It is not just a picture: Revealing some user practices in Instagram

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***Abstract*—In this work we investigate the user practices in Instagram, a social photo sharing service. Some interesting conclusions emerge from our analysis. For instance, users tend to concentrate their posts during the weekend and at the end of the day. Furthermore, people tend to endorse photos with many *likes* and *comments*, inducing the *rich get richer* phenomenon. Our findings can support future research on sociology and cultural analitycs research areas, such as on the proposal of new clustering algorithms based on the user practices in different social media networks.**

***Keywords*-Instagram, Post Popularity, Photography.**

I. Introduction

It is well-known that technology has been changing the way people see the world as well as interact with each other. Among the several technology innovations introduced in the latest years, the smartphone can be considered as one of the most important and impressive ones. The everyday use of smartphones with high quality built-in cameras combined with the online social networks, such as Facebook[1], Youtube[2], Twitter[3], Flickr[4] and Instagram[5], have lead to a new way of sharing and reacting to life events. This new environment brings several interesting questions about people's social behavior and the impact of these new technologies in our everyday life. Some works that explore these questions can be found in [1], [2], [3].

In this work, we focus on user practices in which a photograph application on smartphones is used to share life events experiences. We examine the use of Instagram, a social photo sharing service. Instagram includes dedicated mobile applications that allow users to take and manipulate photographs by adding filters and frames, and to share them online where other users can react through *comments* and *likes*. Launched in October 2010, Instagram has seen enormous growth. According to usage statistics[6], the service has 200 million registered users who have posted so far 20 billion photographs, with an average of 60 million photographs per day. Based on these numbers, Instagram can be considered one of the most popular applications for sharing photos and for interacting with friends, acquaintances and worldwide brands.

The examination of Instagram practices in our work is based on analysis of $1,265,080$ publicly accessible photos and videos posted by ordinary and popular Instagram users, selected either from specialized blogs[7] or randomly selecting an ID from the set of users. We analyze how users react to new posts through like and comment activities. Some interesting conclusions emerge from our analysis. Users tend to concentrate their posts during the weekend and at the end of the day. Moreover, people tend to endorse photos with many likes and comments, inducing the rich get richer phenomenon also presented on online and real-life social networks. From our results it is possible to infer that mobile technologies and social media applications play an important role on changing the relationship between people and photography. Nowadays, photography can be considered a powerful tool for expressing feelings and for telling about important life events to a large number of people.

We believe that the results we present in this paper provide a better understanding of how people interact with photographs in the social media era. Moreover, we think that our analysis reveal important cultural aspects that are beyond the photograph scope, providing valuable material to sociology and cultural analytics[8] research areas.

II. Related Work

Authors in [4] present an initial exploration of several user practices that have evolved around online sharing in websites, more specifically Flickr. They focus on how Flickr practices contrast with more traditional digital photo sharing, named by Richard Chalfen as Kodak Culture [5]. For instance, unlike Flickr users, Kodak Culture people communicate primarily within their existing social groups of friends

[1]http://www.facebook.com
[2]http://www.youtube.com
[3]http://www.twitter.com
[4]http://www.flickr.com
[5]http://www.instagram.com
[6]http://www.instagram.com/press (last access May 2014)
[7]http://web.stagram.com/hot
[8]http://lab.softwarestudies.com/p/cultural-analytics.html

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and family, sharing images of traditional subjects such as birthdays and family holidays. Furthermore, Kodak Culture people want to control the level of storytelling around and the privacy of different photos. Flickr users, instead, use it as a way to document their lives and view photosharing as a fundamentally public act, organizing themselves in different communities around different photographic styles or subjects.

Instagram is the most popular application that combines smartphones with cameras and the possibility of constant access to social media, enabling easy sharing of images of people's lives. Some academics studies are worried about characterizing the application itself without focusing on how users and their friends organize themselves around photos [6], [7]. In our work, instead, the main role is played by the photos themselves. We focus on the photos in order to reveal some cultural practices that take place through Instagram.

Few studies in the literature focus on understanding user practices and culture through the photos posted in Instagram. Hochman and Schwartz [1] analyzed a dataset of over half a million photos taken in New York and Tokyo and used visualization techniques in an attempt to highlight cultural differences. Authors in [2], instead, examined how users manipulate photographs by adding filters and frames, as well as the process of sharing them online where other users can react through comments and likes in a very specific environment: museums. Furthermore, authors rely on a small number of instagram posts ($\approx$ 225), drawing their conclusions by the data provided from interviews with 16 individuals. Here, our analysis is not limited to a specific environment and we are not focused on how users categorize their posts.

