SMART CAREER PATH RECOMMENDER

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Abstract : Recommender system is a computer program build with the help of experts where the details of the students and their aptitudes help finding a right course for his future. This project proposes feasible predictions for student's field selection based on their marks and choice of interest. Choosing a right field in right stream is very important for his/her future. If the decision went wrong it will be a mismatch between student aptitude, capability and personal interest. This project also reveals the research process for preparation of such a recommender system. Smart Career Guidance Recommendation System is developed for recommending skilling courses and certification courses in the various domain. A substantial amount of literature focuses on predicting student performance in solving problems or completing courses. Many Machine learning techniques, such as decision trees artificial neural networks, matrix factorization, collaborative filters and probabilistic graphical models, have been applied to develop student performance prediction algorithms. In this paper, we identify and apply the suitable algorithms for Student specific skill oriented course recommendation system in the CSE/IT domain. We present the dataset built using the questionnaire and skill tests to extract the information regarding their interests, abilities.

Keywords: Career Planning, Decision-Making, Career Guidance, Personalized Recommendation Systems, Recruitment Process.

I. INTRODUCTION

Smart Career Path Recommender, the ultimate online platform designed to help to students to navigate the complexities of career planning and decision-making. With our innovative system, students can explore a variety of potential career paths, identify your strengths, and discover opportunities that align with your unique interests and goals. Our user-friendly tools and resources will empower you to make informed choices about your professional future, ensuring that you are equipped with the knowledge and skills needed to achieve success in your chosen field. Whether you are just starting out on your career journey or looking to make a change, the Smart Career Path Recommender is here to guide you every step of the way. Competition in today's society is heavily multiplying day by day. Especially it is too hard in present day's to face technical world. So as to compete and reach the goal of students ,they need to be plan and organized from initial and final stages of their education. So it's important to perpetually assess their performance, establish their interests and assess however shut area unit they're to their goal and asses whether or not they are within the right path that directs towards their targeted. This helps them in improving themselves, motivating themselves to a better career path if their capabilities are not up to the mark to reach their goal and pre evaluate themselves before going to the career peek point. Not only that recruiters while recruiting people into their companies evaluate candidates on different parameters and draw a final conclusion to select an employee or not and if selected, finds a relevant stream and career area to student. There are many types of roles like Database administrator, Business Process Analyst, Developer, Testing Manager, Networks Manager, Data scientist and so on. All these roles require some pre-requisite knowledge in them to be placed in them. So, recruiters analyze candidates performance in skills, talents and interests and place the candidate in the right job role suited for them. These kind of prediction systems make their recruitment tasks very easy because as the inputs are given, recommendation is done based on inputs. Already these type of profession recommendation systems and course recommendation, prediction systems are widely used in various private personal analyzing portals like Co-Cubes, AMCAT. They only consider features like technical abilities and psychometric of candidates into consideration.

II. LITERATURE REVIEW

This section provides a comprehensive review on educational expert recommender systems with the focus on career-path recommenders. There are several types and categories of recommender systems designed to support learning for students and teachers. However, the focus of this review will be on personalized fuzzy recommender systems for different disciplines and educational levels. For further details about other types of recommenders, we refer the reader to some excellent reviews from the literature .Some recommender systems were designed to provide educational guidance regarding the management of learning objects such as courses and exercises. For example, a smart course recommender system is proposed to provide teachers with recommendations to help them better manage their courses based on the different learning styles of students. Another example is a hybrid recommender system for course recommendation with professor and student information dataset to enhance the effectiveness of information access to 2 learners. A personalized group-based recommendation system is implemented into improve students' search experience on the Web based on their behavior patterns and competences. Another objective of personalized recommender systems is to predict the most suitable career choice for students based on their personal background, personality, academic

