



Research Report

A study of Facebook behavior: What does it tell about your Neuroticism and Extraversion?



Jianqiang Shen*, Oliver Brdiczka, Juan Liu

Palo Alto Research Center, 3333 Coyote Hill Road, Palo Alto, CA 94304, USA

ARTICLE INFO

Article history:

Available online 18 December 2014

Keywords:

Personality

Behavior analysis

Social network sites

Facebook

ABSTRACT

Social Network Sites offer users the opportunity to portray themselves with much freedom. People get an impression about a user based on this user's online profile, posted content and interactions with friends. In this paper, we examine how Neuroticism and Extraversion traits are expressed through such behaviors of a user on Facebook. While previous research relied on self-reported Facebook usage from small samples of college students, we developed a Facebook application to directly retrieve data from 1327 users. This enables us to study fine-grained signals embedded in users' behaviors, such as writing styles or number of "likes", and correlate them with users' personality. We present the features found to be significant and show that these features can be used to infer a user's Neuroticism and Extraversion.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

Social Network Sites (SNS) facilitate interpersonal interaction and allow for the maintenance of ties that may have otherwise gone dormant (Ellison, Steinfield, & Lampe, 2007). The increased awareness of others' activities could have profound implications for the way we keep connected with others and understand others (Berkovsky, Freyne, & Smith, 2012). People get an impression of a user based on the following SNS behaviors: (1) a "profile" created by this user, including basic demographics, personal interest and a list of friends this user chose to associate with. (2) Posted content, including videos, photos and "status updates" viewable to some or all of this user's friends. Status updates (a.k.a. posts) are broadcast messages that are written for others' consumption and usually are not tailored to a particular person. They are a major means to communicate with friends on SNS (Kramer, 2010). (3) Interactions with friends, such as "like" or "comment" on a post.

People are motivated to be seen as attractive, likeable, competent, and virtuous (Leary, 1996). Though SNS users strive to project a positive image of themselves (Barash, Duchenaud, Isaacs, & Bellotti, 2010), their portrayed images could still be quite telling of their underlying characteristics, such as personalities. Personality traits are consistent patterns of thoughts, feelings, or actions that distinguish people from one another (John, Robins, & Pervin, 2010). In a study conducted by Gosling, Gaddis, and Vazire

(2007), 9 undergraduate research assistants rated personality traits of 133 subjects by examining their Facebook profiles. They found some consensus about profile-based personality assessment, with particularly strong consensus for Extraversion. Such personality assessment shows some accuracy, compared with traits reported by the studied subjects and their friends. This suggests that there exist some specific cues eliciting personality related behaviors and those cues are actually valid indicators of what someone is like.

The popularity of Social Network Sites (SNS) such as Facebook provides a great opportunity to examine personality inference using significant amounts of data. Indeed, recent SNS offer a wealth of behavioral indicators ranging from profiles to activity statistics that could reflect a user's personality. This behavioral richness could be leveraged to infer the personality of the individual behind an SNS account. However, the problem of modeling personality from Facebook behaviors has achieved very little advance in terms of concrete data analysis. This is largely due to the difficulty in data collection. Researchers typically made their analysis based on the self-reported data from a small sample of students from a single university. There is no guarantee that the reported data is objective and reflects the real behaviors. The homogeneous, small-sized population likely leads to biased conclusion. The contradiction between some research results might be due to the above facts. For example, Ross et al. (2009) showed that Extroversion was found to belong to more Facebook groups and not necessarily be associated with more Facebook friends, while Hamburger and Vinitzky's (2010) demonstrated that Extroversion had a positive effect on the number of friends, but no effect was found with regard to the use of Facebook groups.

* Corresponding author. Tel.: +1 650 812 4428.

E-mail addresses: jianqiang.shen@parc.com (J. Shen), oliver.brdiczka@parc.com (O. Brdiczka), juan.liu@parc.com (J. Liu).

In this paper, we use a data-driven approach to personality modeling and prediction for Facebook users. We developed a Facebook application to directly retrieve data from 1327 users. From a user's profile, we extract a rich set of features and perform correlation analysis to discover which features are strongly correlated with the personality. The direct retrieval enables us to study objective, fine-grained signals embedded in users' behaviors, such as writing styles or number of "likes". Privacy concern often is a major hurdle to data collection and needs to be properly addressed. In our work, we have spent extra effort to guard personal information and designed a two-stage approach: (1) careful anonymization in the preprocessing stage to remove personally identifiable information (PII) such as name, address, email address and all numbers, and (2) the innovative design of an activity logger, which processes Facebook activities and retains only aggregated statistics. No raw content is logged in the feature set. Furthermore we assure that the aggregated statistics are sufficiently abstract such that the original content and/or meaning cannot be reconstructed from the feature set. These measures mitigate the privacy concern and are key to our data collection.

