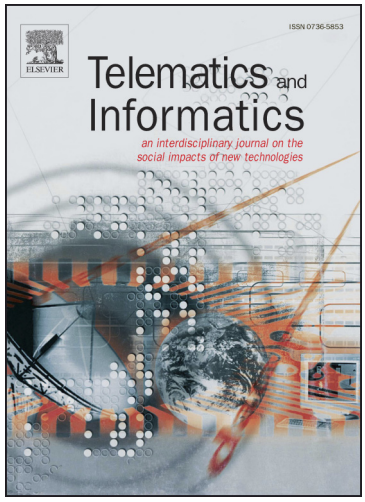

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Hybrid Occupation Recommendation for Adolescents on Interest, Profile, and Behavior

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Abstract

Young people in high school or college make critical decisions regarding what major to study and which career path to pursue. But, many students enter post-secondary education without a clear idea of their major and future career plans. Mismatch in major selection and lack of information through the professional study is one of the reasons for them to switch majors. Moreover, students may like one aspect of a certain occupation but they may not understand what other aspects come with that profession. They may not have all information about the occupation they are pursuing. For example, the occupation may require more math or engineering background than those students are studying. Hence, some practical research questions that arise from those problems are, which students are suited for which occupations and how to guide them in selecting the proper occupations. Discovering students' suitable occupations as early as possible can help them to choose an appropriate vocational learning direction and to build the skills and the abilities for the prospective occupation. For those reasons, students need an automatic counseling system. In order to do this, recommendation methods were employed; it aims to counsel suitable occupation for students, to discover their occupational interests and to guide them to improve their skills. We implemented a hybrid recommendation system called Occupation Recommendation (OCCREC) that integrates content-based and collaborative filtering methods. We involved three sets of information including student's profiles, vocational interests from the questionnaire using Holland code, and their behaviors. The student profile contains two types of data, namely, background and interest/hobby retrieved from Facebook. In the experiment, the students from four countries consisted of Mongolia, Sri Lanka, Taiwan, and Thailand used the OCCREC. And, five occupations were shown to the students by using five similarity measures which are Euclidean, Intersection, Cosine, Jaccard, and Pearson. Finally, OCCREC allows students to rate the results accordingly based on user's satisfied scores and to share their experiences on Facebook.

Keywords: Occupation recommendation, Vocational Interests, Hybrid recommendation, Collaborative filtering, Content-based method, Holland model.

1. Introduction

Students make initial but critical decisions regarding what to study and which career path to pursue (Ferry, 2006). A mass of students has decided their majors/occupations out of proper and professional advice from school services. Mismatch of the major choice and lack of information through professional study is one of the reasons for them to change major. Such changes are wasteful in time and resources, and it is the cause of financial and emotional stresses of students. An approximated twenty to fifty percent of students enter college as undecided major; and an approximated seventy-five percent of students change their major at least once before graduation (Gordon, 2007). On the other hand, the students' major choices are influenced by the society, the education environment, and mostly their families. Those pitfalls are potentially the causes of a mismatch major between academic achievements, personality, interest and abilities of students. It would be useful to understand how students' choice of the academic majors depends on personal characteristics, competencies, and vocational interests. Most of the students do not possess adequate information about meaning of occupations/majors, what careers can be reached by which majors, and what kind of skills and abilities are needed for a particular occupation/major. Especially, even some parents are unfamiliar with the contemporary occupations/majors.

The main goal of this paper is to construct an occupation recommendation system by using data mining method. In the experiment, we focus on testing Mongolian, Sri Lankan, Taiwanese and Thai students. The system can provide details of occupations and can assist the students for major choices, as well as the careers to pursue. Furthermore, the research goal incorporates a set of results, which are recommended using similarity measurements and recommendation techniques. We called this a hybridization system. These methods serve as a base for recommending occupations that meet interests and competencies of students.

The rest of the paper is organized as follows. Section II presents related works about Content-based, Collaborative filtering, and hybrid techniques. In Section III, we introduce the proposed system its methods and functions. Section IV provides experimental results. Finally, Section V contains the conclusion and future work.

2. Related work

Recommendation systems are tools that use user information (or another user who have the same behavior) and prioritize items likely to be of interest to a user. Recommender systems are applied in a variety of application such as movies, music, books, and products. Many websites that we use every day are designed based on some recommendation algorithms (Burke et al., 2011). Amazon, the popular e-commerce site, uses content-based recommendation. When a user chooses an item to buy, Amazon recommends other items other users purchased based on that original item. This approach is called collaborative filtering. LinkedIn, the business-oriented social networking site, perform a recommendation for people, job, groups or companies that users might know or are interested. Facebook suggests who should be your friends or whatever groups you might want to follow. The profile of a user contains two types of