Educational Recommendation and Tracking System.

Prof. Seema K. Yadav, Mr. Sujit J. Singh, Mr. Akshay M. Bora, Mr. Shashankit N. Thakur

Abstract— The existing ways for career guidance includes seminars, counseling and analysis based on academic performance, considering aspects and parameters such as economic status, future job perspectives, academic performance etc. which may turn out to be irrelevant for determining better and suitable profession for students. There are various other alternatives existing, but none of them provide a concrete and precise solution to the problem. We therefore come with a concept of application which takes into consideration the sheer interest of students as the single parameter for recommending areas of interest. This application will be designed for educational usage. Surveys will be taken to generate results, the results will be stored in database on which machine learning algorithm will be implemented followed by a regular tracking of student's performance, and thus generating informative reports

Index Terms— survey, recommendation, tracking, first level questionnaire, second level questionnaire, career option, learning style, personality, machine learning

———————————— ◆ ————————————

1 INTRODUCTION

There are various evident researches predicting the educational progress of students, but these researches do not consider the overall student's behavior. Some of them only focus on the academic data, while others focus on personalities and interests of students. None of the systems has managed to consider all the aspects. A student's performance depends upon various parameters [5] like their personalities, learning style, student's academic interests, learning time and family environment and support. The educational tracking and recommendation system focuses on the student's overall performance and the impact of each factor is reflected in the form of report generated at the end.

The proposed system follows SRT (Survey, Recommendation and Tracking) model wherein a general survey questionnaire is provided depending upon different factors like different career related field questions, personality identifying questions. The result of the survey is displayed in the form of recommendation system. The results consist of the career option along with the percentage of inclination of student in that career. To see whether these recommendations are followed by the student, a regular tracking is done in the form of the frequent adaptive questionnaires. Also, if the student tends to deviate from the career, then the questionnaire will adapt to the changes and try to locate a new career option. The recommendations provide guidance in career options, majors and domains of interest.

This system aims to provide tools, educational goals

———————————————

- *Sujit J. Singh is currently pursuing bachelor's degree of engineering program in information technology in University of Mumbai, India, E-mail: sujit.singh@somaiya.edu*
- *Akshay M. Bora is currently pursuing bachelors degree of engineering program in information technology in University of Mumbai, India, E-mail: akshay.bora@somaiya.edu*
- *Shashankit N. Thakur is currently pursuing bachelor's degree of engineering program in information technology in University of Mumbai, India, E-mail: shashankit.t@somaiya.edu*

and success. And hence, system will provide a separate inter -

face for the parents so that they could see the full report and improvement status of their child. The interface will also be linked only to the parents and children so it maintains a privacy and security constraint. This system makes use of a machine learning algorithm so that it can assess dynamic input from the students. Therefore, the system accounts that the machine learning will emphasize the ever-changing behavior of the students.

2 EXISTING SYSTEM

2.1 Pen and Paper

Various surveys through pen and paper are commonly conducted by many organizations. Although this methodology is easy to implement it has accessibility problem by many users which is difficult further to assess. The results of such surveys are usually restricted to some parameters hence the overall assessment of student's performance is hardly possible.

2.2 Counselling

The one to one counseling session proves to be an efficient technique to improve student's performance. This technique ensures individual assessment of student's behavior. This method lacks flexibility in accessibility which is provided by the proposed application.

2.3 Online Personality Tests

There are various online sites which detects personality based on various parameters but this process is generally a one-time approach. The continuous tracking of the student's performance is not delivered here which is done by the proposed system.

3 LITERATURE REVIEW

The existing system [2] focuses on attaining the accuracy of the recommendations that they provide. In doing so, they often miscalculate the natural response as per the user's query. Our application is split into two parts which takes care of the comprehensive and changing interests of the students. The first is a recommendation system which at its first level, will pose static questions to students and help them to know their area of interest, a domain under which they would find professions, suited as per their skills, and the next level of the test will be an adaptive test which will help them to come a step closer to a specific vocation best for them.Instead of opting for a course on his/her own in the first level of test, the test will provide a domain of interest followed by the next step which would provide the professions in the respective domain by analyzing the answers and gauging the student's skill and inclination towards specific career path.

