

What’s in a Name?
Understanding Profile Name Reuse on Twitter

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ABSTRACT
Users on Twitter are commonly identified by their profile names. These names are used when directly addressing users on Twitter, are part of their profile page URLs, and can become a trademark for popular accounts, with people referring to celebrities by their real name and their profile name, interchangeably. Twitter, however, has chosen to not permanently link profile names to their corresponding user accounts. In fact, Twitter allows users to change their profile name, and afterwards makes the old profile names available for other users to take.

In this paper, we provide a large-scale study of the phenomenon of profile name reuse on Twitter. We show that this phenomenon is not uncommon, investigate the dynamics of profile name reuse, and characterize the accounts that are involved in it. We find that many of these accounts adopt abandoned profile names for questionable purposes, such as spreading malicious content, and using the profile name’s popularity for search engine optimization. Finally, we show that this problem is not unique to Twitter (as other popular online social networks also release profile names) and argue that the risks involved with profile-name reuse outnumber the advantages provided by this feature.

General Terms
Security, Measurement

Keywords
Social network; OSN; Profile name; Impersonation

1. INTRODUCTION

Users on Twitter are identified by their profile name, such as @taylorswift13. A user’s profile name is also used to directly mention accounts on Twitter, as well as to identify their profile page’s URL. However, Twitter provides profile names as a mere convenience to its users. Internally, the social network identifies accounts with unique numerical identifiers, so-called user IDs (e.g., the number 17919972 for Taylor Swift’s Twitter account). While user IDs are globally unique and persistent, they are usually not observed by end-users. With these robust identifiers in place, Twitter allows users to change the profile names of their accounts over time. As the concepts of stable user IDs as well as changeable profile names are crucial to this paper, we will use the terms user ID and account interchangeably to refer to the persistent notion of an account as identified by its user ID. Furthermore, we use the term profile name to refer to the changeable name the user chose for a given account. There are multiple reasons why a user might want to change their profile name, including changes of jobs and affiliations, changes of names due to marriage, or the selection of a different nickname. Interestingly, once a user changes her profile name, Twitter releases the old name for other users to adopt. The same happens if a user decides to delete her account. Only in the case of an account that gets suspended due to a violation of the terms of service, does Twitter make the profile name unavailable for other users to adopt.

There are many reasons why a Twitter user might take a profile name that was previously in use and then abandoned, both legitimate and malicious. It is possible that a person innocently selects a profile name that was previously in use, perhaps because it corresponds to a particularly common first and last name (e.g., JohnSmith). It is also possible, however, that a malicious entity will select abandoned profile names on purpose, in an attempt to leverage the residual reputation that this profile name might have. Miscreants trying to spread spam on Twitter might use this reputation in the hope of attracting more followers. Another use of abandoned profile names is Blackhat Search Engine Optimization (SEO) [19]. Since profile names identify the URL of the profile pages of accounts on Twitter, once a profile name is freed there will be multiple links on the web pointing to a non-existent page. By selecting an abandoned profile name with many URLs already pointing to it, a malicious user can start promoting his content and influence search results. Note that this is not a mere hypothetical scenario; the practice of harvesting abandoned Twitter profile names and using them for SEO purposes has been observed in the wild.

1https://twitter.com/taylorswift13
2https://twitter.com/tos
3http://www.inetsolutions.org/quickly-easily-find-high-authority-expired-twitter-accounts/
In summary, this paper makes the following contributions:

- We show that 1% of popular Twitter accounts abandoned their profile name between 2015 and 2016 and had it taken over by a third party; we then provide a number of case studies in which abandoned profile names are used to spread malicious content or to ridicule the original owner.

- We identify 196,200 accounts partaking in this practice, which shared 106,935 profile names over a period of six months. We show that accounts that take over abandoned profile names are more likely than regular Twitter accounts to post malicious content and get suspended by Twitter.

- We show that Twitter is not the only social network allowing profile name reuse, but that Tumblr and Pinterest allow this practice too. We argue that this practice should not be permitted because it enables malicious users to perform reputation hijacking and impersonation attacks.

2. DATA COLLECTION

Our dataset consists of a 1% random sample of all public tweets posted on Twitter over a period of six months, between October 10, 2015 and April 12, 2016. In total, the dataset contains 667,294,613 tweets posted by 70,803,606 distinct users (user IDs). Twitter’s streaming API provides access to this data as a stream of JSON dictionaries that include information about the message and about the account that posted it. We call the dataset of 70,803,606 users U. We used the dataset U for two purposes: to extract a set of popular profile names that were abandoned and taken by a third party, and to identify a set of regular accounts whose profile name was taken over. In the following, we describe these two datasets in detail.

