Social Networking and Micro-Blogging Application Development: The Twitter API

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ABSTRACT

In this report we will explore the social blogging service: Twitter. We shall describe concisely what Twitter is, what it is able to, and give a technical overview with a 'how to start' guide. Overall, we shall look critical against strengths and weaknesses of this web technology.

1. PURPOSE, CONTEXT AND HISTORY

Twitter, also called "the SMS of the internet" [16], is a social micro-blogging service. This service allows users to put text on the internet with a maximum of 140 characters, similar to a Short Message Service (SMS). The idea is that we have the need to communicate certain events, experience or news. However we would not inform such messages via telephone or email; since that would be (socially) inappropriate. For these particular messages, Twitter offers a solution, by being a medium to express certain messages (such as: "I am cooking some nice food, anyone want to join?"). These messages can be read by people who subscribed to your account, which are called "followers". Or there is an option that everyone who has access to the internet can read them, without subscription to the person's account.

The purpose of this web technology, is in first instance to communicate information, in the most broadest sense of the word. If we look at the function, it would act more like a status update service, inspired upon the SMS. The SMS is similar as Twitter, in the sense that it is also for expressing short messages, which can contain different sorts of information, - with on their turn, has different purposes. However there is a difference between Twitter and the mobile SMS. The mobile SMS is bound to send only to mobiles, and has often one receiver. Twitter does support sending messages on mobiles, and also showing them publicly on the internet (therefore: it has many receivers). A question which might escape attention is : What is a status update? The answer to this question is dependent on the user interpretation. However, most often experiences, events, announcement, are considered to be one (e.g. "Having a discussion with Mark about Hegel", "I can't come home, stupid ashcloud…." or "Today is my birthday!"). In an ideal Twitter case, if one has experienced something, or wants to express an opinion that is influencing this person daily activities, one should post these messages on Twitter, called "Tweets". Theoretically every experience in daily life that can be considered as a status update, should be 'tweeted' by the user. Also it is possible to define status update partially by asking: "What are you doing?" and "What is happening or what is going to happen?". Still it should be noted that tweets contains far more, then answers on these questions, and are in essence not limited by any rule. Research shows that the content of tweets, can be categorized as follow:

- Pointless babble – 41%
- Conversational – 38%
- Pass-along value – 9%
- Self-promotion – 6%
- Spam – 4%
- News – 4%

See also figure below:

Content of Tweets

174　72　75
117
751
811

- News
- Spam
- Self-Promotion
- Pointless Babble
- Conversational
- Pass Along Value
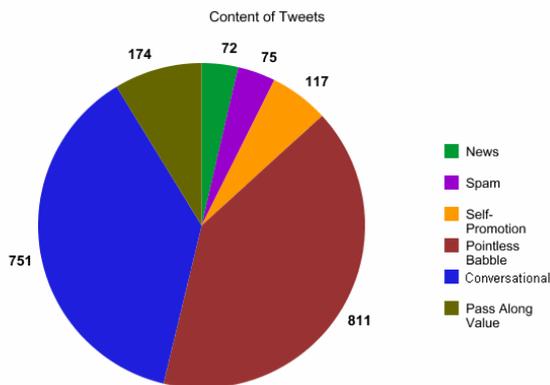
Kelly, Ryan, ed. (2009-08-12), "Twitter Study - August 2009" (PDF), Twitter Study Reveals Interesting ResultsAbout Usage, San Antonio, Texas: Pear Analytics. http://www.pearanalytics.com/wp-content/uploads/2009/08/Twitter-Study-August-2009.pdf

Jack Dorsey, Evan Williams and Biz Stone are the founders of Twitter in 2006. They started with the idea, to make an SMS for the internet, inspired by TXTmob [see also figure for sketch]. TXTmob is a service, similar to electronic mailing lists, but enables the user to share mobile phone SMS text messages with contacts and also strangers. Users are able to register and to send and receive messages to and from various groups ; related to specific topics.
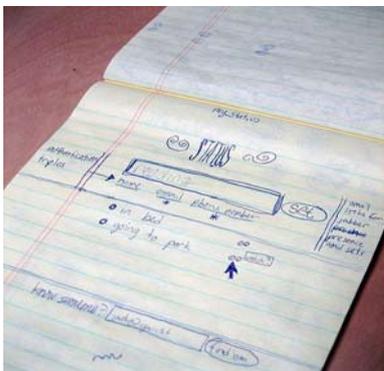

Figure 1: first draft of Twitter, inspired by TXTmob

The original name was not Twitter but twttr, inspired on the Flick connotation. Developers finished their first prototype on March 21, 2006. On this day Dorsey published the first Twitter message: "just setting up my twttr".