The proposed system will also incorporate another module which will consist various logical interfaces like setting up their daily/weekly targets, evaluating their target completion, target estimator, generating reports, noting their distractions, generating guidelines and examining student's learning techniques by using machine learning in an android application. Hence, constituting the second part of the proposed system.

The main objective of the existing systemis to present the design of a multi- expert [1] system for decision support in the career guidance field [3] by using the multi-agent paradigm and the ontology[4] approach. That is recommending career paths based on various factors such as economic stature and future perspectives. Our system primitively focuses on recommending courses based on sheer interest and innate skills instead of whether lucrative jobs exists in it or not.

This comparison of theexisting and the proposed system is made in the below table:

Existing System	Proposed System
It prediction of the results is the primary strategy devised for generating recommendations.	recommendation with tracking is a primary strategy used.
It gives a one-time result based on user inputs.	It implements continuous evaluation of student's interest is undertaken.
It proposes results based on the current user inputs without even considering his previous behavior.	It studies the behavioral pattern of the students and provides recommendations accordingly.
There are fixed sets of questionnaire that does evaluation on some pre-defined parameters.	It is adaptive in nature and questions student's interests depending upon their inputs.
It uses ontology as its basis of prediction of career paths which gives inappropriate results.	It uses ontology as its supporting parameter to generate more appropriate results.

4 PROPOSED SYSTEM

In this system, the user will enter the data in the application which will be sent to the cloud server. The controller logic will implement the machine learning algorithm (K-Mean) and store the results in database. The results will be displayed in the database as per the user's request as shown in Fig 1.
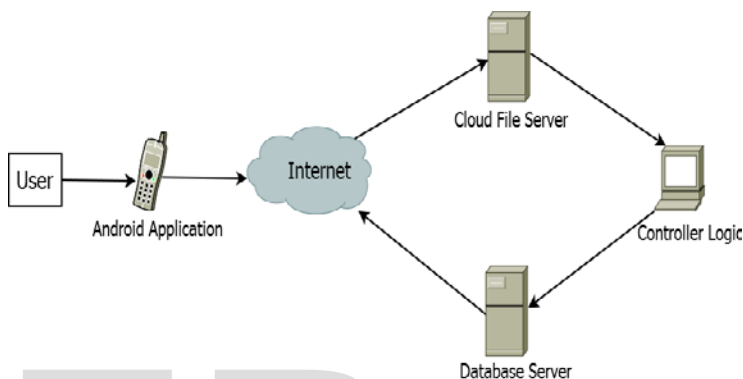

Fig 1. System Component Diagram

In fig 2. The survey questioning and academic performance evaluation comprises of the survey part. The result of survey is evaluated into 4 personality traits representing 4 clusters and a base recommendation template will be generated depending on user's specific interests and personality identification. This recommendation is constantly updated in the process of tracking wherein the adaptive tests will be conducted based on the specific interests of the students. Any deviation from the ideal behavior of student will be reflected through a graphically signifying various parameters of diversion and added recommendation to improve the current scenario.
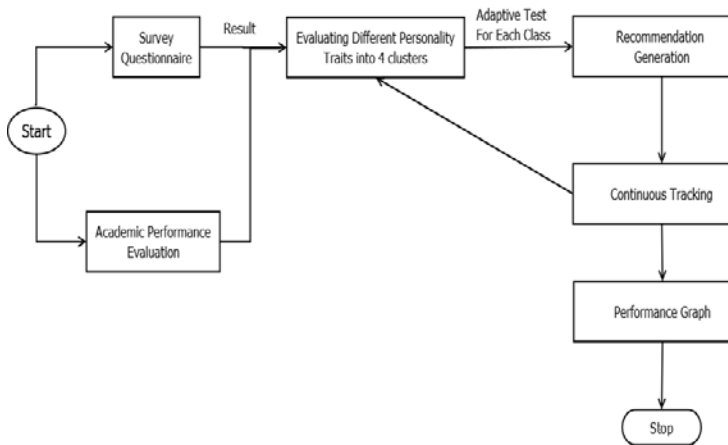
Fig 2. Process Flow Diagram