**Popular account dataset.** To extract popular profile names that were freed and taken over by a third party, we proceeded as follows. First, we define a popular account as an account having at least one million followers. Therefore, we extracted all accounts in U that had more than one million followers at the time the data was collected.

We identified 4,263 accounts that fit that criterion. Second, we queried the Twitter API six month after data collection was completed to assess whether the corresponding user IDs were still associated with the same profile names that we observed during the data collection. After this procedure, we obtained 42 popular profile names that were freed and taken by another account. This is approximately 1% of all accounts with more than one million followers. We call this set of users C.

For 146 popular accounts, the Twitter API did not respond with valid information. In these cases, we visited the profile URL associated with the profile name, and we also queried the Twitter API for the user ID originally associated to that profile name. If the profile name was marked as suspended by Twitter and the user ID was not active anymore, we concluded that the original account was simply suspended for violating Twitter’s terms of service. If, however, the user ID was still active but the profile name that it had freed was blocked, we concluded that some third party entity took it over and used it for malicious purposes (e.g., to spread malicious content), resulting in suspension by Twitter.

**General account dataset.** Besides assessing popular accounts, we also analyzed the behavior of regular accounts. To this end, we analyzed U to identify accounts that engaged in profile name reuse during our observation period. We identified 196,200 accounts that shared 106,935 profile names during the measurement period, posting 3,290,286 tweets. These accounts constitute 0.27% of all accounts observed in our sample. We call this dataset G.

**Auxiliary dataset.** To better characterize accounts that partake in profile name reuse, we use a dataset of random Twitter accounts. This dataset provides a baseline of typical behavior of accounts on Twitter and helps to highlight differences in behavior shown by accounts involved in profile name reuse, compared to a regular account. To this end, we randomly sampled one million accounts from U. We call this dataset R.
Limitations. Although our dataset allowed us to measure the practice of profile name reuse on Twitter, it has some limitations. First, we can only detect two accounts as sharing the same profile name if they both posted tweets during the observation period, and if these tweets were both captured in the 1% sample that we collected. This means that our dataset is likely to make us underestimate the phenomenon of profile name reuse.

The limited visibility provided by our dataset can also impact the conclusions that we draw from our analysis. While accounts that are observed switching many profile names during the observation period are likely to be participating in profile name reuse schemes and are potentially malicious, the fact that an account is present in our dataset with a single profile name is not a guarantee that the account never changed its profile name. As we will describe in detail in Section 4, we took extra care in ensuring that we can infer the profile name change history of an account, but some of these limitations persist.

Ethics. Dealing with social network data raises ethical concerns. In this paper, we only used publicly-available Twitter data, and we successfully obtained ethics approval from the University College London ethics committee (Project ID 6521/004). To treat data ethically, we followed the guidelines outlined by Rivers et al. [22]. In particular, we ensured not to link multiple datasets together with the goal of further de-anonymizing the users contained in them, and we stored our data according to the UCL Data Protection Officer guidelines.

3. PROFILE NAME REUSE FOR POPULAR TWITTER ACCOUNTS

One of the main reasons for someone to take an abandoned profile name on Twitter is to hijack the “name recognition” held by that account. This opens up the opportunity for malicious actors to reach a larger audience and mount impersonation attacks. To understand the reasons why people take over abandoned Twitter profile names, we analyzed the accounts in the dataset C in detail. To recap, the profile names of these accounts belonged to popular accounts with more than one million followers. These accounts then changed their profile name, which was taken over by other accounts. In total, we found that 42 profile names were abandoned and taken over by another user. This accounts for approximately 1% of all accounts that appear in our sample and have more than one million followers. Comparing this number with the profile names that are reused in the dataset G presented in the previous section, we can conclude that popular accounts are four times more likely to have their profile name reused than generic Twitter accounts. We then analyzed these accounts in more detail to find out the reasons behind profile name reuse for popular accounts. Broadly speaking, we identified four trends.

Profile names taken over by a third party with clear malicious intentions. We identified that twenty profile names that were freed by their owners, were subsequently used in violation of Twitter’s terms of service, and were eventually suspended. Examples of these profile names include highly visible television outfits, such as, BBC Science News (@bbcsctech) and the Entertainment Channel (@eonline). These high-profile incidents show that attackers are actively using the reputation gained by popular profile names to perform malicious activity. Unfortunately, we were not able to collect evidence of the specific type of malicious activity performed by these accounts before they were suspended by Twitter since the offending behavior was not part of our 1% sample.