After their prototype launch, Twitter was used an interim service for a company called Odeo.

From October 2006 till April 2007, Twitter became officially "Twitter", with full business rights to continue without Odeo.

During a festival, South by Southwest (SXSW), in 2007, Twitter became increasingly popular and during this event twitter had their highest visitors and tweets. During the festival the usage went from 20,000 tweets per day to 60,000.

On March 2010, Twitter broke their record of 1,500 per cent growth in the number of registered users, also their the number of its employees has grown 500 percent, while over 70,000 registered apps have been created for the micro-blogging platform, starting from the first email about Twitter by Biz Stone.

At the end of 2007, there are been more tweets posted then 500,000 per quarter. This would increase to 100 million tweets per quarter at the end of 2008. Recent data shows that currently Twitter has more than 4 billion tweets per quarter.

On April 11, 2010, Twitter was made free to use on Mac and iPhones. , which is now official iPhone app for twitter.

Also during April, Twitter started with advertisement of big companies such as Sony, Red Bull and Starbucks.

3. STRENGTHS AND WEAKNESSES

Like other social networking/blogging sites, twitter is a tool that enables users to post their view, opinion, or any other statements in their own way. In this case, the people itself become their own media. They can post anything they like in a form of a text message no longer than 140 characters, from anywhere in the world. The massive amount of users (put here number of twitter users), make twitter one of the most powerful information source on the internet.

The simplicity of twitter, in a way that people are not necessary to write eight paragraphs long or upload dozens of photos, is strangely enough encourage more people to join twitter and speak their minds. This makes twitter a place where people can exchange ideas, look for the latest news or information, and follow the latest trends.

The powerfulness of twitter as a source of information and media to spread ideas and the 'real' news from people, also made twitter used as a more political platform, particularly during the Iran Revolution in June last year. Even the United States department of state asked twitter to delay the site maintenance to protect the interests of Iranians using the service to protest the presidential election.

However, since the people who twitter are just regular people who may not be bothered to justify what sort of news s/he receives and then post it on twitter, then twitter is highly unreliable. The news that one receives may be true if s/he really knows the person who tweeted it, but other than that it is really risky to trust information from twitter, especially if in relation with political situation for example.

And despite what most people use twitter for, it is not intended for communication platform. It is more like a modern version of word-of mouth, where one can say something and someone else passes it to his or her followers.

The high rise of Twitter gives a good growth in the development of the technology. And not only have the Twitter platform and API enabled hundreds of 3rd-party applications, they have helped spawn 43 other APIs and other application opportunities. In 2007, the API has 10x the traffic of the website.

The big community of Twitter developers also shares their experience in the forum, where they can help each other developing their applications and also share libraries. Currently there are numerous libraries for different programming languages available.

Realising its potential, the people behind Twitter keep updating their technology. In May 2008, Twitter added some API updates which include a feature where one can now update the Location field in a Twitter user's profile using the Twitter API. In 2010, it includes Local Trends.

However, this local trends feature received criticism due to its lack of usefulness. It is also full of spam, just like the global trends.

Another drawback from Twitter API is that it uses three APIs instead of one. Most application developers mix and match the APIs to produce their application. The separation of the REST and Search APIs is less than ideal and it is entirely due to history of Twitter.

The large amount of data retrieved from Twitter can also give problems to the network. To handle this, Twitter give a few explicit limits of what the developers can do; or mostly, to how much you can do. Unfortunately this also means the limitation of the kind of applications can be done with the platform.

Privacy issues

Twitter collects personally identifiable information about its users and shares it with third parties. The service considers that information an asset, and reserves the right to sell it if the company changes hands. While Twitter displays no advertising, advertisers can target users based on their history of tweets and sometimes may quote tweets in ads.

