

An Automated Data-Driven Matching Process for Mentoring Program

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1. Introduction

Nowadays matching program has drawn a lot of attention to share successful career experiences of the seniors with juniors, by making relationship of mentors and mentees[1,2]. Female scientists and engineers in KISTI (Korea Institute of Science and Technology, Information) have been participating in WISET(Women in Science, Engineering and Technology) Fellow Mentoring program since 2009[3,4]. In order to obtain matching satisfaction from mentors as well as mentees together, we designed a data-driven automated matching algorithm to find the best fit matching between mentors and mentees[5,6]. In this paper, we apply and verify the automated matching algorithm based on the data from our accumulated mentoring experience since 2009.

2. Automated Matching for Mentoring Program

For a successful building of mentoring program, matching process is one of the key factors to contentment of mentoring participants. In order to match mentors and mentees appropriately, there have been introduced matching processes between mentors and mentees [7,8]. As a method for finding the best fit matching between mentors and mentees, we suggested a newly designed a data-driven automated matching process using weighted matching algorithm[5,6]. The data is got from candidate mentors and mentees on the application process of mentoring program. The data is divided into profile data and requirement data. The basic formula for matching between mentors and mentees is this.

$$s = \sum_{i=1}^n (W_i F_i) + \sum_{k=1}^m (W_k F_k)$$

S = best matching score, W_i = weight of F_i , F_i = profile factors,
 W_k = weight of F_k , F_k = requirement factors

3. Data Analysis and Discussion

We verify the implication of our automated matching process by using data. We use data obtained from WISET Fellow mentoring program of KISTI in 2013. In our matching algorithm, there are two kinds of data: Profile data and Requirement data. The profile data is data which describes the mentee and mentor in their subjective viewpoints[5,6]. Table 1 describes our applied factors in this paper. In profile data, region of residence, area of expertise, gender, age and career of mentoring are applied. In requirement data, interesting area and desired area of development are applied.

The analysis result of mentor-mentee matching algorithms is shown in Table 2. We use data obtained from WISET Fellow mentoring program of KISTI in 2013. We apply data of 17 mentees and 7 mentors. Best matching score between each mentor and mentee is calculated by the value with considering factors of Table 1.

According to overall data analysis, actual 5 mentor-mentee couples are matched as well as best-fit couples among 17 mentor-mentee couples by using our automated matching process in section 2. By inspecting the mentoring results of the last year, it is of note that 4 best-matched couples by automated matching are also included in successful mentor-mentee couples in 2013. In case that weight is granted to each factor, matching result can be varied depending on the weight. We will also get variable results with increasing weight of mentoring experience or decreasing weight of age and gender. In the next step, we plan to find high impact factors and optimal weights for successful mentoring results through our accumulated data and mentoring experience.

[Table 1] *Considering Factors*

<i>Considering Factor</i>	<i>Applied</i>	<i>Considering Factor</i>	<i>Applied</i>	<i>Considering Factor</i>	<i>Applied</i>
region of residence	√	age	√	interesting area	√
area of expertise	√	stage of education	-	desired area of development	√
hobby	-	religion	-	major	-
gender	√	mentoring experience	√	gender	-

[Table 2] Analysis Results of Mentor-Mentee Matching Algorithms

(gray cell: actual mentor and mentee couples, the number of bold color: maximum score of our algorithm *: best-matched couples, dark gray cell: best-matched couples among actual mentor and mentee couples, ME: mentee)

	ME1	ME2	ME3	ME4	ME5	ME6	ME7	ME8	ME9	ME10	ME11	ME12	ME13	ME14	ME15	ME16	ME17
mentor 1	52*	53	59*	49	38	57	57	39	49	52	54	49	49	56	48	48	43
mentor 2	49.5	45.5	49.5	50.5	34.5	56.5	56.5	40.5	53.5	56.5	53.5	50.5	50.5	58.5	47.5	49.5	49.5
mentor 3	49	45	49	50	34	56	56	40	50	53	53	50	50	55	47	49	49
mentor 4	51	47	51	52	36*	58*	58*	42	55	58	55	52	52	60	49	51	51
mentor 5	44	40	44	45	31	53	53	35	48	51	48	45	45	55	44	44	44
mentor 6	42	38	44	43	31	51	51	33	43	46	48	43	46	50	45*	42	39
mentor 7	41	46	50	42	31	48	50	32	42	45	45	42	42	47	44	41	41

4. Conclusion

In this paper we suggest and verify a new design of matching process using a data-driven automated matching process. For best-fit matching we utilize profile and requirement data of mentors and mentees. We examined the implication of our automated matching process by using data from the WISSET Fellow mentoring program of KISTI in 2013. In the future, we will collect more much data and apply our matching algorithms. We will want to find common positive and useful factors of matching process in mentoring programs.

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6. References

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