Profile names “protected” by a placeholder account. The aforementioned case studies show examples of how malicious actors are misusing abandoned profile names to their advantage. Unfortunately, Twitter does not provide an easy countermeasure for users who want to change their profile name, while not allowing anyone else to take the old one. We observe that some people managing popular Twitter accounts understand the risks of profile-name reuse, and overcome this problem by creating placeholder accounts that take the old profile name. These accounts usually do not post messages, but have a pointer in their profile description to the new profile name of the account. This strategy has been adopted by high-profile accounts such as Manchester City Football Club (@MCFC) and singer Enrique Iglesias (@enrique305).
4. PROFILE NAME REUSE IN GENERAL TWITTER ACCOUNTS

In this section we analyze the accounts in our dataset \( G \) in detail, with the goal of understanding the reasons why profile names are reused on Twitter, and measure the modus operandi of accounts that are switching between multiple profile names. We start by defining different types of accounts involved in profile-name reuse, and we continue with a detailed measurement of their characteristics and activity. We then look for the presence of links pointing to abandoned profile names, and investigate the possibility of using these links for SEO purposes, and to inflate the popularity of Twitter accounts. Finally, we go through some interesting case studies, exposing complex ecosystems of accounts sharing profile names and posting about common topics.

4.1 Types of accounts involved in profile name reuse

Accounts can be involved in profile-name reuse from various perspectives. There are accounts changing their profile name and taking another one, which was never held by another account, accounts that take an abandoned profile name upon creation without knowing it, and accounts that systematically take abandoned profile names for their gain (for example to hijack the reputation linked to those profile names). We group these activities into three types of accounts as follows:

**First unique account.** This type of account represents the typical behavior of a user changing their profile name and taking another one that was never used before, or deleting their account and consequently freeing its profile name. We consider an account as belonging to this group if it is the first one in our dataset holding the original profile name, and if it is the first one holding the new profile name of their choice as well. As we will explain later, if an account changes its profile name to a name that was previously used, or changes its profile name more than once during the measurement period, we consider this account as a “multi account.” Note that some misclassifications are still possible for this category, in particular if the account used multiple profile names in the past and this was not captured by our dataset. We observed 101,244 accounts (over 196,200 total accounts) belonging to this category (that is, first unique).

**Second unique account.** This type of account is one that holds a single profile name in our dataset, and that profile name was freed by another account. These accounts represent the cases in which an account takes a profile name that was previously used, either by chance or on purpose. One possibility is that the abandoned profile name is a popular first and last name (e.g., @johnsmith) and someone happens to have that same first and last name, or that an account owner decides to delete their account and start over again, using the previous profile name. Due to the limitations in our dataset, it is possible that a profile name switched between other profile names in the past and we did not record that. To mitigate this problem, we look at the creation date of each account. If the creation date is before the last time in which the first unique user corresponding to that profile name tweeted, it means that the account was already active back then, holding a different profile name that we did not observe. In this case, we consider the account as a “multi account.” We observed 15,911 second unique accounts in our dataset.

**Multi accounts.** These are the accounts that switched among more than two profile names. They are either observed holding three or more profile names in our dataset (two profile names that were previously used by someone else), or they are identified by following the procedures explained in the previous two categories. Multi accounts represent a systematic behavior in which an account changed many profile names, potentially to hijack the reputation of those names. We observed 79,045 accounts of this type in our dataset.

4.2 General characteristics of accounts reusing profile names

The first analysis that we performed was looking at the general characteristics of accounts reusing profile names. For each type of account described in the previous section, we obtained its creation time, its number of followers, and its number of tweets. We first looked at the life span of accounts reusing profile names. A Cumulative Distribution Function (CDF) of this metric for the different types of accounts is reported in Figure 1. The figure shows that second unique accounts are younger because, by definition, they are using only one profile name that has already been used by someone else during the measurement period. The earliest account creation time for them is therefore the beginning of the measurement period. Multi accounts are also generally younger than first unique accounts.

