

Career Path Prediction Using Machine Learning

Prathamesh Gavhane¹, Dhanraj Shinde¹, Ashwini Lomte¹, Naveen Nattuva¹, Monika Munjal¹

¹Department of Computer Engineering, Dr. D. Y. Patil School of Engineering, Lohegaon, Maharashtra India

ABSTRACT

In today's era, choosing the right career option is the challenging task. Starting at the early stage of life students usually fail to grasp the idea of which career to pursue as they lack maturity and the experience related to that field. Furthermore, students suffer greatly in deciding which career would result the highest benefit. Students do not have sufficient knowledge to take the decision on their own which may lead to complications in future. Choosing proper career can help the student to be successful by excelling his/her skills in that particular field. In this paper we present the detail study for choosing the right career option for an individual. Survey has been done for analyzing the different techniques for making right career choice.

Keywords: Machine Learning, Classification algorithms, Career path prediction.

I. INTRODUCTION

Machine Learning (ML) is the study of computer algorithms that improve automatically through experience. It is seen as a subset of artificial intelligence. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications. Machine learning helps the computers to act without explicitly being programmed. Simply it is giving computers the ability to learn by using statistical techniques [11]. This helps in solving very complex tasks and problems very easily and without involving much human labor.

Nowadays students are getting confused about their right career path. Because of this confusion they are ending up with the career in which they are least interested. In today's world competition is heavily

increasing day by day. Mainly it is too heavy in present day's technical society. Students need to be well organized and planned from initial stages of their education, so as to reach the goal. To help them in improving themselves, motivating themselves to a better career path. It is very important to constantly evaluate their performance, identify their interests and evaluate how close they are to their goal and whether they are in the right path that directs towards their targeted [11].

There are many new career opportunities in every field, because with the increase in research and exploration in various domains. The reasons for this confusion could be unawareness of self-talent and self-personality trait, unawareness of the various options available, equal interests in multiple fields, less exposure, market boom, assumed social life, peer-pressure etc. This creates more confusion to the students to select one career option. There should be proper counseling of the student's psychology,

interest and their capacity to work in a particular field [7]. Otherwise, student may select a wrong career option and the consequences of this wrong decision could be work dissatisfaction, poor performance, anxiety and stress, social disregard etc. There are career counseling services which are helping students to find their career goals, which is the reason counseling centers having been established. These counseling centers helps student to know the wide variety of options available for them. Now students can choose the best path for them provided by the counsellor.

In this paper we are going to provide a machine learning model which will give you the career path prediction. To the best of our knowledge, there is no available benchmark dataset suitable for career path modeling [3]. We thus created new datasets by crawling fifteen popular career paths, namely engineer, doctor, pharmacist, lawyer, archaeologist, financial advisor, motivational speaker, chartered accountant, hotel management, wedding planner, writer, photographer, cabin crew, journalist and translator. For each career path we have an individual dataset. We have collected the dataset by forwarding the google form links to the students, teachers, professional which were containing some questions to answer. Likewise, we successfully completed the collection of datasets.

II. LITERATURE REVIEW

- [1] Roshani Ade & P. R. Deshmukh (2014). In this paper for classification of students using psychometric tests. They used incremental naive bayes algorithm. And the results were TP-Rate_0.896, FP Rate_0.01, Precision_0.903, Recall_0.896, F-Measure_0.893 and ROC-Area_0.99. In future naïve bayes algorithm can be used as a weak classifier in the ensemble concept for incremental learning.
- [2] Ahmad F. Subahi (2018). He proposes a data collection strategy to build the required career path prediction dataset for a promising data-driven system. A new artificial neural network (ANN) approach for career path prediction was used.
- [3] Ye Liu, ET AL (2016). They have created a career path prediction model for career path instead of going to the fortune tellers. They have collected the information from various social networks. And the future work is to extend the model to consider the source descriptiveness and learn the source confidence adaptively.
- [4] Beth Dietz-Uhler & Janet E. Hurn (2013). So, they have used a learning analytics to predict student success through a perspective of faculty. In this paper, they defined about learning analytics, how educational institutions has been used it, what learning analytics tools are available and how faculty can make use of data in their courser to improve the performance of students.
- [5] Min Nie, ET AL (2020). In past, professional career appraisers used questionnaires to suggest the best career path for a student, instead of that they have created a career choice prediction based on campus big data mining the potential behavior of college students. Algorithm used is XGBOOST (ACCBOX). Accuracy of ACCBOX was 0.638.
- [6] Amer Al-Badarenah & Jamal Alsakran (2016). As we know that there are recommendation systems for the recommendation purpose while online shopping, movies, songs, etc. In that way they have created an automated recommender system for course selection which will be easy for students to choose the right subject for them.
- [7] Nikita Gorad, ET AL (2017). Keeping in mind that selecting the right career is one of the important decisions. Some students end up

