Report Outlining Proposed Solution

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Introduction

Helping students to find their career path and equipping them with professional skills is one important goal of education. At the same time, students consider it a vital factor when they choose which university and major to apply to. Software engineering plays an indispensable in measuring and improving the quality of education that university delivers to their students. The main function of our project is to provide universities a way to measure the quality of the education, which can help administrators understand the teaching results, optimize courses, and improve the quality of teaching.

Methodology

Firstly, we figure out ways to rank graduates according to their performance at work. A Questionnaire will be adopted to track the growth of graduates over a 5-year period. After collecting the information, we’ll score the performance of each graduate accordingly, and then rank graduates' performance based on the scores they get. Secondly, we will create a way to connect courses and graduates' performance on the basis of the scoring and ranking. We’ll classify graduates according to the career path chosen by the graduates, and then display the scores of different types of participating graduates by course. Finally, modify the algorithm to construct a program for comparing the teaching results of various departments. These algorithms will be explained in detail in the following report.

Scoring and Ranking System

We not only pay attention to the current performance of graduates, but also dynamic trends of graduates, that is, the growth of graduates. So, the total scoring (TotalScore) mainly includes two parts, as seen in (1), one is the most recent score (CurrentScore) and growth score (GrowthScore).

$$\text{TotalScore} = \text{CurrentScore} + \text{GrowthScore} \tag{1}$$

Current Score

CurrentScore reflects the current development of graduates. When formulating scoring standards, we comprehensively combine objective and subjective evaluations. Objective evaluation(ObjEvaluation) means giving quantitative scores to graduates' performance in accordance with objective standards. Subjective evaluation (SubjEvaluation) is giving evaluations and scores based on people's subjective feelings and judgments. Both objective and subjective evaluations are important, but we believe that objective evaluation will be subject to less human intervention and better reflect the fairness and reasonableness of scores. Therefore, as seen in (1.2), we give objective evaluations a slightly larger weight.

$$\text{CurrentScore} = 60\%\ \text{ObjEvaluation} + 40\%\ \text{SubjEvaluation} \tag{1.2}$$

We use salary level (SalaryRating) and postion level (PositionLevelRating)as the core indicators of objective evaluation; Use self-evaluation (RatingFromSelf) and employer evaluation (RatingFromSupervisor) as core indicators of subjective evaluation.

$$\text{ObjEvaluation} = \text{SalaryRating} + \text{PositionLevelRating} \tag{1.3}$$

$$\text{SbjEvaluation} = \text{RatingFromSelf} + \text{RatingFromSupervisor} \tag{1.4}$$

Combine (1.1), (1.2), (1.3) and (1.4), we can get

$$\text{CurrentScore} = 60\%\ (\text{SalaryRating} + \text{PositionLevelRating}) + 40\%\ (\text{RatingFromSelf} + \text{RatingFromSupervisor}) \tag{1.5}$$

Growth Score

One of the tasks is continuing to track the development of graduates and reflecting the changes in graduates' scores and rankings. If the change of score we construct before is directly used as a measure of graduate growth, the problem of unfair scoring will arise. It mainly arises in the indicator of position level because low-level upgrades are far simpler than high-level upgrades. For example, the time and effort spent from low-level engineers to mid-level engineers are much less than that from mid-level to high-level, so we design a new standard to rate the changes of position level. It can more scientifically reflect the career growth of graduates.

Connect courses and graduates' performance

Graduates will be classified according to the career path they chose. We roughly divide career paths into seven categories: Software Development, Project Management, Big Data Systems and Analytics, User Experience, General Information Systems, Smart Contracts and, Intelligent Systems. We'll calculate the average scores of graduates who participated in specific course by category. The results can help guide students to choose the courses according to their career planning and teaching quality.

Compare performance of different departments

Finally, we try to provide a way enabling college and university administrators to compare the performance of their academic units. Since the average salary in different departments is different, it is not fair to directly use the absolute value of salary to make cross-departmental comparisons. Therefore, we use salary scoring to replace the absolute value of salary when comparing across departments. We use the average salary as a measurement standard, classify the salary and give a score so that each department is comparable. It helps get fair and convincing

results for administrators to refer to.

We hope that our design can guide students to choose courses and guide administrators departments to adjust the courses.