In May 2010, a bug was discovered that allowed users to force others to follow them without the other user's knowledge. One case was that comedian Conan O'Brien, who has been following only one person since joining Twitter, his following list increased up to nearly 200. Twitter responded by rolling back all followers to zero on May 10, restoring the original numbers later in the day.

4. INTENDED APPLICATIONS

The simplicity of twitter encourages developers to add more features to the micro-blogging application. This ranges from adding images and video, to see the latest trends, to status updates with certain location.

The following are some examples of the most used types of twitter applications:

Image Sharing

Image sharing is the most common activity in twitter after the usual text-posting. Most image (and also video) sharing applications give a place for users to put their images in the website and automatically create a link to their tweets.

- twitpic.
  The most popular image sharing application on twitter is Twitpic, launched in 2008 by Noah Everett. Twitpic was also made a huge impact in citizen journalism, in particular when US Airways Flight 1549 experienced multiple bird strikes and had to be ditched in the Hudson River in January 2009. A passenger on one of the ferries that rushed to help took a picture of the drowned plane and posted it on twitter using twitpic before journalists came to the scene.

- yfrog
  Other widely used image sharing application is yfrog, the default photo uploader in iPhone from ImageShack. Recently, yfrog can cross-post image or video uploaded to MySpace and Facebook. Yfrog also enables users to take photo or video directly from a webcam, and post it to twitter. The popularity of yfrog was also boosted by being commonly used by music celebrities.

- snaptweet
  Snaptweet is an application which enables users to integrate their twitter and Flickr account. For avid Flickr users, this application is very useful so that they can share their images both to their fellow-photography-enthusiasts in Flickr and their common friend in twitter.

- Mobypicture
  The large number of tweeps who tweet from their mobile phone resulted in high demand on mobile-twittering, including in image sharing. Moby picture is currently the easiest method of pushing pictures to Twitter. Users only have to send an email or MMS message containing a photo, a title (subject) and optional body text to twituser.twitpass@mobypicture.com, where 'twituser' and 'twitpass' are the Twitter login credentials.

Music Sharing

- blip.fm
  For music enthusiasts or DJ wannabes, blip.fm provides the tool where users can put their status update alongside the songs they are listening to. The account integrates with twitter (and also other sites) and allows users to share tracks back to their

Twitter friends.

- Tinysong

  It is a basic URL shortener for music by Grooveshark. Basically users can easily search songs on the application website, and then get a shortened URL for the track. Tinysong itself has its own API and thus other developers can also integrate it into their application.

- TwittyTunes

  TwittyTunes is a FoxyTunes feature that allows user to post their currently playing songs to Twitter and other social networking sites. FoxyTunes itself is a browser add-on which enables users to play their music in their preferred media player as they use the internet.

Location sharing

Most twitter applications that were integrated with maps or other geographical location tools serve the purpose of data visualisation. It is a good interface for those who want to make a research about twitter, as they can see from which part of the world the tweets are. Some examples from this kind of applications are Geo Twitter, Geotweeter, and MyTweetMap

URL shortening

URL shortening applications were not commonly used before Twitter became a huge hype in the social networking society. The applications were usually used for hiding web addresses in posts (usually for sharing illegal files) or shrinking them so they would fit on one line of page. But since the massive use of twitter, more developers were making URL shortening applications.

The most used URL shortening applications on twitter are TinyURL and bit.ly. However, in April 2010 Twitter launched its own URL shortener (http://twt.tl) to protect users from malicious sites.

Clients

Despite that the largest number of tweeps use the twitter website to tweet (15.7% by May 30, 2010), there is certainly a rise of the use of other clients compared to previous year. A really popular client is TweetDeck, which not only enables user to update their Twitter statuses from their desktop or iPhone, but also update other social networking websites like Facebook and MySpace. Other clients include Echofon, Seesmic, and Uber Twitter.

Social networks and/or messenger integrating

Some of Twitter clients like TweetDeck and Seesmic were already bundled with compatibility to update other statuses of the users. There are also plug-ins which enable users to synchronise their Twitter status updates with live messaging, like TwitterIM which integrates with MSN or ICQ Messenger, or TwitterYM which integrates with Yahoo Messenger.

