

*Mining Facebook in Identifying Software Engineering Students' Personality and Job Matching*

Kasturi Dewi Varathan, Li Thing Thiam

University of Malaya, Malaysia

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Abstract

Getting the job that suits our capability is a dream of each job seeker. But in real life, job seekers especially the fresh graduates may end up choosing a wrong career path because of ignorance of their own strength and weaknesses and improper guidance. When this happens, they tend to perform poorly in the job market. Understanding a person's personality helps in placing them in the right jobs and organization. In our research, we would like to focus on how Facebook can be used as a platform to judge the personality of a student and how it helps in matching the right job. The scope of this research is limited to software engineering students. A system was developed and is expected to help these students to be aware of their own personality based on their user-generated data from Facebook wall. Big Five Personality Model has been used in gauging the personality of each individual. Besides that, the system also suggests the most suitable software engineering jobs that fit the students based on their gauged personality. This will somehow help them not to take up the wrong career.

**Keywords:** personality; job match; Facebook; Big Five Personality Model

## I. INTRODUCTION

The rapid development of modern ICT in the past few years has resulted in an increasing number of people turning to the web for job seeking and career development. Many researches and systems have been developed in recruiting people for jobs by utilizing the information which is available on World Wide Web. Studies by Richard Doherty (2010) shows that the amount of personal data available in social media is more accurate compared to the CV that has been produced by the applicants. This indicates that social media has successfully created worthy data that can be looked upon and these data basically adds more value to many organization's recruitment activities. According to JobVite social recruitment survey conducted in San Francisco, about 80% of companies uses social media data for their recruitment purposes and from this 80%, 95% uses LinkedIn(JobVite Social Recruitment Survey).

On the other hand, the trend of using facebook for career purpose has increased due to the wide popularization of the media. Although it is usually used for leisure but the user generated materials that it contain becomes increasingly relevant to their own professional lives. Burhanna et al.(2009) had stated that Facebook has become a compulsory activity for the students and it has become a part of students' campus life. This finding was further strengthen by socialbakers.com which statistics has proven that majority of Malaysian facebook users lies between the age of 18-24. Meanwhile, Kohnle(2009) has also revealed that even recent graduates employs social media during their job search. The wide usage of this social media among students has created wide range of user generated information which can be very useful if utilized properly in preparing students for job market .

Past research has shown that there is mismatch between our local graduates' capabilities with the industry's needs (Gurvinder Kaur & Sharan Kaur, 2008). There are many reasons which have been stated for this mismatch. One of the main reason is graduates are lacking in the relevant skills to fit the job scope (Shah 2008). When this matter is analyzed further, it indicates that they are unaware of the required skills(Asmak Shafie & Nayan, 2010). Therefore making them to be left behind in the race of job hunting. Jobseekers especially the fresh graduates may end up jobless or with jobs that do not fit their strengths and capability. When this happens, they tend to perform poorly in job market, blame the higher education syllabus which failed to cater for their job needs, etc. All these problems triggered mainly because the students themselves failed to realize their own capability and ignore the degree of suitability of job with their personality.

There are researchers which had been conducted in the past on gauging the personality of the users of facebook(Sumner, 2011; Bachrach et al., 2012; Golbeck et al., 2011). Sodiya et al.(2007) had matched the types of personality traits with Software Engineering Jobs based on Big Five Personality Model. This research work has gone a step ahead in integrating these independent works by linking the personality that has been derived from Facebook to the suitable software engineering jobs. Around 30 students had tested the system and retrieved their personality information from facebook wall. This information are then analyzed and matched with the suitable software engineering jobs. The system had enabled them to identify their strengths and weaknesses and help them to match their personality with a suitable software engineering jobs.

## II. RELATED WORKS

Popular social media platforms include Facebook, Twitter, Blogspot, LinkedIn and Google Plus. Due to the popularity of social media in recent years, there is a lot of information shared in profile and this information somehow reflects the personality of profile's owner (Bachrach et al. 2012). Several authors had reviewed the relationship between social media and personality. Golbeck et al.(2011) collected most recent 2,000 tweets from users. From Twitter account, statistics such as number of followers, number of hashtags, and words per tweet had been collected to find out the correlation between personality and twitter behaviour.

Besides Twitter, Facebook also has become one of the sources in which these types of personal information have been shared in an open manner. This information could be about friends, events, photos, groups or wall posts. Past research by Golbeck et. al(2011) had shown that there exist correlations between Facebook activity and personality traits. They had predicted user's personality through publicly accessible information in user's profile such as personal info, language features, personal info, activities and preferences. Another study by Sumner et. al(2011) had explored the extent to which it is possible to determine personality traits and privacy concerns based on Facebook usage.

