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ScienceDirect

Procedia Manufacturing 3 (2015) 653 – 659

Procedia MANUFACTURING

6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the Affiliated Conferences, AHFE 2015

New tools to help in the recruitment process

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Abstract

The recruitment process is demanding, especially when there are many good candidates. Failure in this process can be expensive. Typically interviews and different psychological tests are used to help in the selection. The problem is that interviews and tests are costly. Here a new, partly automated approach is presented. The new approach was tested in the Tenure Track process at the Tampere University of Technology. The new approach consisted of two parts. Firstly, the candidates used the on-line Evolute Helix application [1]. They responded to 237 claims and gave their degree of agreement with each claim. This part produced data measuring commitment. Secondly, the gathered data, i.e. profiles of commitment, were analyzed to find clusters of similar candidates. These clusters were checked against the desired profile. These two parts were automated. The test data were based on the Tenure Track process at the Tampere University of Technology. Recruitment to universities nowadays largely follows the same principles as the normal recruitment process in companies and other organizations. Universities have started to play a global game in their recruitment and try to find the best possible candidates internationally for their universities. In this case example we show how an organizational commitment application that has been developed could help the recruitment process, in which 55 candidates were applying for two tenure track positions. The application used, Evolute Helix, was useful in the recruitment process and helped in the interviews as well as the selection of applicants for the shortlist. The shortlist consisted of six candidates, who were finally interviewed. The two winners were selected from among these candidates. Commitment can reveal many personal characteristics and also the future aspirations and motivations of applicants. The tested application can also be used afterwards, as the tenure track of the chosen person continues in the university. Automatic preprocessing is a great aid when sifting out desired candidates from multiple applicants.

Peer-review under responsibility of AHFE Conference

Keywords: Recruitment; Assessment; Commitment; SOM

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Peer-review under responsibility of AHFE Conference
doi:10.1016/j.promfg.2015.07.297

1. Background

The recruitment process is a demanding task. Typically, there are a lot of candidates and many good candidates. Failure in this process is expensive. There are not many parameters to control the recruitment process. Typically, one uses the design of the advertisements, interviews and different psychological tests in the selection process. The problem is that interviews and tests are time-consuming and expensive. The manual processing of applications is also expensive. The applications are scanned through and summaries are produced to make comparisons easier.

There are commercial software systems to take care of recruiting and staffing processes, like Zoho, Financial Force Human Capital Management, Artist, Tribe HR, but these programs only deal with the documentation of applications. Better tools are needed. Psychometric tests in job interviews are not new. The first modern personality test was the Woodworth Personal Data Sheet, which was first used in 1919 by the United States Army [9]. It was designed to help screen out recruits who might be susceptible to shell shock. The techniques were then developed further [6]. Attempts to profile people have also been made for a long time. Criminal profiling is a process now known in the Federal Bureau of Investigation (FBI) as criminal investigative analysis. Profilers, or criminal investigative analysts, are trained and experienced law enforcement officers who study every behavioral aspect and detail of an unsolved violent crime scene in which a certain amount of psychopathology has been left at the scene [7,8]. The term profiling is defined by the Merriam-Webster dictionary [5] as “the act or process of learning information about someone based on what is already known” or “the act or practice of regarding particular people as more likely to commit crimes because of their appearance, race, etc.” or more generally as “the act or process of extrapolating information about a person based on known traits or tendencies <consumer *profiling*>; *specifically***:** the act of suspecting or targeting a person on the basis of observed characteristics or behavior <racial *profiling*>”.

In computer science, profiling has a slightly different meaning [2]. Data collection, preparation and mining all belong to the phase in which the profile is under construction. Profiling also refers to the application of profiles, meaning the usage of profiles for the identification of individual persons, or categorization of groups. There is a feedback loop between the construction and the application of profiles. The interpretation of profiles can lead to the iterative fine-tuning of specific previous steps in the profiling process. The application of profiles to people whose data were not used to construct the profile is based on data matching, which provides new data that allow for further adjustments. The process of profiling is both dynamic and adaptive.

The hypothesis of this work is to find out if it is possible to use new techniques to improve the recruitment process.

2. The techniques used

We used the Artist software system to gather and document the applications. First, summaries of all the applicants were collected. Finally, a board consisting of six professors went through all the applicants, concentrated on the shortlist and made the decisions.