Other applications

Apart from the already features above, developers are also developing the Twitter API so that they can have Twitter that have features that are already common to regular blogs or other social networking sites. The following are some examples:

- Twuffer

  Twuffer is an application that allows users to schedule tweets for a later date. This application is handy for bloggers who would like to tweet something at a specific date. It is also useful for forgetful people who would like to send a birthday wish for their friends or some people who wanted to occasionally tweet during the holiday.

- TwtPoll

  Since there are a massive number of people who uses Twitter, thus it becomes a very powerful tool to gather information. One way to retrieve information voluntarily from tweeps is by making a poll. With Twtpoll, users can create polls and post them via Twitter, Facebook, or e-mail. Users can then track the results in the shape of a pie chart from the Twtpoll website.

5. UNINTENDED APPLICATIONS

Twitter platform and the API have spawned hundreds of third-party applications, and some of them were at first not expected to be the kind of features for Twitter. Most of the applications are developed without serious concepts, only for fun, enabling Twitter to be in various parts of human daily life. The following are some examples for unintended applications using Twitter API:

Please Rob Me

Please Rob Me is a website launched in February 2010 by Frank Groeneveld, Barry Borsboom, Boy van Amstel that uses Twitter's search functionality to show location-based messages. Their goal is to raise awareness about the potential risks of location-awareness and over-sharing.

The issue with location-based information is that it exposes another layer of personal information that most people haven't had thought much about it, about their exact physical location at anytime, anywhere.

Social networks have increased enormously in size and number. Most of them allow you to relay messages between different sites and it's easy to lose track of just how much information you might be giving away and how many people have free access to it.

Remember The Milk

Remember The Milk is a reminder that will send the things

users need to do using direct messages. Users can add create their to-do lists by first signing up to Remember The Milk and add them (@rtm) as a friend, and then interact with the application with direct messages.

Qwitter Tobacco

Qwitter is a simple application for people who want to quit smoking. Basically all they need to do is counting the number of cigarettes a user smokes as they write a number after the "@iquit". Users are also able to make their own journal by putting "@iquit" before their statements. If they want to see their progress, users can go to the Qwitter website by putting their Twitter username at the end.

TweetChat

As stated before, Twitter was not meant as a conversation tool. However, more and more people sign up to Twitter to engage in conversations with their friends or online buddies. TweetChat is an application where users can create a chat room based on a specific phrase.

SecretTweet

SecretTweet is an application where one can post an anonymous twitter to the world. By visiting the website, one can make a short secretive statement and SecretTweet will put it on their twitter account.

6. Technical Overview

In this section we will show how one creates a simple web-script with the Twitter-API. Before that, we will give an technical overview of Twitter operations.

Twitter can be described as a form of real-time text messaging, for group. It that sense, it shows similarities to chatboxes, and discussion forums; although personal messages are still possible. The Twitter Web interface uses a an open source web development framework called Ruby on Rails.

From 2007 until 2008 the actual messages were handled by a Ruby server called Starling but since 2009 this has been gradually replaced with a multi-paradigm program language, called: Scala. Since Twitter is offering an API(Application Programming Interface) it could be integrated to other webservices and applications.

Twitter allows multiple hashtags (#) to categorize posts, and to increase search performances. Similarly, the letter d followed by a username allows users to send messages privately to their followers. Otherwise, the @ sign followed by a username publicly states the attached tweets are a reply to (or just mention) any specific users (who can find such recent tweets logged in their interface).

Since the end of 2009 the Twitter enables a feature, which makes it possible for users to follow and reply to lists of authors instead of following individual authors.

From the spring of 2007 until 2008 the actual messages were handled by a Ruby persistent queue server called.

We will describe now the Twitter API, for this the following information is needed:

1. Some knowledge on the concept of API's and how to make calls to the Twitter API

2. A configured apache server with PHP running on it

3. Scripting tools, the tools to create our Twitter script

4. A browser, to run the script

5. A Twitter account

6. Knowledge on scripting, to create our simple Twitter call via PHP

We will address the majority of these subjects. We will start with some elaboration on what API's can do, how they work and how the Twitter API can be used, second we will address on how to configure a server. The following subject that we will talk about is scripting tools and last but not least we will elaborate on how to run the script.

