

An API (Application Programming Interface) is a set of functions, protocols, and tools that are used to create a program or to communicate with services. Twitter offers three APIs to developers (two of which are open to the public), all of which provide access to information from the social network (Riquelme & González-Cantergiani, 2016). Users can limit results to specific hashtags, @userids, languages, or geographic areas using the API. For queries that return a one-time response of limited information from Twitter, the REST (or Search) API is used. The Streaming API maintains the connection and continues to send new data as it becomes available on Twitter's servers. There are also numerous tools available to assist those without programming skills in capturing and archiving twitter data via APIs (Small et al., 2012).

**Twitter Data**

Our dataset includes a complete snapshot of the Twitter network as well as the complete history of tweets posted by all users from 2006 to July 2009. Our database contains 54,981,152 user accounts linked by 1,963,263,821 social connections. Our dataset also includes all of the collected users' tweets, which totals 1,755,925,520 tweets. This dataset is ideal for this project because it includes all tweets exchanged between all users over a long period of time, as well as social links between users. We can identify two types of messages that a user can post from the tweets in our dataset: replies and retweets (Comarela et al., 2012).

Figures shows the results of the analysis:

Chart, bar chart

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**Figure** (1-5) Analysis of Twitter Data (Shelar et al., 2019)

**Analysis of Twitter Data** We want to use sentiment analysis to investigate tweets about donations, fundraising, and charities on Twitter. Under exploratory data analysis, techniques, and approaches to capture the polarity of people's sentiments toward donating for any cause. We determine whether a tweet is neutral, positive, or negative polarity using the Natural Language Processing Toolkit (NLTK). The data we use as training data and to gather prospective clients as a future goal is tweets related to donations (Shelar et al., 2019).

**Influence of Twitter**

"The ability to have an effect on the character, development, or behavior of someone or something," according to the Oxford Dictionary. To determine the online influence of Twitter users, a variety of factors can be considered. The more a user is followed, mentioned, and retweeted, the more influential he appears. However, there is no agreement on which characteristics are the most important, or even if other characteristics would be more discriminant. The majority of existing academic works take into account how the user interacts with others (e.g., number of followers, mentions, etc.), the information on his profile (age, user name, etc. ), and the content he creates (numberof tweets posted, textual nature of the tweets, etc) (Cossu et al., 2016).

Twitter messages contain information that encourages large groups of people to follow, retweet, and recite short narrative descriptions. Through the repeated devolution of twitter narratives, political personalities and their respective causes wield considerable authority and influence (Cook et al., 2014)**.** Several recent attempts have been made to track Twitter influence. For a 10-day period, the Web Ecology Project tracked 12 popular Twitter users and classified their influence into two categories: conversation-based and content-based. According to the findings, news organizations are better at disseminating information, whereas celebrities are better at simply engaging in conversation. Our research expands on their concept of influence by examining the spatial and temporal dynamics of influence using extensive data (Cha, 2010).

**Predicting Individual Influence,** we now look at an idealized version of how a marketer might identify influencers to help seed a word-of-mouth campaign, noting that the critical capability for a marketer is to identify individual attributes that consistently predict influence. We begin by describing the cascades we are trying to predict, reiterating that by "influence" we mean a user's ability to seed content containing URLs that generate large cascades of reposts (Bakshy et al., 2011).

Figures shows the distribution of cascade size and depths.

Chart, scatter chart

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**Figure** Frequency Distribution of Cascade Size (Bakshy et al., 2011)

**Twitter accounts’ Influence** the Influence Metric measurements for the investigated Twitter accounts are presented in this section. Figure shows the sampling date, the value of the Influence Metric, and other metrics. the Influence Metric is calculated using the most recent 100 accounts' tweets directly from the Twitter API. This allows for dynamic measurement based on the most recent trend activity of the investigated Twitter account (Razis & Anagnostopoulos, 2014).