We then wanted to quantify the activity levels of the different types of accounts on Twitter. To this end, we studied the number of tweets posted on Twitter by the various types of accounts involved in profile name reuse compared to the activity of the random sample of one million accounts in our dataset. Figure 2 shows the average number of tweets posted by the accounts in our dataset per day. Accounts that are involved in profile name reuse generally post less tweets than the general Twitter population. First unique and multi accounts do not seem to show a significantly different posting behavior, while second unique accounts are much less active than the others, with 90% of them posting less than 10 tweets per day. As we mentioned in Section 2, this large...
counts under consideration. The number of followers is com-
monly regarded as a measure of reputation on Twitter [26],
and it ultimately regulates how many users will see the sta-
tutes posted by an account. To exclude biases due to the
age of accounts, we plotted the CDF of the average num-
ber of followers gained per day (Figure 3). Interestingly,
multi accounts are able to attract more followers on average
than general accounts, showing that switching profile name
to popular ones could help in gaining more followers. First
unique accounts also attract more followers than random
accounts, while the number of followers obtained by second
unique accounts is still less than for the other types.

Themes discussed by accounts reusing profile names.

Next to obtaining general statistics about the activity as-
sociated with accounts involved in profile-name reuse, we
wanted to understand the popular themes that these ac-
counts tweet about. We also wanted to understand if the
different accounts reusing profile names were tweeting about
different themes or not. To achieve this, we conducted Term
Frequency-Inverse Document Frequency (TF-IDF) analysis
on the text of the tweets. TF-IDF extracts important words
within a given text corpus, and the important words in turn
provide information about the general theme(s) of the text
corpus.

Before carrying out TF-IDF analysis, we preprocessed the
text corpus as follows. First, we removed all non-English
tweets; to identify such tweets, we just need to check the
language from the tweet metadata contained in the JSON
objects returned by the Twitter API. We could have used on-
line automatic translation tools to translate the non-English
text to English, but we found that they fail to translate some
of the tweets properly. Besides, automatic translation would
result in some loss of context which might bias our results.
Second, we filtered out all words with less than five charac-
ters, and also removed all non-printable characters. We then
carried out the TF-IDF analysis on the resulting text. In
total, we processed tweets in English from 54,238 accounts
associated with 26,678 profile names during the period of
observation.

Figure 4 shows the CDF of the percentage of common
words across the tweets of the different accounts that shared the
same profile name. We also grouped the important words we obtained from
TF-IDF analysis into different themes. The main themes
corresponding to the tweets of multi accounts is about “business.”
There are many reasons why an account can get suspended, including sending spam or impersonating an account. However, the possibility of taking abandoned profile names can facilitate malicious activity due to reputation hijacking. Among those categories, including Entertainment, News/Media, and Politics, among others.

In this section, we describe our analysis of the backlinks of reused Twitter user names, in an effort to quantify the misplaced trust that websites have bestowed upon these names. To this end, we started with the set $G$ of 106,935 Twitter profile names that were reused. We carried out this analysis immediately after the end of the data collection phase. We used Moz-Open Site Explorer\(^6\) to gather inbound links for each Twitter profile name contained in our set. We discovered that out of the 106,935 profile names, 12,037 (11.3%) of them had active inbound links on the web. The total number of discovered inbound links for these 12,037 profile names was 20,457. Next, for each page hosting a link to a reused Twitter account, we gathered three additional attributes, namely, its Rank, Safety, and Category. The Rank attribute is the Alexa rank of a linking page’s main domain (TLD + 1) and was sourced from lookups in Alexa’s top one million dataset, as well as scraping of Alexa’s API\(^7\) for the links having ranks greater than one million. In this manner, we were able to collect Rank information for 19,178 pages, leaving 1,279 pages without rank information. The categories of Safety and Category were provided by Trendmicro’s public website categorization engine\(^7\). We found that the vast majority of domains linking to the hijacked Twitter user names are safe sites and not exploit-ridden sites that link to Twitter accounts for SEO purposes. We also found that the vast majority of websites linking to reused Twitter user names are popular benign websites with ranks that imply thousands of visitors on a daily basis.

The discovered websites belong to a wide range of categories. The top three categories are Social Networks, Computers and Internet, and Sports, in that order. The remaining categories include Entertainment, News/Media, and Politics, among others.

\(^3\)https://twitter.com/tos

\(^6\)http://data.alexa.com/data?cli=10&url=alexa.com

\(^7\)http://global.sitesafety.trendmicro.com
We wanted to see if multi accounts have a preference for reusing profile names with more links pointing to them. We counted the number of links pointing to profile names that were reused at some point during our observation, grouping the accounts as earlier described (that is, second unique and multi account groupings). We found that users in the multi accounts category have a higher preference for reusing profile names that have more links pointing to them, than second unique accounts, likely for SEO purposes. Figure 6 highlights this observation, which we confirmed by applying chi-square tests to the data. Specifically, we tested the hypothesis that multi accounts have more websites linking to them with respect to second accounts. We tested the two categories by dividing the accounts in those to which at least two links in the wild were pointing at or not. The p-value of the statistical test is less than 0.0001, stating that there is evidence of difference between multi and second accounts.