5 MODULES

The system is divided into three modules namely Survey, Report and Recommendation & Tracking also referred to as SRT. This is explained as follows:

5.1 Survey

This system will be implemented with two levels of questioning. The first level includes academic data and personality questionnaire where the result of these questionnaire generates a report, indicating the initial interest, probable career option, strength and weakness of the student. This questionnaire shows the personality by analyzing learning style and academic interests. The initial recommendations will be tested based on frequent questioning which forms the second level of the application. The second level of questioning will include adaptive questionnaire which asks questions depending on the recommended domain. This level helps to evaluate specific traits in the student behavior.

5.2 Recommendation and Report

The Recommendation generated is dependent based on the first level questionnaire. This recommendation is generated using K-Mean clustering algorithm. The results of the first level questionnaire are clustered into four different clusters which symbolizes the four different personality groups. The personality groups are decided based on Briggs Meyer 16 personality types [6].

5.3 Tracking

This phase is used for measuring the degree to which the recommendations are followed by the students. Tracking generates various graphical model for displaying the statistical deviation in behavior of the user inputs and variations from their ideal situation. Moreover, its further scope includes reports in the form histogram, pie-chart, data table, polygon graph, pdf-generated guidelines, inspirational You Tube or any other relevant videos to evaluate themselves and trigger their learning interests. This section is based on an adaptive model wherein tracking will ensure

the continuous evaluation of student's interests and any huge deviation will be accounted to the students with its advantages and disadvantages.

6 APPLICATIONS

6.1 Career Counseling

The main purpose of the purposed system is to help students decide their career. The system will provide a set of questionnaire followed by a set of adaptive reports. The student's career will also be tracked by keeping a record of the progress.

6.2 Psychological Treatments

The purposed system will keep a track of the student's whole career and thus if any student faces and psychological issues the machine will detect an anomaly in the record and will also help the Psychologist to determine the cause of the trouble.

6.3 Educational Institutes

One of the applications of such a system is to evaluate student's academic performance at the school level. The students are made to update their records continuously through their academic progress. The counselors can use such system to predict the proper guidelines for the students and help them.

6.4 Recruitment & HR Interviews

The proposed system will be developed to maintain a record of the students and when recruiting companies look to hire students the system will help them to filter out the process by specifying a criterion to shorten the recruitment process & time.

6.5 Feedback System

The system can be used to predict the originality of the feedback received by various employees per the system's review of the employee. The system can keep a track of the employee's personality and check the feedback.

7 ADVANTAGES

The proposed system analyzes on multiple factors. The inclusion of various factors enhances its ability to generate more accurate career options. The system suggested is also based online rather than on paper. Adaptive learning ensures that the questionnaire is updated per each user which also tracks his progress in the area. The inclusion of machine learning also adds to increasing the accuracy of the system by studying each user's behavior. The tracking feature of the system makes sure that user is making progress in the chosen field and checks if student's interest is changing over the period.

8 CHALLENGES

8.1 Generation of Adaptive Survey

There are various career options available to the student's, there is nearly impossible to consider all of them while creating the questionnaire. Some career options may have to be excluded to generate the questions.