**A picture containing text, crossword puzzle, receipt

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**Figure** The examined Twitter accounts' Influence Metric measurement and Twitter-related characteristics (Razis & Anagnostopoulos, 2014)

**Ranking user** the proposed method of assessing influence can also be used to rank users' influence. Below Table lists the most influential candidates based on their individual relationships. Their popularity is determined by the number of retweets, mentions, and replies they receive. Because different rankings are used for each relationship, the presented results do not show the global influence of candidates in the network. Users are also ranked based on how central they are. The number of candidates' neighbors in the multi-relational network is used to calculate it. This allows for a global ranking of candidates, but it does not provide any information about each candidate's level of influence. The examined Twitter accounts' Influence Metric measurement and Twitter-related characteristics (Azaza et al., 2015).

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**Table 1-4** (Azaza et al., 2015)

Our experimental goal in this section is to use our proposed approach to detect the most influential candidates on the network. We focus on the French election candidates, with 616 candidates and 4 million tweets.

**Analytical Tools for Estimating Twitter Influence** There are numerous analytical tools for calculating a twitterer's influence. Simple counters are insufficient to determine a user's network power. The way people interact should be used to measure influence. To calculate the influence degree, these tools combine some of the parameters mentioned above with others. Twinfluence, TwitterGrader, and Klout are the three tools used to collect and compare data (del Campo-Ávila et al., 2011).

**1.Twinfluence.** It's a straightforward tool for calculating the combined influence of tweeters and their followers. Twinfluence produces two kinds of rankings:

• Absolute ranking: it represents the user's reach (number of first order and second-order followers, with a maximum of 30,000) when compared to all other Twitter users Twinfluence has looked at. The metric is presented in two formats: list position and percentage of users with a lower score.

• Relative scores are calculated by comparing users who have a similar number of followers.

**2.TwitterGrader.** It only provides an absolute ranking that compares a user's performance to that of the entire population. According to Twinfluence, the score is expressed as a percentage of users with a lower score or as a position in the ranking. Apart from quantitative measures (such as the number of followers or the follower/following ratio), TwitterGrader infers the following metrics for calculating the influence score:

• Follower power: it calculates the TwitterGrader grade of the people who follow you (similar to Twinfluence's "social capital").

• Update frequency: a higher grade is usually associated with more recent updates.

• Retweets are the most common form of engagement.

**3.Klout.** It assigns a score based on a combination of factors that indicate how successful a person is at engaging their audience and how powerful their messages are:

• True reach: it considers how active a user's network of followers is in real life. It represents the total number of followers minus spammers, inactive accounts, and people with little influence.

• Amplification potential: the chance that your message will be retweeted or spark a conversation.

• Network score: a metric that indicates how influential people who retweet, mention, list, or follow you are.

Chart, waterfall chart

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**Figure 1-2** (del Campo-Ávila et al., 2011)

**Social Influence of Twitter** We used the launch of Windows 8.1 to demonstrate how information from the event was disseminated on Twitter in this case study. On October 17, 2013, Microsoft released Windows 8.1, and the Twitter search API was used to compile a one-month archive of tweets containing the key phrase "Windows 8.1." We collected a total of 450,250 messages from 206,792 users. Figure 1 shows that nearly 60% of related tweets were sent out within the first week of Windows 8.1's release. Within four days, the number of daily tweets plummeted from over 100,000 to under 20,000.

**Chart, line chart

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However, on October 21, when Microsoft temporarily removed the Windows RT 8.1 update from the Windows Store, the number of tweets increased to over 20,000. Since then, the number of tweets about Windows 8.1 has steadily decreased. The number of related tweets was only around 2,000 a month after Windows 8.1 was released. As a result, one month of data collection is sufficient to investigate the issues of social influence and information dissemination surrounding the launch of Windows 8.1 on Twitter (Shen & Kuo, 2014).

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**Table (1-4)** (Shen & Kuo, 2014)

# conclusions

In this paper, we looked at various approaches and surveys to determine the widespread use of Twitter and its impact. Because of the viral nature of social media, determining the influence of social media platforms is critical. This study examines Twitter in further depth and answers the question, "What is Twitter?" How many people use Twitter? What is the purpose of Twitter, and so forth? We demonstrated several data collection approaches and research that reveals the influence of twitter and users by examining this paper review. However, due to the cross-sectional nature of the study, we are unable to fully address the twitter data and analysis of twitter influence. As a result, we've covered most of the facts about Twitter as a social media platform and its influence.

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