It was quite a hard task to consider 55 applications in a way that was fair to all 55. The applications consisted of a list of publications, curriculum vitae, research plan, and motivation letter. To make the comparison easier we decided to use a two-stage approach. The first stage comprised a commitment test based on Helix software [1]. If somebody considered this test unsuitable, it was a personal choice and the applicant was rejected. The idea was to create a profile measuring the commitment of each applicant. Commitment is a very important feature and we were looking for candidates that were willing to commit to our organisation. An example of a hypothetical profile can be seen in Figure 1. There were a large number of claims, 237. Based on the applicants’ degree of agreement and the reliability, the claims were visualised. After all the applicants had answered, it was possible to calculate a mean profile and the variation. Knowledge of the variation used together with the profile of the applicant characterised the applicant very well. Another illustration of a profile was a star diagram [3]; see Figure 2, which was extremely useful when comparing two candidates. This piece of information together with the list of publications, curriculum vitae, research plan, and motivation letter made it possible to draw up a shortlist.

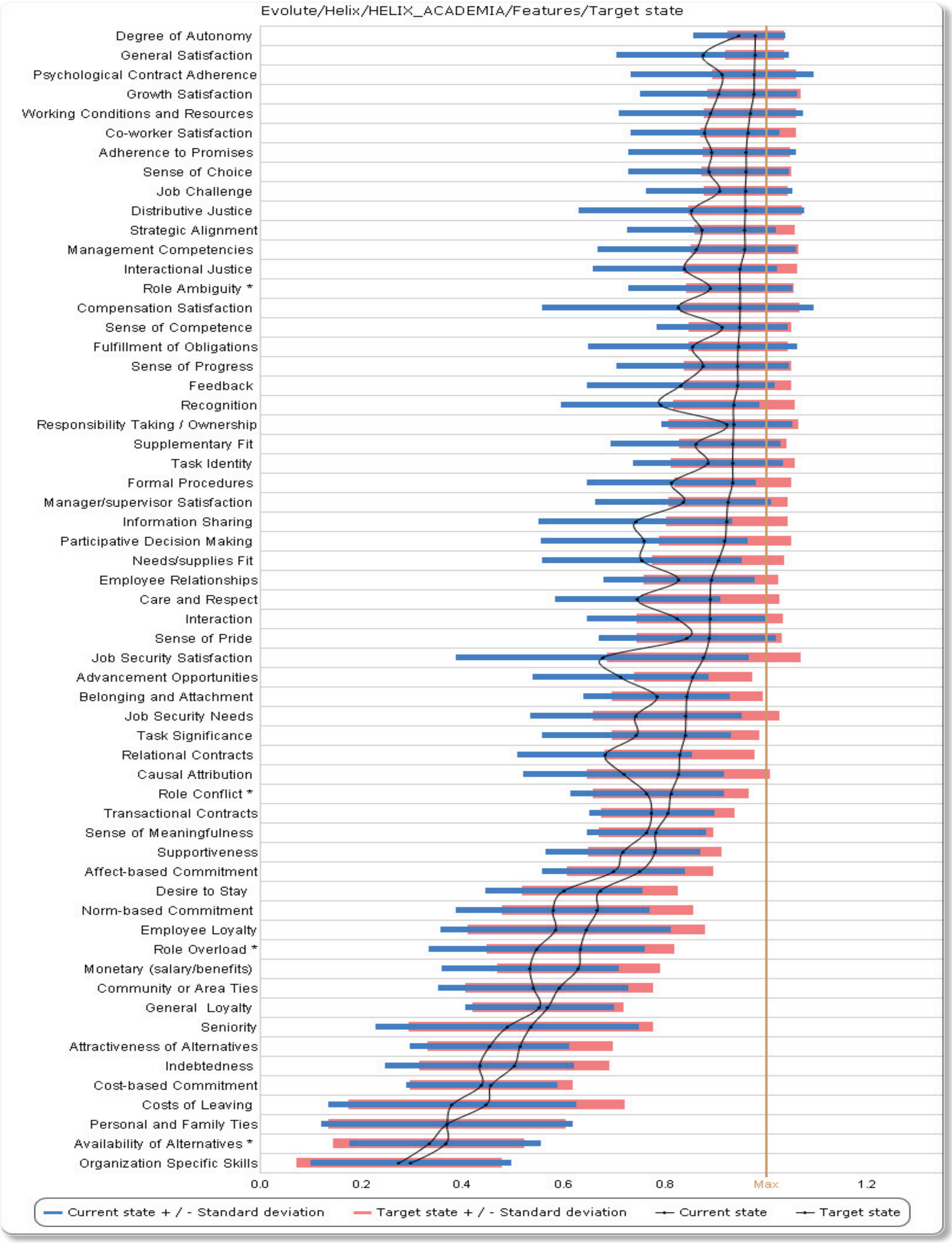

Fig. 1. An example of a hypothetical profile from Evolute Helix software.

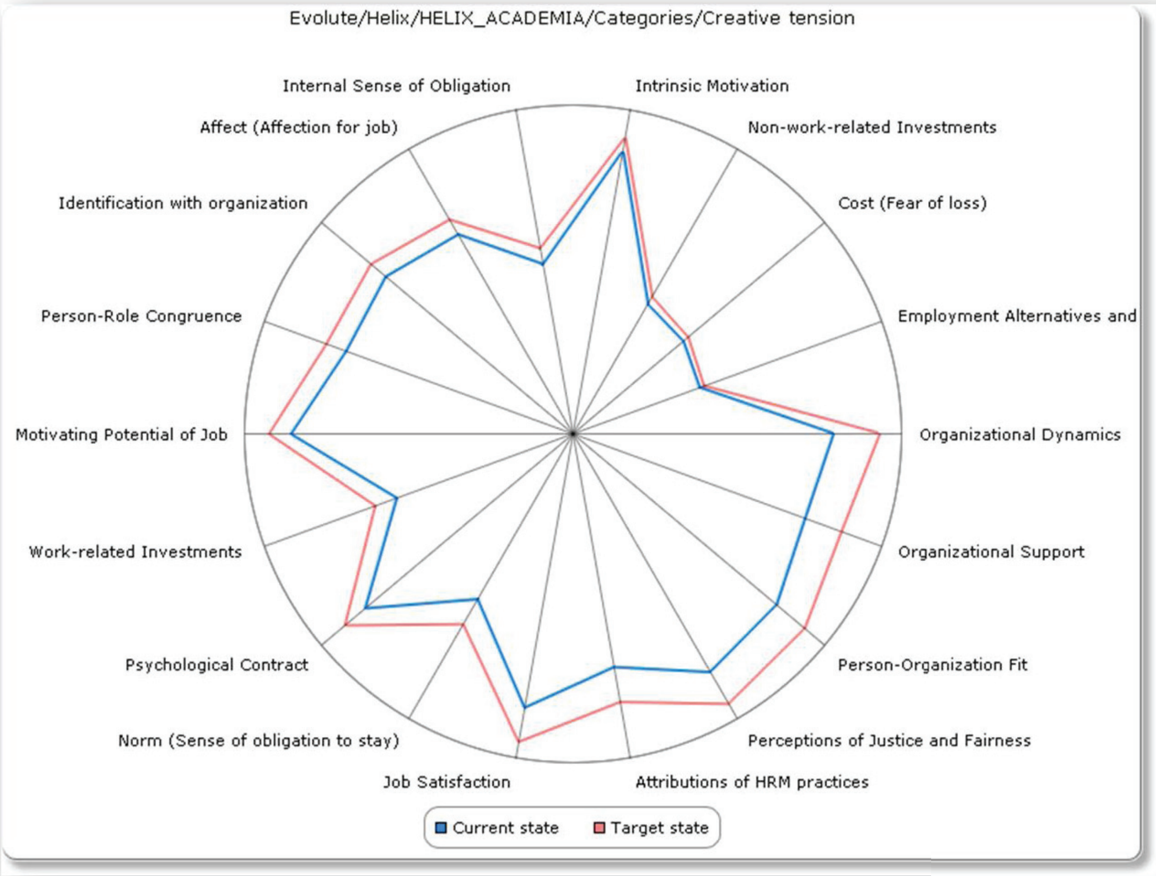

Fig. 2. A star diagram of selected items in a profile. A star diagram makes it easy to compare different applicants.