performance and environment .Choosing a career path is a difficult decision high-school students need to take at a very young age. Such a decision is affected by many factors such as; family influence, gender, personality, academic performance, and cultural and financial influence .Students usually do not have guidance nor experience to help them choose their career path. For example, in engineering there are various disciplines to choose from, such as civil, chemical, computer and electrical, and industrial engineering. Students do not have knowledge on the difference between engineering disciplines which affects their choice negatively The Smart Career Path Recommender website is a modern solution that helps individuals in selecting their career path. The literature review reflects the views of various scholars and researchers on the importance of career counseling, career path selection, and the role of technology in this area. According to research, career counseling is a critical factor in helping individuals choose a career path. Studies have shown that individuals who receive career counseling are more likely to make informed decisions about their careers and experience greater job satisfaction (Gati, Krausz, & Osipov, 1996). Career counseling can positively impact individuals' lives by providing them with direction, support, and guidance in their career pursuits. In recent years, technology has played an increasingly vital role in career counseling. With the use of smart algorithms and artificial intelligence, webbased programs can offer personalized recommendations based on an individual's skills, interests, and qualifications. These algorithms can sort through vast amounts of data to provide tailored recommendations, saving individuals time and effort in their job search (Lerner, 2018).One such program is the Smart Career Path Recommender website, which is designed to assist individuals in finding their ideal career path. The website uses sophisticated algorithms to generate a personalized set career recommendations 3 based on user inputs, such as personality traits, skill sets, and education level. Users can take advantage of a broad range of features and tools offered by the website, including career assessments, job search engines, and career advice. Studies have shown that technology based career counseling can be just as effective as traditional, face-to-face counseling (Richardson, Vanderveen, & Bell, 2012). As technology continues to advance, web-based career counseling programs like the Smart Career Path Recommender website are likely to become increasingly popular and valuable tools for career seekers. conclusion, the literature review provides evidence for the importance of career counseling and the role of technology in career path selection. The Smart Career Path Recommender website offers a timely and innovative solution for individuals seeking career guidance.

III. PROBLEM STATEMENT

Many people struggle to identify the right career path for themselves. This can be due to uncertainty about their strengths, the job market, and the skills needed to succeed. The result is often confusion, dissatisfaction, and underperformance in the workplace. Inadequate guidance and support in navigating the career landscape can create significant barriers to success. This problem affects not only individuals, but also the wider economy, as unfulfilled job roles can lead to lost productivity and potential. Therefore, it is crucial to develop effective tools and resources that can help individuals plan and develop their careers, making informed decisions about the best path forward.

IV. METHODOLOGY

4.1 Dataset Collection

Student Login to Gmail The Career Guidance form will be sent to student's individual mails Students can view the form by logging into their respected mails Student can open the form by clicking on link which sends to different mail ID's Form link will be mailed to student's mail id, By clicking on the link student can view the form.

4.2 Data Processing and Normalization

Student Can See Various Fields After opening the form students can see various fields like Programming, Web Developer, Networking and Hardware, Data Science , Android. A student can take the Test After opening the form student can start filling the form and answer the questions. Result for the test has to be calculated. Every individual response of students will be saved in Responses section of the form in the format of a spread sheet that we can download into a csv file.

4.3 Model Building and Training

Not only spread sheet ,the result can also be displayed in the graphical format. Pre-processing We pre-process the data in to required format. For Example, the data in data set will be stored in the form of words nothing but alphabetic. We convert those into numerical format Predicting the Skills from the Data applying various machine algorithms on the data set ,we found more accuracy. At any one algorithm ,thus it suits for the recommendation system to be accurate. Then Recommend the respected skill Certifications Individual student differ from the other student in their skills. recommendation system helps to predict 4 the inherent skill of a student and recommend the respected skill certifications.

