Assessing a candidate's natural disposition for a software development role using MBTI

Daniel Varona
CulturePlex Laboratory
Western University
dvaronac@uwo.ca

Luiz Fernando Capretz
Faculty of Electrical and Software Engineering
Western University
lcapretz@uwo.ca

Abstract

Over the past decade, there has been a marked interest in understanding the personal traits of software developers and their influence on the process of assigning people to roles, as has been evident from the growing number of related publications on this topic. This study is part of a larger research project focussed on identifying the elements associated with the candidate´s personal traits and how these traits better fit with particular software development roles. Our goal in this study is to complement the current approach to assigning roles, which is based on an individual's capacity to fulfill a role´s functional competencies profile during the assignment process. Our approach helps to support the assigning of people to software development roles by providing a set of tools, based on Myers-Briggs type indicators, to assess a candidate´s natural disposition. To do this, we modeled the results obtained in a previous study on software developer preferences for tasks associated with software industry roles. As a result, we obtained a set of rules to be considered at the time of assignment— relationship values between MBTI type indicators based on preferences— and then mathematically formalized a coefficient to evaluate the natural disposition of candidates during the allocation process.

Keywords: Software Project Staffing, Role Natural Disposition Assessment in Software Industry, MBTI, Assigning People to Role in Software Projects, MBTI and Software Projects

Introduction

There is no doubt that the software industry is key to all spheres of society: economic, social, political and infrastructural. Due to its wide range of applications, it is difficult to conceive of an industrial branch without a software component. Behind that technical coverage, there is a project team, the group of people who make it possible. Like any other industry, software needs raw materials.

In the case of software development, the raw material is expressed as technical and non-technical competencies, and as the communication skills required from developers, among others, that contribute to enhancing the synergy of the team. Considering that software projects tend to be planned in shorter periods of time each time, the synergy of the team gains a significantly greater value. In terms of the contribution of each member to other members of the

team, the software industry is an ecosystem where the success of the projects depends chiefly on proper role assignment and adequate project team staffing from the beginning of the project.

Over the past decade, academics have become more interested in the relationship between natural disposition and the suitability of software development roles and have begun researching new approaches that can complement the current process of assigning roles in software projects. These approaches include studies on personality traits (Varona, Capretz, Piñero, & Raza, 2012) (Varona, Capretz, & Raza, A multicultural comparison of software engineers, 2013) (Capretz, Waychal, Jia, Varona, & Lizama, 2019) (Lizama, Varona, Warchal, & Capretz, 2020), and team staffing (Mazni, y otros, 2016) (Aritzeta, Swailes, & Senior, 2007) based on team roles, to name just two examples. The present research continues work done in a previous study (Capretz, Varona, & Raza, Influence of personality types in software tasks choices, 2015) conducted by the authors, which sought to describe the distribution of MBTI indicators among software developers and to identify their preferences for certain software related tasks that were historically linked to roles such as Project Leader, Analyst, Designer, Programmer, Tester, and Maintenance related roles.

While it is true that these more defined roles are closely tied to heavy software development methodologies, and that most projects are currently implemented following flexible development methodologies, we must point out that in such cases roles do not dissolve but are mixed. Ones acquiring responsibilities subscribed to other, and therefore, the needs that the role demands of the individual who performs it remains untouched. One may acquire responsibilities that have been assigned to another person, but the demands on the individual of the originally assigned role remain unchanged. Therefore, the need for a proper human resources allocation from the very beginning becomes even more important.

This study aims to identify a set of patterns based on software practitioners' preferences for certain software tasks and the distribution of their MBTI-type indicators gathered in (Capretz, Varona, & Raza, Influence of personality types in software tasks choices, 2015), that can be used to model a natural disposition coefficient towards the role a candidate is given. And together, both tools support the decision-maker while role assignment subprocess in the process of human resources acquisition for software projects.

Method

Firstly, we converted the software practitioners' preferences exhibited in (Capretz, Varona, & Raza, Influence of personality types in software tasks choices, 2015) into "If - then" rules that we then processed using R. This resulted in 1500 rules that we summarized using R features for

rules summarization. With the resulting set of rules, it was possible to identify a set of patterns which are related in the Results and Discussion section.

Next, and also based on the software practitioners' choices of software tasks and their preference priorities over the studied roles, we determined the correlation values between the MBTI type indicators and the studied software roles. Table 1 in the Results and Discussion section shows the correlation values.

Lastly, taking into account the identified correlation values between MBTI type indicators and software development roles, we proceeded to mathematically formalize a coefficient to evaluate the natural disposition in role candidates.

Results and Discussion

Following the same order presented in the Methods section, we then proceeded to present the patterns we had identified. Our goal is for these patterns help the decision-maker at the time of assigning people to software development roles. For better organization we grouped the patterns by roles, as can be seen below.

- To better assess a candidate's natural disposition for the Project Leader role, the candidate should meet the following criteria that characterize current successful software practitioners performing as Project Leader:
    - There must be a predisposition towards ST or NT mental functions
    - There must be a predisposition towards EJ attitude functions
- To better assess a candidate's natural disposition for the Analyst role, the candidate should meet the following criteria that characterize current successful software practitioners performing as Analysts:
    - There must be a predisposition towards extroversion E_ _ _.
    - There must be a predisposition towards an extroverted judging attitude function _ _ _ J if it is met that IS_ _.
    - There must be a predisposition towards an extroverted perceiving attitude function _ _ _ P if it is met that IN_ _.
    - There must be a predisposition towards the following mental functions[1]: NT, ST, and SF; no prioritization needed between them.
    - The following type indicators must be prioritized in this exact order: ESTJ, ESTP, ISTJ, ISFJ, INTJ, ESFP, and INTP.