Big Five Model has been chosen to predict user's personality in this study since it is one of the most widespread and generally accepted models of personality (Wehri 2008). Big Five Personality factors (OCEAN) include **O**penness to experience, **C**onscientiousness, **E**xtroversion, **A**greeableness, and **N**euroticism. Figure 1 shows the Big Five Model with five factors as stated by Golbeck, Robles & Turner (2011).

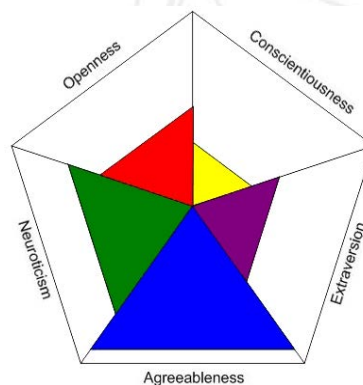


Figure 1: Big Five Model

Openness to experience is the first factor of Big Five Personality factors. People who are high in openness to experience tend to be curious, creative and open to new ideas (Bachrach et al. 2012). They are interested in trying new things and highly motivated to learn new skills. The second factor, conscientiousness measures the degree of a person in organized, systematic, and dependable. Conscientiousness persons are enjoying in planning and seeking for achievement and goals in their life (Bachrach et al. 2012). Extrovert is friendly people who desires excitement and take risks, whereas the introvert is quiet, reflective person who prefers his or her own company and does not enjoy large social events. Agreeableness, as the forth factor, reflects individual differences in concern with cooperation and social harmony. Lastly, neuroticism refers to the degree to which a person is anxious, temperamental, and moody

(Golbeck et al. 2011). It is found that people who are belonging to neuroticism tend to be stress, nervous and unhappy in their life (Bachrach et al. 2012).

From a recent study by Bachrach et al.(2012), it shows that there are relationship between Facebook profile features and Big Five Model. According to Bachrach et al.(2012), openness to experience is in a positive relationship with the number of status updates, photos, groups, and “likes”. This can be explained by those who like to share comments with their friends and enjoy seeking new things. Conscientiousness is found to be negatively related with number of friends, likes and group membership. Those who score high on conscientiousness spent less time on Facebook, had fewer Facebook friends, belonged to fewer groups and posted fewer photos to Facebook than those who are score low on conscientiousness. Those high in extroversion were correlated with a large number of self-reported Facebook behaviour. They tend to interact more with other users using Facebook groups, which allow exchange of information and interaction with a wider set of people. On the other hand, agreeableness is positively correlated with number of friends, groups, and “likes”. Neuroticism is reported to be positively correlated with number of Facebook likes.

### III. MINING FACEBOOK

Trend in using social media for job search have increased since the popularization of Facebook and other social media. Study by Sodiya et al (2007) had looked at the assessment of personality traits in Software Engineering jobs. In their research, they had found the relationship between different Software Engineering jobs and six personality factors. Instead of using only Big Five Model, this study consists of another personality factor which is Cognitive Ability. We have extended their research by linking the Big Five Model with Facebook. The conceptual model of job matching by using user generated data from Facebook is shown in Figure 2.