III. Dataset

The material used in our analysis englobes a dataset that was collected during February and March 2014. The dataset consists of $1,265,080$ photographs or videos from $256,398$ users. Data was collected using the Instagram Application Programming Interface (API)[9].

As we are interested in a broad type of user profiles, our dataset was collected in two different ways. First, we collected 200 profiles that belong to celebrities, professional photographers and worldwide brands, using specialized blogs[10]. Second, we randomly selected accounts from the users ID application set. In this way, it is guaranteed that our dataset is composed by popular and ordinary Instagram users.

We also collected a set of user features (*Total number of posts, Website, Total number and list of who the user follow, Total number and list of who follows the user - 'followed by' users*) as well as post features (*Identification number, Total number of tags - terms with #, List of tags, Total number of likes, List of users who commented and liked the post, Time and Day, Filter*). These features will enable us to identify user practices and, consequently, possible new trends on how people interact and share photography in the new era of social media networks.

Finally, in our dataset, 48% of the users have neither shared an image nor a video in their accounts. Active users (52%) can be divided into two groups: 85% of them have shared up to 30 posts and 15% of them more than 30 posts. As expected, engaging in Instagram has different levels of intensity. It is very likely that inactive users are those who signed up to the application either for curiosity (when the application was launched) or just for following other people (for instance, celebrities or brands). In the other hand, users that are very active may represent celebrities, professional photographers or brands that may use Instagram as a self-promotion media.

IV. Results and Discussion

We analyzed the data collected regarding how users feed the application and interact with the posts. In this section, we discuss our finding about *users' practices* in Instagram.

Figure 1 shows that Instagram users massively share their photos and videos over two days: Saturday and Sunday ($\approx$ 50% of the posts). We may suppose that users make extensive use of their smartphones to share interesting life events, that are more likely to happen at these particular days. Interestingly, a non-negligible number of posts is shared on Friday and Monday. Maybe a large number of them are related to weekend events.

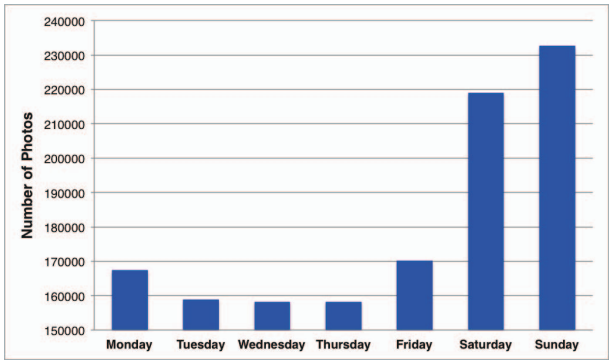

Figure 1. Shared posts over the days of the week.

Focusing on the daily basis shared posts, we note that users have some schedule preferences. Figure 2 depicts at what times users post more frequently. Posts are mainly shared during the afternoon and the evening, with the highest peaks at 21:00. A non-negligible number of posts is also shared overnight.

Next, we look at how users can enrich the image quality of their posts. Figure 3 shows the filters applied by the

[9]http://instagram.com/developer/
[10]http://web.stagram.com/hot

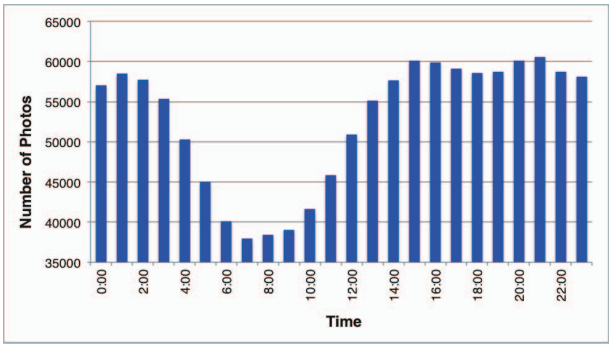

Figure 2. Daily basis shared posts. The Number of Photos axis is ranged in the minimum and the maximum number in our dataset.

users we monitored. In our dataset, the majority of the posts (76%) has some image processing. However, a non-negligible number ($\approx$ 24%) of shared posts is unfiltered (Normal filter or none). The users that shared posts without filters may be amateurs who still cannot work their smartphones. Moreover, photos may be treated outside Instagram application and they are then posted without using any native filters.