Secondly, we visualised the profiles of the applicants and used this piece of information to study the applicants. We used visualisation techniques to obtain an idea about the applicants in general and the applicant's position within the distribution of the applicants, see Figure 3. These illustrations were used as a tool to find interesting candidates and to focus on the most interesting ones. To make the comparisons between the candidates fair we also used SOM-based illustrations [4] to indicate similar candidates. On the basis of these tools, 41 applicants were ruled out. The remaining 13 applicants were interviewed by the board. Based on the interviews, five applicants were finally selected for psychometric tests and external evaluation by three referees.

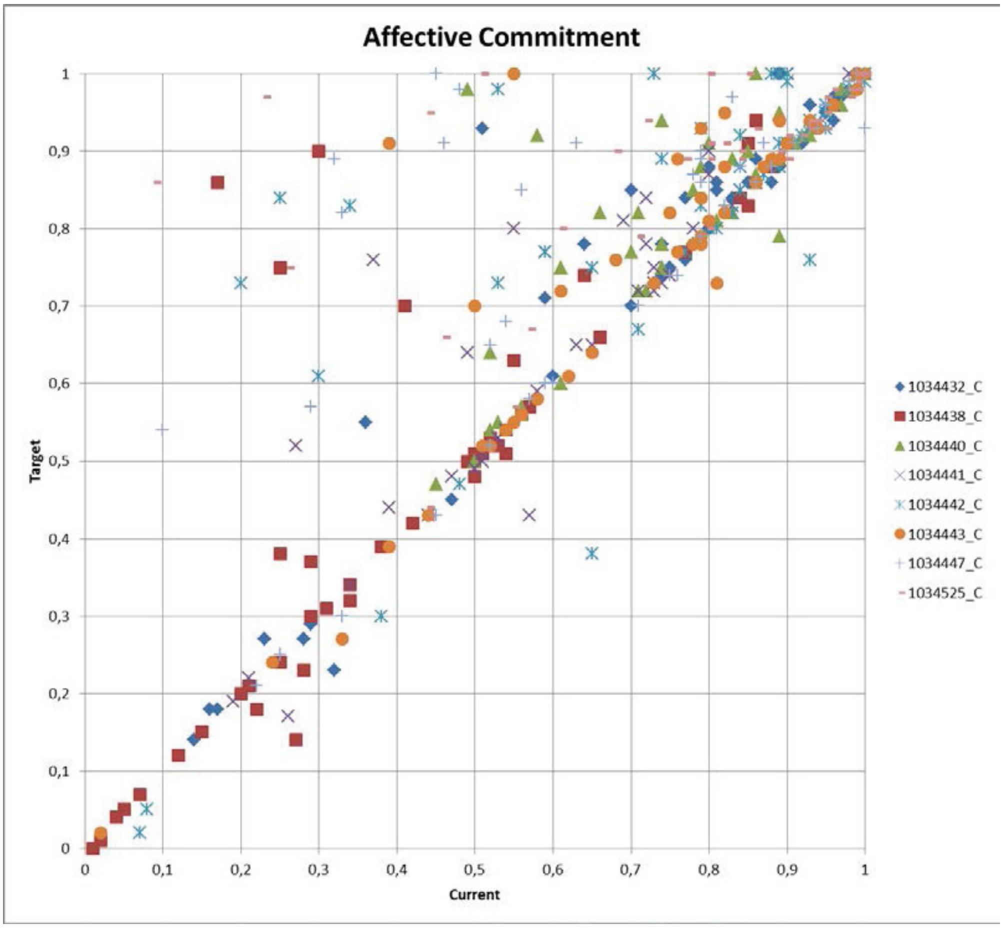

Fig. 3. An example of a scatter diagram that was used to study the distribution of the applicants.

3. Results

As one step in the process we decided to use profiles. One example of a profile is shown in Figure 1. This kind of profile provides a lot of information about an applicant. It also makes it possible to compare the applicant with the mean profile. To compare two applicants, we used star diagrams [3], see Figure 2. To obtain more information about relations between different applicants we used different scatter plots [3], see Figure 3. The scatter plots made it possible to find the applicant’s position within the distribution of the applicants. This was a very convenient visualization, as the interpretation of lists of publications and curricula vitae was made much easier.

Finally, SOM maps were used to check out the shortlist and make pairwise comparisons, see Figure 4. As one can see, SOM clusters some applicants directly in certain prototypes.