- selecting wrong decision. For that purpose, they have created a career counselling model using data mining. They used adaptive boosting algorithm which gave around 94% of accuracy.
- [8] Dileep Chaudhary, ET AL (2019). For selecting an appropriate career path, they have created a student future prediction model using machine learning. Algorithms used were linear regression, decision tree and random forest, to improve accuracy they used adaptive boosting over the algorithms.
- [9] Vivek Kumar Mourya, ET AL (2020). They have created a career guide application using machine learning. Through this application students can easily choose a best career path for them. The machine learning algorithm used for predicting is a clustering algorithm named as K-means algorithm.
- [10] Lakshmi Prasanna & DR.D.Haritha (2019). Keeping recommender system in mind, they have created a smart career guidance and recommendation system. This paper proposes feasible predictions for student's field selection based on their marks and choice of interest. Ten to eleven machine learning algorithms were used for the predictions. In which logistic regression gave 82% accuracy. In future we can use clustering methods for better understanding.
- [11] K. Sripath Roy, ET AL (2018). They have created a student career prediction model using advanced machine learning techniques. Algorithms used are support vector machine (SVM), xgboost and decision tree. SVM gave more accuracy with 90.3 percent and then the XG Boost with 88.33 percent accuracy.
- [12] Mubarak Albarka Umar (2019). A case study of student academic performance prediction using artificial neural networks was presented. This study presents a neural network model capable of predicting student's GPA using students' personal information, academic information, and place of residence. Thus, the model correctly predicts 73.68% of student performance and specifically, 66.67% of students that are likely to dropout or experience delay before graduating.
- [13] Ezenkw.C.P, ET AL (2017). In this paper, an Automated Career Guidance Expert System (AC-GES) has been developed using case-based reasoning (CBR) technique. AC-GES is to assist high school students in choosing career paths that best suit their abilities based on their previous performances in some selected subjects, using Nigerian students as a case study.
- [14] Elaf Abu Amrieh, ET AL (2016). They have used data mining technique in educational data to predict student's academic performance using ensemble methods. They have used bagging, boosting and random forest (RF) and set of classifiers such as artificial neural network, naïve bayesian and decision tree. The obtained results reveal that there is a strong relationship between learner's behaviors and their academic achievement.
- [15] Sudheep Elayidom, ET AL (2009). They have applied data mining on dataset using statistical techniques for career selection. This will help the students in a great way in deciding the right path for them for a bright future. The software developed is simple to use besides being reasonably accurate. Moreover, the user-friendly interface used in this project turns out to be easy to handle and avoid complications.
- [16] Maha Nawaz, ET AL (2014). In this paper they have created an automated career counseling system for students using case-based reasoning (CBR) and J48. This model presents an automated system that copies a one-to-one meeting with a professional career counselor. Out of the two algorithms tested, CBR gave the highest accuracy and Decision tree J-48 gave the

lowest accuracy. The results indicate that the system is capable of correctly proposing majors with approximately 80% accuracy when presented with sufficient data and features.