8.2 Testing in Practical Conditions

The testing facility depends on various factors like internet connection, reliability of server Capacity of server. Also, the adaptive nature may fluctuate if the server's response is impeded.
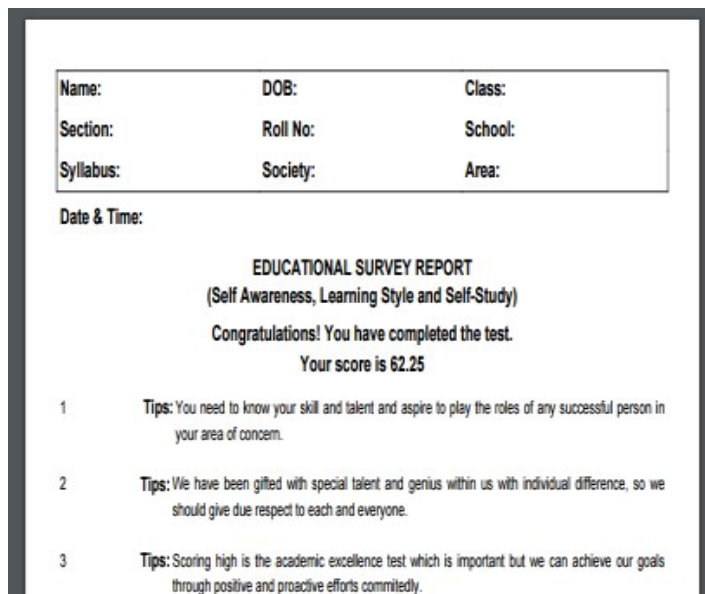
9 REMOTE INTERFACES

9.1 Test Login

9.1 Test Questionnaire

9.3 Recommendations Provided on E-mail

10 CONCLUSION

The proposed system has a good potential to curb some of the problems faced in the existing system like accessibility, efficiency, continuous evaluation of behavioral traits, data integrity and confidentiality. This is a well bound application involving K-mean algorithm as a controller agent and Meyer Briggs type indicator (MBTI) [6][7] for survey. The regular tracking methodology will keep the user in touch with his progress. This application eliminates the drawbacks of various other existing system. With the new emerging technologies and algorithm in future, this concept can be used in variety of application effectively.

11 ACKNOWLEDGMENT

12 REFERENCES

[1] Essaid EL HAJI, Abdellah AZMANI, Mohamed EL HARZLI(2014), "Multi-expert system design for educational and career guidance: an approach based on a multi-agent system andontology International Journal of Computer Science Issues (IJCSI);Sep2014, Vol. 11 Issue 5, p46, September 2016.

[2] Crystal D'Mello, RiniAranha, Boni Gregory, VarshaShrivastava(2016), "Online Career Guidance System," International Journal of Advanced Research in Computer Science and Software Engineering(ijarcsse), Vol. 6 Issue 4, April 2016.

[3] C. M. Chang, "Choosing career paths: The outputs of VTASI

teams," *2012 Proceedings of PICMET '12: Technology Management for Emerging Technologies*, Vancouver, BC, 2012, pp. 725-733

[4] Chung-Yi Huang, Rung-Ching Chen and Long-Sheng Chen, "Course-recommendation system based on ontology," *2013 International Conference on Machine Learning and Cybernetics*, Tianjin, 2013.

[5] E. Sorour S., Mine T., Goda K. and Hirokawa S. (2014). Efficiency of LSA and K-means in Predicting Students' Academic Performance Based on Their Comments Data.In Proceedings of the 6th International Conference on Computer Supported Education - Volume 1: CSEDU, ISBN 978-989-758-020-8, pages 63-74.

[6] L. H. Moretto, "Who are we? Why do we act the way we do? An overview of the Myers Briggs personality type indicator," *1995 IEEE International Professional Communication Conference. IPCC 95 Proc. Smooth Sailing to the Future*, Savannah, GA, 1995, pp. 211-214. doi: 10.1109/IPCC.1995.554910

[7] M. S. Halawa, M. E. Shehab and E. M. R. Hamed, "Predicting student personality based on a data-driven model from student behavior on LMS and social networks," *2015 Fifth International Conference on Digital Information Processing and Communications (ICDIPC)*, Sierre, 2015, pp. 294-299.

IJSER