Multi accounts have more websites pointing to them with respect to second unique ones, therefore this means that multi accounts are more likely to use profile names that have multiple links on the web pointing to them. We further observed that the majority of Twitter accounts in our dataset that reuse profile names and have inbound links have less than ten such links, with around 90% of accounts having five or less inbound links.

Overall, if we combine the information of ranking, category, and links pointing to reused profile names, we can safely conclude that the majority of websites linking to these hijacked Twitter user names are popular benign sites which have no knowledge of the fact that they are no longer linking to the accounts of popular users and celebrities, but rather to accounts that are now under the control of potentially malicious users. This confirms that profile name reuse in social networks is far from a theoretical danger since it is already happening in the wild.

### 4.6 Case studies

In this section, we analyze two case studies of accounts reusing profile names. These examples show different ways in which abandoned profile names are used in the wild.

#### Activity of second unique accounts

In Section 4.4 we showed that second unique accounts have a higher chance to get suspended by Twitter (10% compared to 5% for a random population of accounts). We investigated possible reasons why these accounts could have been suspended. We could not identify a common theme, since the activity of most accounts seemed unrelated to each other. We, however, identified evidence of accounts sharing links to YouTube videos that are now deleted for violation of their terms of service, as well as links pointing to malware and pornography. We also identified accounts from this type engaging in follow-back schemes [26]. Our hypothesis is that these accounts obtained abandoned profile names and started posting malicious content, hoping to leverage the residual popularity of these accounts to attract more victims.

#### A group of accounts sharing profile names

We identified an interesting group of 48 accounts that shared 187 distinct profile names. Every time one of the accounts released a profile name, another one took it. Figure 7 shows the timeline of this case study. Overall, the accounts involved in it changed profile name 246 times, often taking names that were previously abandoned. These accounts appeared to portray models from Asia, and the accounts were tweeting in Indonesian. One of the popular words that appeared in the tweets sent by these accounts was “follow,” indicating that the accounts that reused those profile names were likely involved in follow-back schemes, similar to the ones presented in previous work [26].

### 5. Discussion

In this section we first aim to understand whether the problem of profile name reuse is unique to Twitter. We then reason about our findings and offer some suggestions that social networks should put in place to avoid the security problems highlighted in this paper.

#### 5.1 Profile name reuse on other social networks

In this paper, we analyzed the phenomenon of profile name reuse on Twitter. As a further step, we wanted to understand to what extent other popular social networks allow their users to change their user name. To this end, we examined the terms of service of eight popular social networks other than Twitter: Facebook, Google+, LinkedIn, Pinterest, Reddit, Snapchat, Tumblr, and Youtube. We looked...
Figure 7: Timeline of a group of 48 accounts that shared 187 distinct profile names during the measurement period. Each line shows a different account, while the Y axis shows different profile names. Each dot represents a tweet sent by the account with a certain profile name. As it can be seen, accounts in this group typically changed profile name multiple times over the measurement period. It also happened in multiple occasions that a previously freed profile name was taken by another account in the group.

for clauses specifying whether a user is allowed to change their user name and if the released user name can be used by other users in the future. In case the terms of service did not contain a definite answer to these questions, we created two accounts on the platform, a1 and a2. We then changed a1’s user name (if that was allowed), and set up a2 to pick a1‘s old user name, checking if this was allowed. The results of our investigation are summarized in Table 1. We identified three categories of social networks, illustrated in detail in the following.

Social networks not allowing a change of user name. These social networks present the strictest settings, not allowing users to change their user name at all. Reddit8 and Snapchat9 belong to this group. Google+ and Youtube allow users to change the name of their profile up to three times in 90 days. This name is the one listed on the profile page of a user and used to directly mention her, but is not part of the URL of the profile page. At the same time, users are also allowed to set a handle for their page or channel, which allows people to more easily remember the URL associated to it (e.g., https://youtube.com/taylorswiftVEVO). After this name has been set, however, it is not possible to change it anymore.10 We mark both Google+ and Youtube as social networks that do not allow a profile name change.