Some findings are expected and well in alignment with qualitative findings in social science studies. For instance, extroverts engage more actively in Facebook social activities. They share more photos, longer videos, and more status updates. Individuals high in Neuroticism are more likely to post accurate personal information. Our analysis also discovered some findings that we did not originally anticipate. For instance, we originally anticipated that neurotic users are more cautious and thus write less on Internet, but instead our analysis found that neurotic users tend to write longer posts, use more negative sentiment words and strongly subjective words in posts. Furthermore, we build a model to predict a Facebook user's Neuroticism and Extraversion. Our predictor achieves a modest accuracy with correlation $R > 0.3$. Giving the noisy nature of the online data and the difficulty in personality analysis, the prediction accuracy is encouraging. In this paper, we also report some preliminary results on other personality traits, with the hope of inspiring future research.

2. Related work and theoretical background

Personality profiling. Personality traits are consistent patterns of thoughts, feelings, or actions that distinguish people from one another (John et al., 2010). Different theories make different predictions about how mean levels of personality traits change in adulthood (Srivastava, John, Gosling, & Potter, 2003), but it is generally agreed that the personality profile affects our activity (Hogan, Johnson, & Briggs, 1997). First, having a specific personality trait means reacting consistently to the same situation overtime, for example, being agreeable or cooperative means consistently going along with reasonable requests. Second, to respond consistently in the same situation, people must have a capacity to respond to situational cues. Research has shown that it is possible to estimate a stranger's personality solely based on his/her behaviors (Kenny, Horner, Kashy, & Chu, 1992).

Personality profiles are usually constructed through surveys based on proven inventories of questions, e.g. International Personality Item Pool (Goldberg et al., 2006). Personality is readily expressed in specific cues in everyday life. Recent research has shown that when meeting a stranger face-to-face for the first time, it is possible to quickly assess their personality with some accuracy thanks to verbal and non-verbal cues (Kenny et al., 1992). For instance (Kenny et al., 1992), observers generally agree that Extraverted individuals speak louder, with more enthusiasm and energy, and that they are more expressive with gestures. Interestingly, personality cues can also be found in the physical

world: perceivers are able to accurately predict the personality of strangers by looking at their offices and bedrooms (Gosling, Ko, Mannarelli, & Morris, 2002), or even by examining their top ten favorite songs (Rentfrow & Gosling, 2006). There has been some success at predicting personality in a meeting scenario using visual and acoustic indicators (Lepri, Mana, Cappelletti, Pianesi, & Zancanaro, 2009).

Internet usage & personalities. Researchers have started exploring the connection between personality traits and general Internet usage. Modeling user personality based on Internet usage could enable better personalization of user interfaces and content (Ehrenberg, Juckes, White, & Walsh, 2008), more efficient collaboration (by forming groups of compatible individuals) in virtual games (Lepri et al., 2009), more precise targeted advertising, or improved learning efficiency by customizing teaching materials and styles (Muldner, Bursleson, & VanLehn, 2010), to name just a few possibilities.

Hamburger and Ben-Artzi (2000) demonstrated that on Internet "the poor can get richer", namely, that introverts could compensate themselves for the difficulties they experience in offline social interactions. It was shown that more introverted, less agreeable, and less conscientious students engaged in higher levels of Internet usage (Landers & Lounsbury, 2006). In anonymous forms of online communication such as chat rooms, individuals high on the trait of Neuroticism were more likely to post accurate personal information on their profiles (Hamburger, Wainapel, & Fox, 2002). Guadagno, Okdie, and Eno (2008) conducted a similar study of blogs and found that people high in Openness and high in Neuroticism were more likely to be bloggers.

Facebook & personalities. The explosive growth in the number of Facebook users motivated some research investigating personality cues in Facebook profiles. A study conducted by Ross et al. (2009) showed that individuals high on Extraversion were found to belong to more Facebook groups, but not necessarily be associated with more Facebook friends. They also found that Neuroticism was unrelated to the posting of personally-identifying information and those low in Neuroticism preferred posting photos on their Facebook profiles. While Ross et al.'s study relied on self-reports by participants, in a follow-up study Hamburger and Vinitzky (2010) asked a research assistant to hand-code user information on Facebook. Hamburger and Vinitzky's (2010) results are contrary to those of Ross et al.'s (2009) in some aspects. They demonstrated that Extroversion had a positive effect on the number of friends, but no effect was found with regard to the use of Facebook groups, and individuals with high Neuroticism were found to be more inclined to post their photos on Facebook than individuals with low Neuroticism.

Our study & contribution. In general, existing research agrees that there are associations between Facebook activities and a user's personality. However, the findings are quite controversial, mainly due to the limitation of collected data. This (re-)study seeks to expand the literature by using a larger population and more objective measurements to investigate digital traces related to the personality of Facebook users. Compared with the existing research, our study has the following unique merits. First, unlike the existing research that used a small sample of students from a single university, we recruited 1327 subjects from all over the U.S. Second, instead of relying on self-reports or hand-coding of user profiles, we developed a Facebook application called *iPersonality* to directly retrieve information from Facebook accounts. Third, while the existing research limited features to demographics and high-level usage (spent time, count of friends, groups, albums and photos), direct retrieval enables us to calculate much finer-grained signals that are salient to the audience yet never explored by researchers before, such as written content and interactions with friends.

Download English Version:

<https://daneshyari.com/en/article/350453>

Download Persian Version:

<https://daneshyari.com/article/350453>

[Daneshyari.com](https://daneshyari.com)