III. CONCLUSION

Career path prediction is essential as it helps to identify the interest, self-talent, and potential of the student. If the student takes the wrong decision in the early stage of his/her career he/she will face a lot many problems like lack of interest, leaving the course uncompleted, frustration, wastage of time and money etc. It is very important to build reliable models which can predict career path so that the student can escape huge loss and it is also difficult to start with the new career option in this competitive world. The paper presents a review of career path prediction. It projects many attributes and techniques used to predict career path. The purpose of the paper is not to introduce a new technique but to review the implementation and understanding of the existing models. In this paper, 16 techniques have been discussed. From the survey conducted it is understood that predicting career path is important for student.

IV. REFERENCES

- [1]. Ade R. and Deshmukh P. R. (2014). Classification of Students Using psychometric tests with the help of Incremental Naive Bayes Algorithm. *International Journal of Computer Applications*. (0975 – 8887) Volume 89 – No 14.
- [2]. Subahi A., F. (2018). Data Collection for Career Path Prediction Based on Analyzing Body of Knowledge of Computer Science Degrees. *Journal of Software*. Volume 13.
- [3]. Liu Y., Zhang L., Nie L., Yan Y., Rosenblum D. S. (2016). *Fortune Teller: Predicting Your Career Path*. Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence (AAAI-16).
- [4]. Uhler B. D., Hurn J. E. (2013). Using Learning Analytics to Predict (and Improve) Student Success: A Faculty Perspective. *Journal of Interactive Online Learning*. Volume 12.
- [5]. Nie M., Xiong Z., Zhong R., Deng W., Yang G. (2020). Career Choice Prediction Based on Campus Big Data—Mining the Potential Behavior of College Students. *Applied science*. a.Doi: 10.3390/app10082841.
- [6]. Badarenah A. A., Alsakran J. (2016). An Automated Recommender System for Course Selection. *International Journal of Advanced Computer Science and Applications*, Vol. 7, No. 3.
- [7]. Gorad N., Zalte I., Nandi A., Nayak D. (2017). Career Counselling Using Data Mining. *International Journal of Innovative Research in Computer and Communication Engineering*. Vol. 5, Issue 4.
- [8]. Chaudhary D., Prajapati H., Rathod R., Patel P., Gurjwar R. K. (2019). Student Future Prediction Using Machine Learning. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*. Volume 5, Issue 2.
- [9]. Mourya V., Phatale S., Thakur S., Mane P. (2020). Career Guide Application using ML. *International Research Journal of Engineering and Technology (IRJET)*. Volume: 07 Issue: 09.
- [10]. Prasanna L., Haritha D. (2019). Smart Career Guidance and Recommendation System. *International Journal of Engineering Development and Research*. Volume 7, Issue 3.
- [11]. Roy K. S., Roopkanth K., Uday V., Bhavana V., Priyanka J. (2018). Student Career Prediction Using Advanced Machine Learning Techniques. *International Journal of Engineering & Technology*.

- [12]. Umar M. A. (2019). Student Academic Performance Prediction using Artificial Neural Networks: A Case Study. *International Journal of Computer Applications (0975 – 8887)* Volume 178.
- [13]. Ezenkwu C.P., Johnson E.H., Jerome O.B. (2017). Automated Career Guidance Expert System Using Case-Based Reasoning Technique. *Cisd ijournal*. Volume 8, No. 1.
- [14]. Amieh E. A., Hamtini T., Aljarah I. (2016). Mining Educational Data to Predict Student's academic Performance using Ensemble Methods. *International Journal of Database Theory and Application*. doi.org/10.14257/ijdta.2016.9.8.13.
- [15]. Elayidom S., Idikkula S. M., Alexander J. (2009). Applying Data mining using Statistical Techniques for Career Selection. *International Journal of Recent Trends in Engineering*, Vol. 1, No. 1.
- [16]. Nawaz M., Adnan A., Tariq U., Salman J. F., Asjad R., Tamoor M. (2014). Automated Career Counseling System for Students using CBR and J48. *Journal of Applied Environmental and Biological Sciences*.