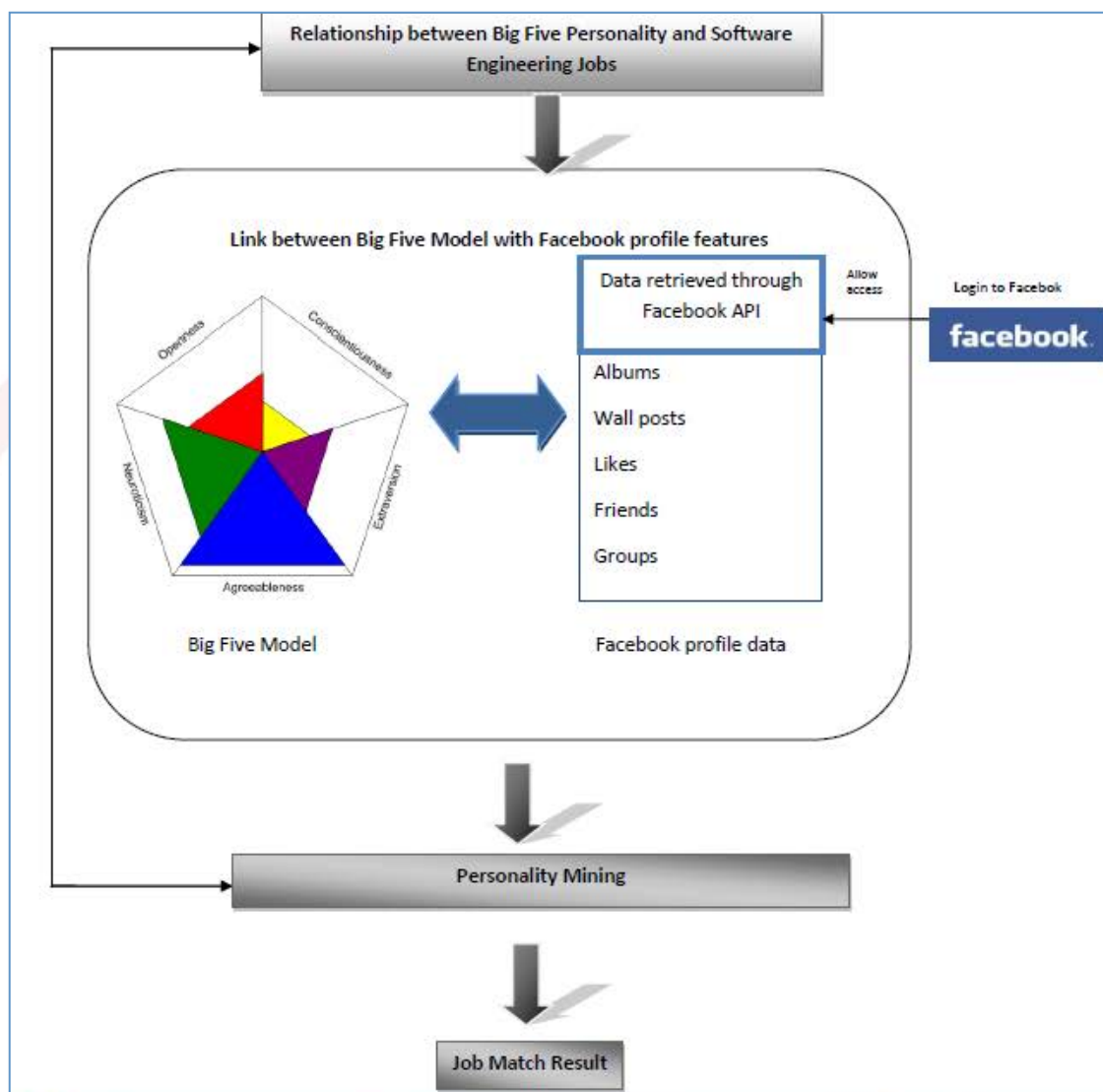


Figure 2: Conceptual model of job matching by using user generated data from Facebook

The conceptual model of job matching by using user generated data from Facebook describes the overall process of job matching in our research. The job matching process begins by utilizing the studies which was conducted earlier by Sodiya et al.(2007) between Big Five personality and software engineering jobs. It is then followed by mapping between the Big Five Model with Facebook profile features. In this study, we are focusing on the main Facebook profile features such as albums, wall posts, likes, friends and groups. A Facebook application named “Job Match” was built to retrieve the participant's Facebook profile data. Users will be able to view the calculated Facebook Personality and Job Match result based on the relationship between Big Five personality and software engineering jobs as shown in Table 1.

## Relationship between Big Five Personality and Software Engineering Jobs

To predict a user's Facebook personality, we have utilized the relationship between Big Five Personality and Software Engineering Jobs (Sodiya et al.,2007). The table of relationship between Big Five Personality and Software Engineering Jobs is shown in Table 1.

Table 1: Relationship between Big Five Personality and Software Engineering Jobs

Big Five Personality	Low	Medium	High
Openness to Experience	E2,E3,E4	E1,E6	E5
Conscientiousness		E1,E4,E5	E2,E3,E6
Extroversion	E1,E3,E4,E6	E2,E5	
Agreeableness			E1,E2,E3,E4,E5,E6
Neuroticism	E1,E2,E3,E4,E5,E6		

Note:

E1: Management Engineers

E2: Requirement Engineers

E3: System engineers

E4: Programmer

E5: Tester and Implementer

E6: Evaluator.

From Table 1, each factor in Big Five Personality traits is divided into three different ranges, which is low, medium, and high. For different range of personality, there are different software engineering jobs that suits it. The software engineering jobs represents by E1, E2, E3, E4, E5, and E6. By referring to table 1, we can conclude that those who belongs to group of high in agreeableness and low neuroticism is suitable to all kind of software engineering jobs. Besides that, those who belong to group of low conscientiousness, high extroversion, low or medium agreeableness and medium or high in neuroticism do not suit any kind of jobs. On the other hand, people who are low in openness to experience will be suitable to be requirement engineers, system engineers or programmer. In contrast, those who score high in openness to experience only suitable choose the career as tester and implementer. Management engineers and evaluator fits the people who are medium in openness to experience. Introverts are suitable to jobs such as management engineers, system engineers, programmer or evaluator. People who fall under the group of medium extroversion match the jobs as requirement engineers or tester and implementer. Lastly, high conscientiousness people will suit the job of requirement engineers, system engineers and evaluator the most whereas medium conscientiousness people should chose their career as management engineers, programmer, or tester and implementer.