API

An API or application programmers interface is a set of functions and rules that are available for developers to connect their software to other platforms, software or services. In most cases they are used to provide **application A** with the information from **application B** with the use of a cross-platform messaging standard such as XML (see figure 1 for details). Twitter is no exception in this case.

```xml
<?xml version="1.0"?>
<note>
    <to>Tove</to>
    <from>Jani</from>
    <heading>Reminder</heading>
    <body>Don't forget me this weekend!</body>
</note>
```

Figure 1 XML example taken from w3schools

API's are commonly used in modern web-services, for example: Flickr, Facebook or Digg, they all have their own API's which all present their information to be processed in other applications. Good API's are always documented, the documentation can often be found on the homepage of the service itself. Often it is very well documented so that developers can understand how to make the API's communicate with their own services. Twitter has a very well documented API which can be found on: http://apiwiki.Twitter.com/Twitter-API-Documentation.

One can address the Twitter API through simple HTTP POST or GET requests. However there are some rules in calling the Twitter API:

- Apart from fetching the public timeline, you need to authenticate yourself with a valid Twitter user account if you want to use a Twitter API method. At this moment, Authentication happens through HTTP Basic Authentication. If haven't registered with Twitter, you can do so here.

- The Twitter API has limits for the number of requests you can make. You are allowed to make 70 requests per 60 minutes. This limit applies to all methods that need authentication. HTTP POST requests (sending a tweet, a direct message, etc. are an exception).

All this can be considered to be basic knowledge on the topic of applications programmer interfaces. In the next section we will continue our short tutorial and address the configuration of an Apache web-server with PHP. (Source: http://twittut.netsensei.nl/)

Configuring your own server

To run the scripts we need a server on which we can actually run the scripts. To run the scripts we will use the WampServer 2. This is a server which is already configured and only needs to install itself in a directory the user prefers, it's a rather easy installation. If one follows the following steps it will be an easy process to configure the server:

1. First download the WampServer Microsoft installer from the following link: http://www.wampserver.com/en/download.php

2. Run the setup file and install the WampServer 2 in a specified directory

If you have installed the Wamp server correctly you can see the icon in the lower right bar (figure 2) in windows.

Figure 2 The WampServer running Icon (red rectangle)

Now we'll move on to the configuration of the server, readying it for the Twitter PHP script we will be writing in the next section:

1. Navigate to WAMP\bin\php\(your version of php)\
2. edit php.ini
3. Search for curl, uncomment extension=php_curl.dll
4. Navigate to WAMP\bin\Apache\(your version of apache)\bin\
5. edit php.ini

6. Search for curl, uncomment extension=php_curl.dll
7. Save both
8. Restart WAMP

We want to be sure the WampServer runs correctly so that when you navigate http://localhost you will see the screen as presented on figure 3. Now we will move to the next section and create the actual script.

Figure 3 the Localhost server screen for the WampServer

Writing the Twitter Script

A prerequisite for writing the Twitter script is that to test the script we need a Twitter account. So to make this Twitter script work one must go to www.Twitter.com and register an account on Twitter. Now that we have done that we can start on writing the actual script, We advise you to use a tool called Notepad++ which you can download on http://notepad-plus.sourceforge.net/uk/site.htm.

We are going to use the following API call: http://apiwiki.Twitter.com/Twitter-REST-API-Method%3A-account%C2%A0verify_credentials. This API call posts all the users account characteristics on request from the PHP script. We can use this Twitter API by calling the following link in our script: http://api.Twitter.com/1/account/verify_credentials.[format*]

The API call does the following according the Twitter page:

" Returns an HTTP 200 OK response code and a representation of the requesting user if authentication was successful; returns a 401 status code and an error message if not. Use this method to test if supplied user credentials are valid."

Let's go over this, whenever we call the Twitter API with the verify credentials method, it returns a 200 OK response code and a representation of the Twitter user profile. Whenever incorrect login credentials are supplied it returns a 401 status error.