4.4 Block Diagram
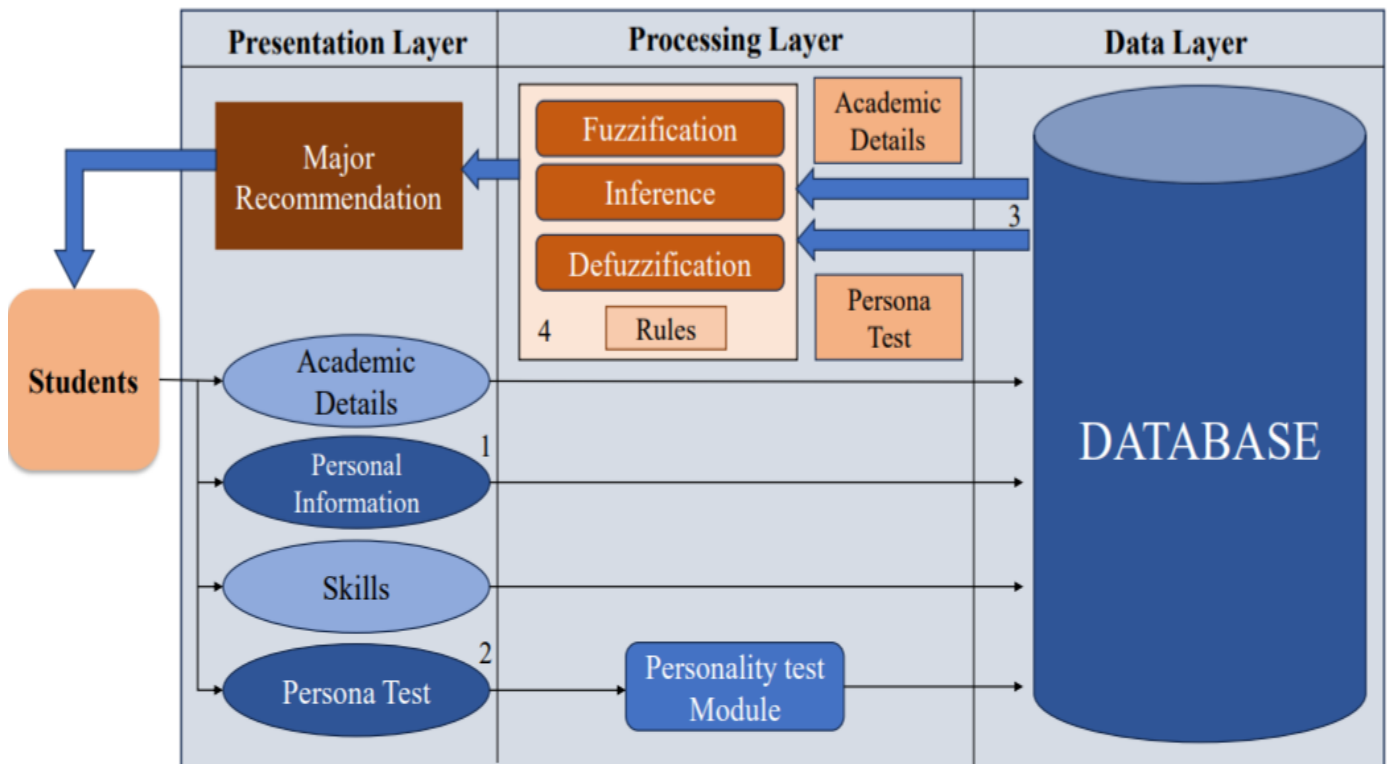