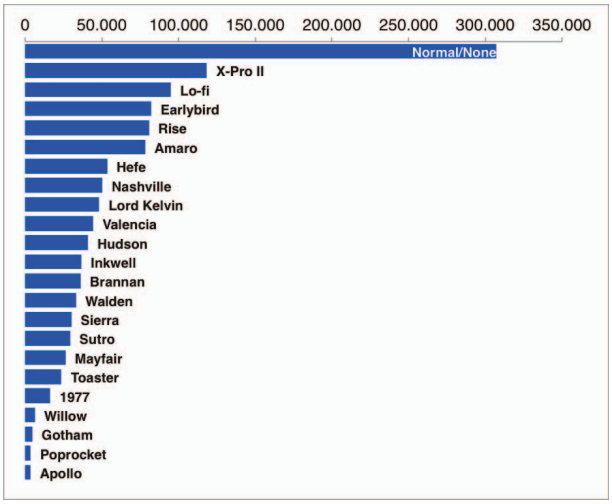

Figure 3. How users apply the filters in their posts.

Some interesting findings emerge on how users interact with the posts that are not posted by themselves. Figure 4 presents the number of likes received by the posts we collected (divided into one-thousand bins up to 10 thousand and above this amount). Similarly to the degree distribution in social networks, the number of likes follows a power-law distribution[11]. Figures 5 and 6 zoom in the first one-thousand bin, showing the likes distribution divided into one-hundred bins and into one-ten bins, respectively. The power-law behavior is preserved. It is worth noting that the behavior is similar in $[0, 10]$ range. Thus, some posts are more attractive than others and they catch more attention. These popular posts are highly likely to be posted by very participative users that tend to attract a large number of followers. In our database, the maximum number of *likes* received by a post was approximately $660K$. The total number of photos that do not receive any like is equal to $622,140$.

[11]Note that the last point is the sum of several one-thousand bins.

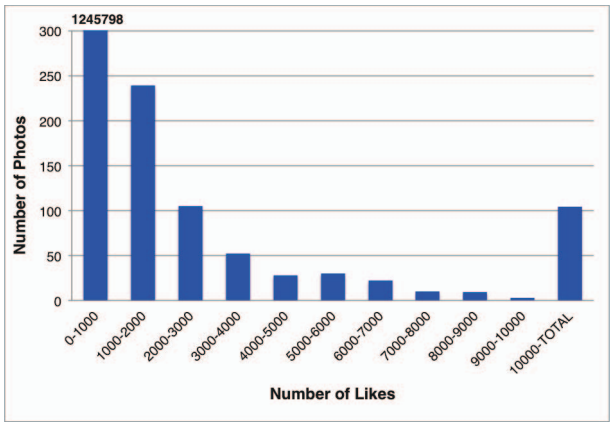

Figure 4. Post likes Distribution. The maximum number of photos with up to one thousand likes is $1,245,798$.

Figure 7 presents the most common tags associated with the posts that received more than 2 thousand likes. Some of them are related to events or celebration dates. For instance, let us focus on the *sochi* tag that appeared several times in our database. We know that the 2014 Winter Olympic Games took place at this Russian city in February and this tag is highly likely to be associated to this worldwide sport event. Another example, is the *valentinesday* tag associated with one of the most important celebration dates in the north hemisphere countries. We have also the *consproject* tag, an event organized by the Converse Company[12].

In Brazil, for instance, we can highlight the *bailedavogue* tag, a big event that occurs during carnival and every year attracts many celebrities and fashion personalities. In this sense, we may suppose that people enjoy interacting with

[12]www.converse.com

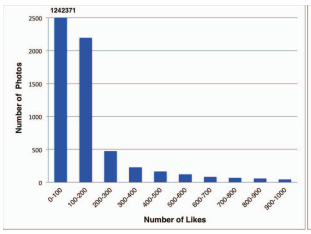

Figure 5. One-hundred bins.

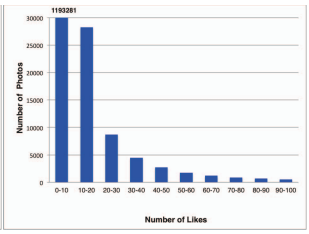

Figure 6. One-ten bins.

posts that are related to current real life events. Moreover, people use Instagram for telling how they are interacting or even reacting to these events.

Figure 7 also shows that posts shared by worldwide brands (*topshop, louivuitton, gucci, disney, converse*) receive a large number of likes. These posts may be shared either by the brands themselves or by their fans. It is well-known that brands use Instagram as a self-promotion media, attracting the public interested in their products. Moreover, worldwide brands are also promoted by bloggers that tend to have a large number of followers increasing the probability of attracting many likes. However, it is worth noting that interaction with posts is not only driven by a large number of followers, but also by the content of the post. We have also language expression tags such as *aw*[13]. Another interesting tag is *regram* which is the act of reposting on Instragram, revealing that people tend to replicate the most interesting posts.