Let's start implementing our Twitter API call, if you recall correctly we configured the server to enable cUrl calls; that is exactly what we're going to start with. First off let's start with 3 variables

```php
$login =
"USERNAME_TWITTERACCOUNT:PASSWORD_TWI
TTERACCOUNT";

$tweets =
"http://api.twitter.com/1/account/verify_credentials.xml";

$tw = curl_init();
```

The **login** variable must be provided with the correct values, as already stated one should provide the username and the password of his or her Twitter account respectively.

With the tweets variable we are going to call the verify credential method of the Twitter API. Because PHP has a built in XML parser method we will ask for a XML document with all our accounts credentials. Later on we will use the tweets variable to process all the credentials one by one in a simple loop.

Now the third variable **tw** is initializes a cURL session **curl_init()**, for now it is enough to know that cURL can get files or send files via URL syntax.

```php
curl_setopt($tw, CURLOPT_URL, $tweets);

curl_setopt($tw,           CURLOPT_USERPWD,
$login);

curl_setopt($tw, CURLOPT_RETURNTRANSFER,
TRUE);

$twi = curl_exec($tw);
```

The next 3 methods are methods that set several options for the cURL session, preparing the cURL session for the actual   data-transfer. http://www.php.net/manual/en/function.curl-setopt.php discusses the several options in depth that can be added to the curl_setopt() function. The last variable **twi** executes the cURL session.

```php
$tweeters = new SimpleXMLElement($twi);

$i = 0;

foreach ($tweeters as $twit )

{

$i++;

echo     "Profile     characteristic".$i."
".$twit."<br />";

}

curl_close($tw);
```

In the last part of our script we will take look at the **tweeters** variable, this is a variable that calls the **SimpleXMLElement** in php; this is a method that creates an object array from a document request. Because we use the simple xml element method we automatically create an object array from the **tweeters** variable. And since the **tweeters** variable inherits all the information from the Twitter API call the tweeters variable will hold all the actual

information from our account as an object array; the lonely thing left to do is to read and print the array to visualize its data.

To read the tweeters variable we are going to use a foreach-loop that reads the **tweeters** variable as a new variable called twit. The foreach loop reads every single element from the object array and prints them with the **echo** method. Finally we close the cURL session to finalize the script.

Now that we finalized the script we can save it; we need to save it as a PHP file, you can do that in Notepad++ by selecting the prehypertext processor extension, choose to save it as Twitter_script.php. To make the script run on our installed apache server we need to save the script in the following folder "*WAMP\www*" . To run the script we need to open the browser and navigate to localhost/Twitter_script.php. If you have done correctly you will see all the verified credentials of your Twitter account, both simple and plain on the browser, see figure 4 for details on the representation of the script.


```
Profile characteristic1 148343147
Profile characteristic2 RVBrouwer
Profile characteristic3 RVBrouwer
Profile characteristic4
Profile characteristic5
Profile characteristic6 http://s.twimg.com/a/1274899949/images/default_profile_1_normal.png
Profile characteristic7
Profile characteristic8 false
Profile characteristic9 1
Profile characteristic10 9ae4e8
Profile characteristic11 000000
Profile characteristic12 0000ff
Profile characteristic13 e0ff92
Profile characteristic14 87bc44
Profile characteristic15 4
Profile characteristic16 Wed May 26 13:19:44 +0000 2010
Profile characteristic17 0
Profile characteristic18
Profile characteristic19
Profile characteristic20 http://s.twimg.com/a/1274899949/images/themes/theme1/bg.png
```

Figure 4 the finalized script running on the server.

7. FINAL THOUGHTS

We see an increase in social media usage, however our direct social contact is decreasing. For further research purposes, it would be interesting to ask, the reason for that social media, de-value direct contact or at least simulate the drop of direct social contact (even digitally).

What are the consequences of over twittering? Is twittering an addiction? What are the psychological implications of to tweet? Can we still enjoy our daily lives, of aesthetic moments, besides rushing to tweet about it, since we have an urge or even obligation to tweet?

What are the consequences for the environment, all this digital pollution, is not only ugly to see on the internet. It also demands more servers, more energy, and thus more environmental pollution! Of course do we really have to twitter?

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