V. FLOWCHART
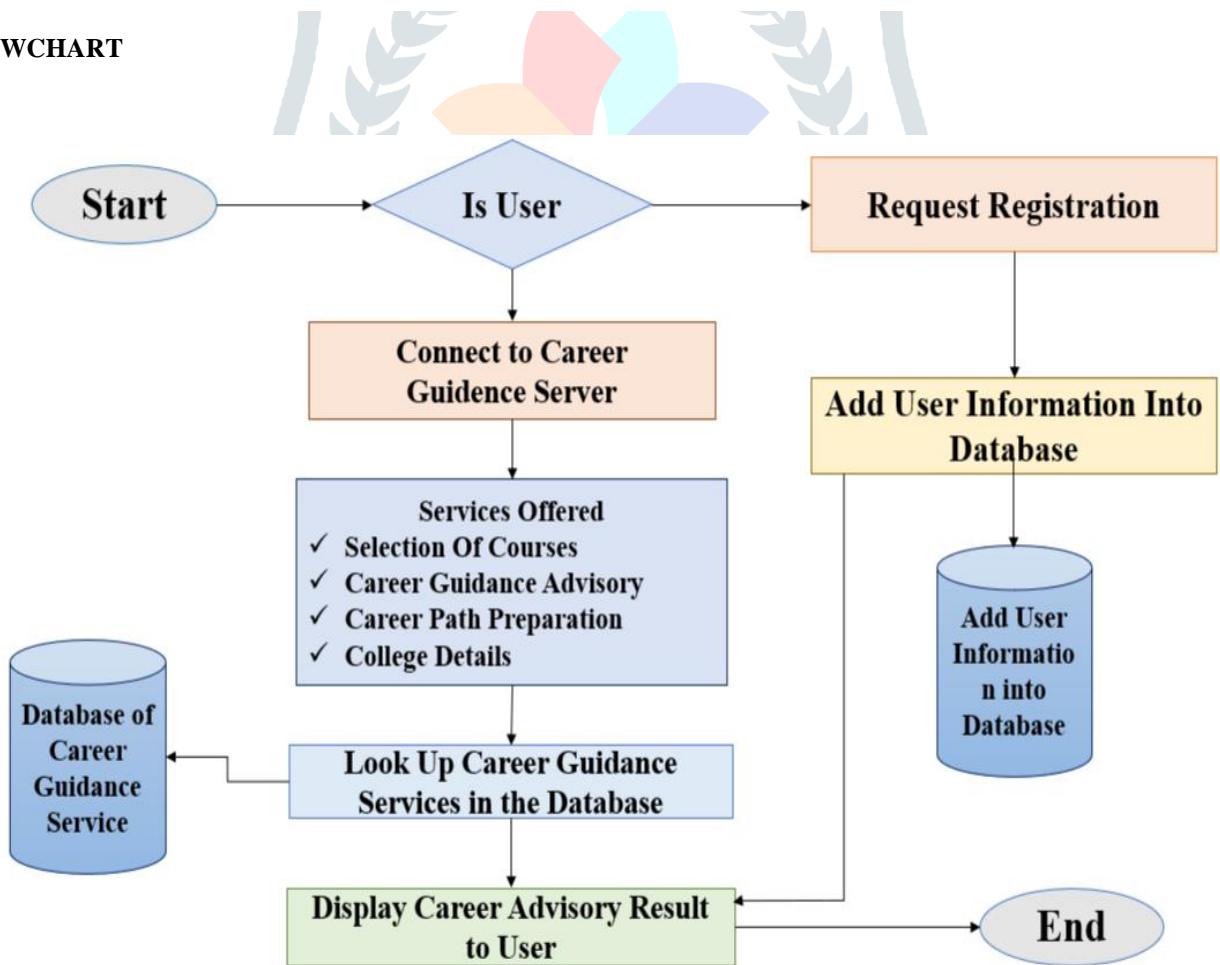
VI. BENEFITS