## Mapping Big Five Model with Facebook profile features

In this study, we have mapped each of the Facebook features with Big Five Model. Based on the samples collected, the low range, medium range and high range of each Facebook feature is determined. It is followed by the measurement of respondent's personality based on each Facebook feature. The features that will be discussed in this study are number of albums, number of wall posts, number of likes, number of friends and number of groups. These features show either positive or negative relationship with five personality traits. The relationship between each Facebook features and Big Five Model is shown in Table 2.

Table 2: Relationship between each Facebook Features and Big Five Model

Facebook Features	Openness to experience	Conscientiousness	Extroversion	Agreeableness	Neuroticism
Number of albums			+	+	+
Number of wall posts	+				
Number of likes	+	-		-	+
Number of friends			+	+	-
Number of groups	+	-	+		

The relationship between each Facebook features and Big Five Model is mainly derived from three past study on predicting personality of Facebook users, which is study by Golbeck et. al(2011), study by Sumner et. al(2011) and study by Bachrach et al. (2012). The positive (+) sign indicates positive score feature while negative (-) sign indicates the reverse-score feature. Positive score feature indicates the existence of a positive correlation with Big Five Model while reverse-score feature is negatively correlated with Big Five Model. For example, number of albums is positively related to extroversion, agreeableness and neuroticism. Meanwhile, number of wall posts shows positive relationship with openness to experience. As for number of likes, it shows positive correlation with openness to experience and neuroticism but negative correlated with conscientiousness and agreeableness. Extroversion and agreeableness are positive related with number of friends. However, neuroticism shows a negative relationship with number of friends. It indicates that the highly neuroticism people have fewer friends in Facebook profile. Lastly, number of groups is in positive relationship with openness to experience and extroversion but negative correlated with conscientiousness.

## Personality Mining

It is followed by the calculation of Facebook personality after the relationship between each of the Facebook feature and Big Five Model had been checked. A scale score table is created as shown in Table 3.

Table 3: Table shows scores of different range with positive-score feature and negative-score feature

Range	Positive-score feature (+ sign)	Negative-score feature (- sign)
Low	1	3
Medium	2	2
High	3	1

For low range, it will be computed as 1, whereas for medium range, it will be computed as 2 and for high range, it will be compute as 3. For reversed features (with – sign), the computation of marks is reversed, which means low range is 3 and high range is 1. Table 4 shows the sample computation that has been made in computing the score for neuroticism based on Facebook features that have been obtained from a student:

Table 4: Sample Computation for Neuroticism based on Facebook Features

Facebook Features	Neuroticism	Range	Score
Number of albums	+	High	3
Number of wall posts		- (Not related)	-
Number of likes	+	Medium	2
Number of friends	-	Low	3
Number of groups		- (Not related)	-
<b>Total Score</b>			<b>8/9</b>

There are 3 Facebook features that relates to neuroticism, which means total score of all features computed is 9. Then, the range of each Facebook features is determined based on the Table 3. Finally, the total score by adding on all the score of features is computed. The total percentage for the example shown above is 89%. From the total score obtained, it can be concluded that the person falls under the group of high neuroticism. The same process is applied to other four personality traits. After the personality traits are determined for each of the user, mapping of these traits to the job is determined based on Table 1.



## Job Match Result

The results of job matching are the best choices of jobs recommended based on the personality traits of each user. Top 3 choices of jobs are recommended as shown in Figure 3. The matched result is computed by using the concept of intersection sets of jobs that relates to the Big Five personality traits.

<b>Job Recommendation:</b>	
First Choice:	Programmer
Second Choice:	System Engineers
Third Choice:	Management Engineers

Figure 3: Sample of User's Job Match Result

## IV. CONCLUSION

The developed prototype managed to retrieve the required information and gauged the personality of students based on Big Five Personality Model from user generated data which was extracted from Facebook. Besides that, the prototype also suggested 3 most suitable software engineering jobs that fit the student's personality. This information managed to create some awareness among students on their own personality and the jobs that fits them well. This kind of awareness will be very helpful for them in setting the right path for their future career. For further research, we would like to extend this research beyond software engineering jobs by accommodating other jobs as well.

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