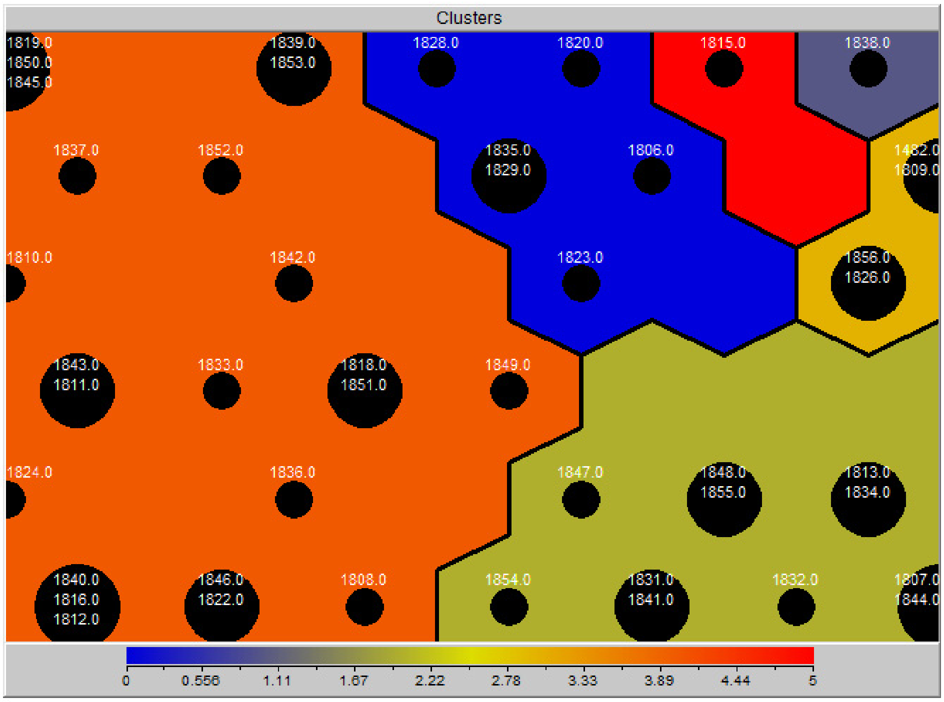

Fig. 4. A self-organized feature map (SOM) visualization of the applicants. Different colors represent clusters. The applicants are indicated as numbers on the map.

4. Discussion

The topic is interesting but unfortunately it is not allowed to show very detailed results to safeguard the integrity of the applicants. This is also a problem considering comparisons between applicants.

The selection process cannot be made totally automatic. Some human judgements are always needed. The described techniques provide the greatest help in the preselection phase, when creating a shortlist of suitable candidates. We calculated that it would take a secretary about 110 hours to make summaries of 55 applicants. The expected time spent by the board was estimated at six times 110 hours, i.e. 660 hours. By using the described tools the time spent by the board was cut down by 30 minutes per applicant, which means 165 hours, saving a considerable amount of time and money. It is essential not to spend too many calendar months in evaluation. At the same time one should minimize the risk that promising candidates are dropped from the shortlist. This was the reason why SOM maps were used during the second phase. SOM maps work in a slightly different way than statistics. SOM maps consider the whole profile as a vector. There are some correlations between dimensions and SOM benefits from this. When both techniques agreed on the elimination of an applicant, the decisions were easy. If the techniques produced different opinions, the board considered those cases carefully. To avoid unintentional eliminations we decided to select 13 applicants for the shortlist, which means that they were interviewed. Without these new tools the length of the shortlist would have been 10 applicants. The price was negligible in comparison with the gain in preselection.

One of the key issues is of course the commitment test. The quality of the commitment test is crucial. There should be enough claims and versions of the claims to avoid manipulation of the test.

Finally, one could ask if there is any experience based on the selected applicants. We can say that the selections have been successful. This is based on the experience of six months. It could well be that the selected applicants would have been the same using the old methods but the new tools helped to save time in calendar months and money in man months.

5. Conclusions

A new and interesting approach to speed up the recruitment process is described. The hypothesis of this work was to find out if it is possible to use new techniques to improve the recruitment process. The answer is yes. The new tools helped to save time in calendar months and money in man months.

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