- Personalized Career Guidance: The platform offers personalized career guidance based on individual strengths, interests, and goals, helping students make informed decisions about their professional future.
- Efficient Decision Making: By providing comprehensive information about various career paths, the platform streamlines the decision-making process for students, reducing uncertainty and increasing confidence in their choices.
- Skill Enhancement: Through assessments and recommendations, students can identify areas for skill improvement, enabling them to enhance their capabilities and competitiveness in the job market.
- Alignment with Market Demand: The platform can analyze trends and demands in the job market, guiding students towards career paths that are in high demand, thus increasing their employability and job prospects.
- Recruiter-Friendly: By assessing candidates' skills, talents, and interests, the platform can assist recruiters in identifying suitable candidates for specific job roles, streamlining the recruitment process and ensuring better matches between candidates and positions.

VII. DRAWBACK

- Lack of Human Touch: While the platform offers automated recommendations, it may lack the human touch and personalized guidance that a career counselor or mentor could provide, particularly for students who require more nuanced support.
- Bias in Recommendations: Depending on the algorithms and data used, there may be biases in the recommendations provided, leading to inequitable outcomes for certain demographic groups or perpetuating existing inequalities in the job market.
- Overreliance on Data: There is a risk of overreliance on data-driven recommendations, potentially overlooking intangible factors such as passion, creativity, and interpersonal skills, which are also crucial for career success.
- Limited Scope: The platform may have a limited scope in terms of the career paths and industries it covers, potentially neglecting niche or emerging fields that could be relevant to certain students.

VIII. CONCLUSION

In conclusion, Smart Career Path Recommender website is a valuable tool for individuals seeking guidance in their career paths. It offers personalized recommendations based on their skills, interests, and qualifications, saving them 5 time and effort in their job search. With its user- friendly interface and sophisticated algorithms, it provides reliable and accurate information on potential career opportunities. By leveraging technology ,the website helps users make informed decisions about their future careers, ultimately leading to greater job satisfaction and success. This project presents Student Career Guidance and Recommendation System using the inherent student skills for choosing right career. Choosing a right career by is significant due to the diversified human abilities. Many students are choosing their career path without receiving proper advice from suitable professional or university services. This may potentially cause mismatch between academic achievements, personality, interest and abilities of the students. In order to recommend students in career selection, it is essential to build a recommendation system that provides direction and guidance to students in choosing their career. The key challenge in this project is selecting key attributes/skills that help in predicting the right path to meet diversified students goals. System is developed using machine learning algorithms like Decision tree Classifier, Support Vector Machine, Ada Boost, Linear Discriminant Analysis, Logistic Regression,…etc. Logistic Regression and Linear Discriminant Analysis has given more accurate results. We took dataset from 1000 student's data. The recommendation system will be helpful for establishing good Institution Student relationship and improving Institution reputation. This system In future we can create effective web application that can gather information by evaluating and examining. Analytical, Memory Based, Technical, Logical , Hobbies, interests in Technical/Non Technical, Performance of the student from the child hood and skill based tests can be conducted and information collected can be used to improve the accuracy. The Dataset can be built from several thousands of student's data. We can try to use the clustering methods for better understanding. We can also implement the techniques like Deep Neural Networks and Time series Analysis.

REFERENCES

[1] R. D. Ibrahim Z, "Predicting Students' Acdemic Performance: Comparing Artificial Neural Network, Decision Tree and Linear Regression, 2007," in 21st Annual SAS Malaysia Forum, 5th September 2007, Shangri-La Hotel, Kuala Lumpur, 2007.

[2] Smart Career Guidance and Recommendation System lakshmi prasanna, 2DR.D.Haritha Student, Head of Department SRK Institute Of Technology,Vijayawada,Andhra Pradesh,India © IJEDR 2019 | Volume 7, Issue 3 | ISSN: 2321-9939 M. Glenn, ''The future of higher education: How technology will shape learning,''New Media Consortium, Austin, TX, USA, Tech. Rep. ED505103, 2008.

[3] Arsad P M, Buniyamin N, Rasheid N A, "Evaluation of Academic Performance of Electrical Engineering Bachelor Degree Students from Various Entry Levels: a Case Study," in 9th WSEAS International Conference on EDUCATION and EDUCATIONAL TECHNOLOGY (UDU'10) , IWATE Japan Dec 2010 Iwate Prefectural University Japan, 2010.

[4] Arsad P M , Buniyamin N, Manan J A, Hamzah N, "Proposed Academic Students' Performance Prediction Model: A Malaysian Case Study," in International Congress on Engineering Education (ICEED), 7-8 December 2011, Malaysia 2011 3rd, 2011.

[5] M. Glenn, ''The future of higher education: How technology will shape learning,'' New Media Consortium, Austin,

TX, USA, Tech. Rep. ED505103, 2008.