[1] The attitude pair analysis is omitted here as it seems to tend to the IJ and that might be perceived as a contradiction to the above stated conditions whereas is actually it harnesses the mental pairs and allow this extroverted energizing attitude.

- To better assess a candidate's natural disposition for the Designer role, the candidate should meet the following criteria that characterize current successful software practitioners performing as Designers:
    - There must be a predisposition towards an extroverted perceiving attitude function _ _ _ P if it is met that I _ T _.
    - There must be a predisposition towards an extroverted judging attitude function _ _ _ J if it is met that IS_ _.
    - There must be a predisposition towards the following mental functions: NT, ST, and SF; no prioritization needed between them.
    - The following type indicators must be prioritized in this exact order: INTP, INTJ, ISTJ, ISTP, ESTJ, ENTJ, ESTP, and ESFP.
- To better assess a candidate's natural disposition for the Programmer role, the candidate should meet the following criteria that characterize current successful software practitioners performing as Programmers:
    - There must be a predisposition towards extroversion E_ _ _.
    - There must be a predisposition towards the following mental functions: ST, and SF; no prioritization needed between them.
    - There must be a predisposition towards the following attitude functions: IJ, and EJ; no prioritization needed between them.
    - The following type indicators must be prioritized in this exact order: ESTJ, ESTP, ISFJ, ENTJ, ESFP, and ISTP.
- To better assess a candidate's natural disposition for the Tester role, the candidate should meet the following criteria that characterize current successful software practitioners performing as Testers:
    - The ISTJ type indicator must be prioritized.
- To better assess a candidate's natural disposition for the Maintainer role, the candidate should meet the following criteria that characterize current successful software practitioners performing as Maintainers:
    - There must be a predisposition towards an extroverted perceiving attitude function _ _ _ P if it is met that ES_ _.
    - There must be a predisposition towards the ST mental function.
    - There must be a predisposition towards the following attitude functions: EP, IJ, and EJ; no prioritization needed between them.
    - The following type indicators must be prioritized in this exact order: ISTP, ISFJ, ENTJ, ESTJ, ISTJ, ESFP, and ESTP.

Considering the patterns outlined above, we proceeded to relate the type indicators to the functional roles under investigation, as can be seen in Table 1. The blank cells indicate that the corresponding type indicator and functional role are not related. In contrast, the cells that denote a relationship between the corresponding type indicators and functional roles exhibit a value expressing the type indicator´s natural disposition coefficient for the functional role.

To find the value that expresses the natural disposition of a type indicator with respect to a role, it was necessary to formalize a coefficient to that effect, which we call the natural disposition (ND) coefficient. Equation I show the ND coefficient modeling:

Equation (I): $ND = \frac{PT}{TP}$

Where PT is the number of patterns for a given role a type indicator satisfies between all identified patterns for that role, and TP is the total number of identified patterns for the analyzed role.

MBTI Type Indicators	**Functional Roles**					
	Project Leader	**Analyst**	**Designer**	**Programmer**	**Tester**	**Maintainer**
ISTJ	0.5	0.6	0.75	0.5	1	0.75
ISFJ		0.6	0.5	0.75		0.5
INFJ				0.25		0.25
INTJ	0.5	0.4	0.5	0.25		0.25
ISTP		0.2	0.75	0.5		0.5
ISFP		0.2	0.25	0.25		
INFP		0.2				
INTP		0.6	0.75			
ESTP	0.5	0.6	0.5	0.75		1
ESFP		0.6	0.5	0.75		0.75
ENFP		0.2		0.25		0.25
ENTP	0.5	0.4	0.25	0.25		0.25
ESTJ	0.5	0.6	0.5	1		0.75
ESFJ	0.5	0.4	0.25	0.75		0.25
ENFJ	0.5	0.2		0.5		0.25
ENTJ	1	0.4	0.5	0.75		0.25

Table 1 Relation between the MBTI type indicators and the studied functional software roles

The ND coefficient takes values between 0 and 1, resulting in the natural disposition of the given MBTI indicator for a given role. Consequently, the possibilities for assigning an individual with a certain MBTI type indicator to a given role can be easily sorted and related to the roles for which the type indicator is a better match. Table 1 itself represents a decision matrix for each type indicator and their associated roles given its natural disposition coefficient

for each of them. The decision-maker can use the matrix as a tool for reference when assigning people to roles.

Conclusions

In the present study we identified a set of patterns from the MBTI type indicators of currently successful software practitioners performing in each of the roles studied, as well as their preferences towards software task choices, also linked to the competence profile of the roles studied.

Based on the patterns identified, it was possible to formalize a coefficient to assess a candidate´s natural disposition in relation to a given software project role. This was done by considering that candidate´s MBTI type indicator, expressed in terms of the relation between the number of patterns the candidate´s MBTI type indicator satisfied from the total number of identified patterns for the target role.

We defined a decision matrix connecting the MBTI type indicators with the target roles using the values assumed by the natural disposition coefficient, which can be used by the decision-maker as a support tool when assigning people to roles in software projects.

The new approach described in this study complements those currently available within the specialized literature focusing on the assignment of people to roles in software development. It also enriches the methodological framework around the assignment as an object of study in the software engineering field of study.

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