Social networks allowing a change of user name, but not its reuse. Similar to Google+ and Youtube, Facebook and LinkedIn also allow users to change their name — a legitimate use of this being, for example, a user changing their last name after their spouse’s. Moreover, Facebook11 and LinkedIn12 allow users to change the user name that is associated to the URL of their public profile page. Facebook, however, limits their users to a single change of user name in the account’s lifetime. More importantly, after a user name is changed on these networks, it is not made available for others to use. Facebook and LinkedIn, therefore, are not vulnerable to the type of impersonation attacks described in this paper.

Social networks allowing both a change of user name and its reuse. Finally, Pinterest13 and Tumblr14 match Twitter’s capability in profile name reuse, both allowing users to change their user name and return the old user name to the pool of available ones. A user name on these networks identifies both the user, and the URL of their profile page (or their blog in the case of Tumblr). As a partial mitigation, Tumblr releases the old user name only after 24 hours from the change. These findings show that the security issues and the phenomena highlighted in this paper are not unique to Twitter, but can be found on other social networks too.

5.2 Recommendations to social networks

By using large-scale measurements and individual case studies, in this paper we described the problem of profile-name reuse on Twitter and how other social networks that follow similar name-reuse choices will likely suffer from the same type of abuse. We acknowledge that allowing profile name reuse can have some benefits and it is a user friendly policy that gives a high degree of freedom to users. We

8https://www.reddit.com/r/help/wiki/faq
9https://support.snapchat.com/en-US/a/change-username
10https://support.google.com/plus/answer/2676340
11https://www.facebook.com/help/203523569682738
12https://www.linkedin.com/pulse/20140424124611-12064186-how-to-customize-your-linkedin-public-profile-url
13https://help.pinterest.com/en/articles/edit-your-profile
14https://www.tumblr.com/docs/en/blog_management
showed, however, that this policy also has security implications.

The best solution to these security issues is, in our opinion, not to allow accounts to reuse abandoned profile names. Some social networks such as Facebook and LinkedIn allow the change of user name, but they do not allow the reuse of profile names that have already been used by someone; we suggest that Twitter, Tumblr, and Pinterest should adopt a similar policy to easily and effectively tackle the problem. As a less strict approach, social networks could allow accounts to take abandoned profile names, but should then start monitoring them for signs of malicious activity.

6. RELATED WORK

Being one of the most popular online social networks, Twitter attracted significant interest from the research community, who studied its general characteristics [15], how reputation on the network works [5], investigated peculiar traits of the service, in particular its microblogging features [16], and looked at the unfollow patterns of Twitter users [12].

Particular focus was given to the security issues around Twitter. Grier et al. performed the first large-scale study of abuse on the platform [10], while Thomas et al. studied marketplaces where one can buy fake Twitter accounts [29]. Stringhini et al. studied services that sell compromised accounts as followers to customers that are willing to pay for them [23, 26]. De Cristofaro et al. studied the ecosystem of services that deliver likes to the Facebook pages of their customers [6]. Based on the insights from this research, a number of systems have been proposed to detect malicious activity on Twitter, such as fake accounts [3, 17, 18, 24, 28], compromised accounts [8] or malicious accounts controlled by botnets [4, 25, 31]. Goga et al. studied the problem of impersonation on Twitter [9]. In this work, we showed how reusing abandoned profile names could facilitate the impersonation problem on Twitter.

The problem of profile name reuse on Twitter was originally presented in our preliminary work [20]. In that previous paper, we identified the security issues linked to profile name reuse on Twitter, identified 19,000 profile names that had been reused over a period of one month, and provided general statistics about them. In this paper, we took the study much further, analyzing more accounts for a much longer period of time, and performing a deeper analysis on the modus operandi and characteristics of accounts that reuse abandoned Twitter profile names. Jain et al. also published a study in which they show that users on Twitter temporarily change their profile names [13].

The problem of profile name reuse shares certain similarities with the phenomenon of cybersquatting since attackers essentially squat profile names that they do not own in an attempt to confuse visitors about the nature of a Twitter account. In a similar fashion, in domain squatting, attackers register domains that are confusingly similar to popular authoritative domain names, and abuse this similarity for various types of advertising fraud, phishing, and malware delivery [1, 2, 7, 14, 21, 27, 30].

7. CONCLUSION

In this paper we studied the phenomenon of profile name reuse on Twitter. We identified a number of interesting ways in which profile names are reused, some of which are malicious. We also showed that Twitter is not the only social network vulnerable to the issues highlighted in this paper. We hope that this work will help to raise awareness of the issues with freeing profile names after they have been abandoned.

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