[6] P. C. Wankat and L. G. Bullard, ''The future of engineering education– Revisited,'' *Chem. Eng. Educ.*, vol. 50, no. 1, pp. 19–28, 2016.

[7] I. L. Organization. *Employment Promotion (Arab States).* [Online]. Available: https://www.ilo.org/beirut/areasofwork/employment-policy/lang–en/index.html.

[8] U.-C. Klehe, J. Zikic, A. E. van Vianen, J. Koen, and M. Buyken, ''Coping proactively with economic stress: Career adaptability in the face of job insecurity, job loss, unemployment, and underemployment,'' *Role Econ. Crisis Occupational Stress Well Being*, vol. 10, pp. 131–176, Jun. 2012.

[9] S. Nicolai, *Fragmented Foundations: Education and Chronic Crisis in the Occupied Palestinian Territory*. ERIC, Paris, France, 2007.

[10] P. C. B. of Statistics. (2019). *Selected indicators for education in palestine by level of education and region for scholastic Year.* [Online]. Available: http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Education2018 _E.html

[11] (2017). *Educational Fields and Labor Market for Persons Aged 20-29 Years.* [Online]. Available: http://www.pcbs.gov.ps/ post.aspx?lang=en&ItemID=3179

[12] Q. Unit. *Abet Accredited Engineering Programs*. Accessed: Jul. 1, 2020. [Online]. Available: https://eng.najah.edu/en/quality-unit/abet-accredited- engineering-programs/

[13] I. O. Pappas, M. N. Giannakos, and L. Jaccheri, ''Investigating factors influencing Students' intention to dropout computer science studies,'' in *Proc. ACM Conf. Innov. Technol. Comput. Sci. Edu. (ITiCSE)*, 2016, pp. 198–203.

[14] M. M. El-Bishouty, T.-W. Chang, S. Graf, Kinshuk, and N.-S. Chen, ''Smart e-course recommender based on learning styles,'' *J. Comput. Edu.*, vol. 1, no. 1, pp. 99–111, Mar. 2014.

[15] Z. Gulzar, A. A. Leema, and G. Deepak, ''PCRS: Personalized course recommender system based on hybrid approach,'' *Procedia Comput. Sci.*, vol. 125, pp. 518–524, 2018.

[16] P. Verma, S. K. Sood, and S. Kalra, ''Student career path recommendation in engineering stream based on three-dimensional model,'' *Comput. Appl. Eng. Edu.*, vol. 25, no. 4, pp. 578–593, Jul. 2017

[17] A. Shumba and M. Naong, ''Factors influencing students' career choice and aspirations in South Africa,'' *J. Social Sci.*, vol. 33, no. 2, pp. 169–178, 2012.

[18] A. S. Kazi and A. Akhlaq, ''Factors affecting students' career choice,'' *J. Res. Reflections Educ. (JRRE)*, vol. 11, no. 2, pp. 187–196, 2017.

[19] R. Paloş and L. Drobot, ''The impact of family influence on the career choice of adolescents,'' *Procedia-Social Behav. Sci.*, vol. 2, no. 2, pp. 3407–3411, 2010.

[20] A. Godwin, G. Potvin, Z. Hazari, and R. Lock, ''Identity, critical agency, and engineering: An affective model for predicting engineering as a career choice,'' *J. Eng. Edu.*, vol. 105, no. 2, pp. 312–340, Apr. 2016.

[21] P. Rosati, ''Academic progress of Canadian engineering students in terms of MBTI personality type,'' *Int. J. Eng. Educ.*, vol. 14, no. 5, pp. 322–327, 1998.

[22] P. Rosati, ''Student retention from first-year engineering related to per- sonality type,'' in *Proc. IEEE Frontiers Edu. Conf. (FIE)*, Nov. 1993, pp. 37–39.

[23] J. Reynolds, D. R. Adams, R. Ferguson, and P. Leidig, ''The personality of a computing major: It makes a difference,'' in *Proc. EDSIG Conf.*, 2016, pp. 2473–3857.