Interestingly is that tag usage could attract likes from people who do not belong to a particular *followed by* list. It means that, tags can attract people who are interested in a Instagram profile in particular, as well as those interested in different types of events (music concerts, fashion weeks, etc.) or photo types (weddings, fashion, fitness, etc.). However, Figure 8 suggests that a large number of tags will not result in more likes. People who received the largest numbers of likes use to associate less than 5 tags in their posts.

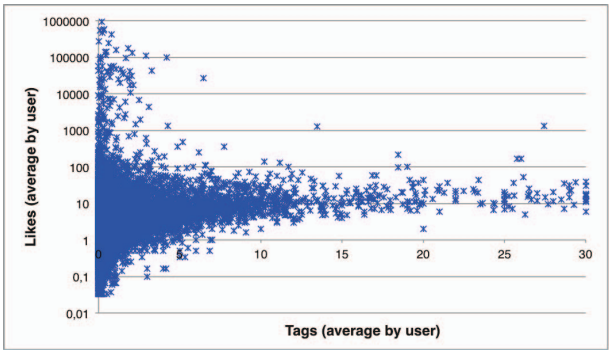

Figure 8. Average of post tags and likes correlation.

Moreover, Figure 9 shows that one feature that influences the number of received likes in an account, as opposed to the number of tags, is just the amount of people who follows the user, inducing the rich get richer phenomenon. Thereby, more followers attract more likes that could turn posts and even tags more popular.

Finally, we turn our attention to how comments and likes are correlated (Figure 10). It is interesting to note that posts with more likes also receive more comments. Users tend to comment posts that were already endorsed by other users,

[13]Used to express, for instance, pleasure, affection.

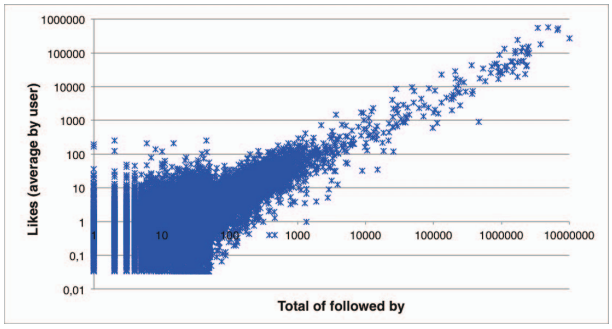

Figure 9. Number of followed by and average of likes correlation.

inducing, again, the rich get richer phenomenon with respect to the post popularity.

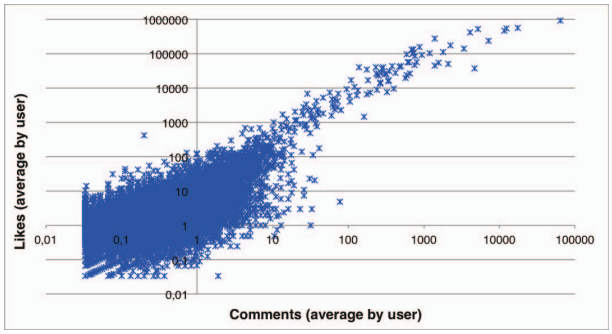

Figure 10. Average of comments and likes correlation.

V. Conclusions

In this work we focus on analyzing how people interact with photographs using the data we collected from the Instagram application. Based on our findings, we have noticed that users tend to concentrate their posts during the weekend and at the end of the day. People also tend to endorse photos with many likes and comments, inducing the rich get richer phenomenon. We could also understand the influence of tags over the amount of likes that some post receives and explore the content of the most popular tags in the data we collected.

We believe that the results presented in this work are the first step to beginning an exploration of how people are interacting with images nowadays. In times when online social networks and mobile technology have been acquiring greater emphasis, we would like to understand the behavior of users *with* photography and mainly *through* photography. One of our research focus is to understand how the social aspects of a tool influence the behavior of users. Furthermore, we want to know if these social aspects could define by themselves a user. Based on some of the results presented in this paper and these research focuses, we will depart to answer some research questions: How to validate our user practices hypotheses applying qualitative analysis? How

Figure 7. Most common posts tags with more than 2 thousand likes.

to perform a meaningful comparison among user practices considering different types of social media? How to extend our analysis applying cultural analytics theory? Is it possible to propose a clustering user practices driven algorithm? We plan to address these questions next.

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