[24] I. Briggs-Myers, ''Myers-Briggs type indicator (MBTI),'' Consulting Psy-chologists Press, Palo Alto, CA, USA, Tech. Rep., 1985.

[25] A. Garden, ''Relationships between MBTI profiles, motivation profiles, and career paths,'' *J. Psychol. Type*, vol. 41, pp. 3–16, 1997.

[26] K. R. Kelly and W.-C. Lee, ''Relation of psychological type to career indecision among university students,'' *J. Psychol. Type*, vol. 64, no. 2, pp. 11–20, 2005.

[27] N. Saka, I. Gati, and K. R. Kelly, ''Emotional and personality-related aspects of Career-Decision-Making difficulties,'' *J. Career Assessment*, vol. 16, no. 4, pp. 403–424, Nov. 2008.

[28] W. Tyson, R. Lee, K. M. Borman, and M. A. Hanson, ''Science, technology, engineering, and mathematics (STEM) pathways: High school science and math coursework and postsecondary degree attainment,'' *J. Edu. Students Placed Risk (JESPAR)*, vol. 12, no. 3, pp. 243–270, Oct. 2007.

[29] X. Wang, ''Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support,'' *Amer. Educ. Res. J.*, vol. 50, no. 5, pp. 1081–1121, 2013.

[30] J. Knowles, T. Kelley, and J. Holland, ''Increasing teacher awareness of STEM careers,'' *J. STEM Educ.*, vol. 19, no. 3, pp. 56–64, 2018.

[31] A.-S. Denault, C. F. Ratelle, S. Duchesne, and F. Guay, ''Extracurricular activities and career indecision: A look at the mediating role of vocational exploration,'' *J. Vocational Behav.*, vol. 110, pp. 43–53, Feb. 2019.

[32] B. Lawhorn, ''Extracurricular activities,'' *Occupational Outlook Quart.*, vol. 9, pp. 16–21, Mar. 2008.

[33] N. Darling, ''Participation in extracurricular activities and adolescent adjustment: cross-sectional and longitudinal findings,'' *J. Youth Adoles- cence*, vol. 34, no. 5, pp. 493–505, Oct. 2005.

[34] O. Dalrymple and D. Evangelou, ''The role of extracurricular activities in the education of engineers,'' in *Proc. Int. Conf. Eng. Educ.*, 2006, pp. 24–30.

[35] B. E. Woolnough, ''Factors affecting students' choice of science and engineering,'' *Int. J. Sci. Edu.*, vol. 16, no. 6, pp. 659–676, Nov. 1994.

[36] M. Coetzee and N. Martins, ''Organisational culture, employee satisfac- tion, perceived leader emotional competency and personality type: An exploratory study in a South African engineering company,'' *SA J. Hum. Resource Manage.*,

vol. 5, no. 2, pp. 20–32, 2007.

[37] S. V. Paunonen and M. C. Ashton, ''The structured assessment of personal- ity across cultures,'' *J. Cross-Cultural Psychol.*, vol. 29, no. 1, pp. 150–170, Jan. 1998.

[38] J. Teague, ''Personality type, career preference and implications for com- puter science recruitment and teaching,'' in *Proc. 3rd Australas. Conf. Comput. Sci. Edu. (ACSE)*, 1998, pp. 155–163.

[39] R. M. Felder, G. N. Felder, and E. J. Dietz, ''The effects of personality type on engineering student performance and attitudes,'' *J. Eng. Edu.*, vol. 91, no. 1, pp. 3–17, Jan. 2002.

[40] L. A. Zadeh, G. J. Klir, and B. Yuan, *Fuzzy Sets, Fuzzy Logic, and Fuzzy Systems: Selected Papers*, vol. 6. Singapore: World Scientific, 1996.

[41] L. A. Zadeh, ''Fuzzy sets,'' *Inf. Control*, vol. 8, no. 3, pp. 338–353, Jun. 1965.