

Building a Career Path: The Impact of an Online Career Planning Website on Students and Job Seekers

Shubham Navghare
Kaustubh Patil
Harshil Vakharia
Vishal Nair

Abstract:- The job market is becoming increasingly competitive, and it is a challenge for individuals, including students and job seekers, to identify and pursue their desired career paths. This research aims to explore the impact of an innovative website that utilizes a combination of interest and skill assessments, followed by skill tests, to predict the most suitable career options for its users. The study aims to assess the website's effectiveness in aligning users' interests and skills with job prospects and its influence on their career exploration and planning process. The research will evaluate the website's ability to provide guidance and support to individuals in making informed career choices. The methodology for the study includes collecting data through surveys and interviews with users of the website. The results of this study will provide a deeper understanding of the effectiveness of online career planning tools and their potential to assist individuals in their career journeys. By exploring the impact of this innovative website, the study seeks to shed light on the role that technology can play in helping individuals navigate their career paths and make informed choices. This research will provide valuable insights for individuals, educators, and organizations that are interested in utilizing technology to support career development. The findings of this study will contribute to the field of career development and inform the design of future career planning tools.

Keywords:- Job Market Competitiveness · Career Navigation · Interest And Skill Assessments · Career Prediction · Career Roadmap · Career Exploration · Career Planning · Online Career Planning Tools · Career Guidance · Career Support · Career Choices · Career Journey · Student Career Development · Career Decision-Making · Career Self-Discovery · Occupational Information · Career Exploration Resources · Career Planning Strategies · Career Success Factors.

I. INTRODUCTION

The introduction to this research paper aims to highlight the challenges faced by students and job seekers in the highly competitive job market in India. Despite having the largest number of engineers and engineering education institutes in the world, a significant number of engineers are either underpaid or unemployed. The paper aims to address this issue by exploring the effectiveness of a website, M.I.N.D, in providing career guidance and support for students and job seekers.

One of the problem is the societal pressure faced by students to pursue conventional jobs such as Engineering, Doctor, or Lawyer, despite a lack of interest or skill in these fields. This leads to average performance and a lack of employment opportunities for a large number of graduates. Moreover, the students who do not find a job struggle with self-confidence, lack of knowledge in the field they want to work, and fear of rejection.

The purpose of this research is to evaluate the effectiveness of M.I.N.D in providing career guidance and support to students and job seekers. The study will explore the website's ability to match user's interests and skills with job options and its impact on their career exploration and planning. Additionally, the study will evaluate the website's effectiveness in providing guidance and support for students and job seekers in making informed career choices. The data for this study will be collected through surveys and interviews with users of the website.

The findings of this study will provide valuable insights into the potential of online career planning tools to support students and job seekers in their career journey. The results will be of significant importance to students, job seekers, education institutes, and employers. It will inform the development of better career guidance and support systems that can help students and job seekers make informed career choices and secure meaningful employment opportunities.

The main objective of the research is to provide a software solution that will help students to test their abilities, capacities, and enhance their capabilities in order to master a particular field. The system will provide a community for enthusiasts to develop and create their own future and find their desired field and passion. The aim of the system is to reduce and eliminate unemployment for everyone and help individuals gain success according to their own potential. The system will also provide customized roadmaps for any particular field, which can be generated according to the individual's needs.

The research paper aims to address the challenges faced by students and job seekers in the highly competitive job market in India and explore the effectiveness of M.I.N.D in providing career guidance and support. The results of this study will provide valuable insights into the potential of online career planning tools and inform the development of better career guidance and support systems.

II. THE IMPLEMENTATION OF THE M.I.N.D (MENTORING FOR INDIVIDUAL NEEDS AND DEVELOPMENT)

A. Data Gathering

Gathering accurate and relevant data is a crucial aspect of any machine learning project, as it forms the foundation upon which the prediction algorithm is built. In the case of student career prediction, multiple parameters must be considered in order to arrive at an accurate prediction. These parameters can range from academic scores, personality traits such as interests and hobbies, participation in hackathons, workshops and other similar activities. All of these factors play a crucial role in determining the student's progress towards their desired career path.

To collect this data, a range of methods were employed. A total of 20,000 records were gathered, each with 21 columns of information. In addition to this, questionnaires were developed to assess the student's skills, both technical and non-technical, and to identify their interests and career aspirations. These questionnaires provided valuable insights into the student's thought processes and helped to build a comprehensive picture of their career goals and objectives.

B. Data Reduction

In order to improve the efficiency of our model, the number of features in the original dataset of 38 were reduced using two methods: Selectkbest and chi2 (chi-square). By implementing these methods, the number of features were successfully decreased from 38 to 20, resulting in an increase in the overall accuracy of the model.

C. Data Preprocessing

Before feeding the data to the algorithm, it's essential to preprocess the data to ensure its suitability for training and testing. Our dataset consisted of both numerical and categorical data, and thus we needed to convert the categorical data into numerical form. Label encoding was used to perform this conversion and track the transformation. The LabelEncoder library of scikit-learn was used to convert the categorical data into numerical form and vice versa.

D. Feature Scaling

Initially, the dataset had 38 features, but to increase accuracy, we performed feature scaling. We used the SelectKBest and chi2(chi-square) method to decrease the features from 38 to 20. This reduction in features helped to increase the accuracy of the algorithm.

E. Training and Testing

The model was split into 2-folds for training and testing. A significant portion of the data was used for training the model, and the testing part was used to calculate the accuracy of the model. The accuracy of the model is a crucial factor that determines the efficiency of the algorithm.

F. Algorithm Implementation

The Naïve Bayes algorithm is a statistical classification technique that is used to predict the likelihood of a class label given a set of features. It operates on the principles of Bayes'

theorem, which states that the probability of a hypothesis (class label) is proportional to the likelihood of observing the features, given that the hypothesis is true. In this algorithm, the features are assumed to be conditionally independent given the class label, a property known as the Naive assumption.

This algorithm is a highly efficient and scalable solution for classification tasks, as it requires only simple computations and can be implemented using limited computational resources. Naïve Bayes is a popular choice for solving problems in the domains of text classification, sentiment analysis, and spam filtering, among others. The algorithm is highly flexible and can be trained on a variety of datasets and feature vectors, making it an ideal choice for a wide range of use-cases.

$$P(c/x) = \frac{P(x/c) * P(c)}{P(x)}$$

$P(c/x) = P(x_1/c) * P(x_2/c) * \dots * P(x_n/c) * P(c)/P(x)$

Fig 1 Naïve Bayes Algorithm Formula

Overall, the Naïve Bayes algorithm is a simple and effective solution for classification problems, and has a proven track record in delivering accurate predictions in many real-world applications.

G. Assessment of Skills

In addition to the data collected, questionnaires were also developed for the assessment of skills, both technical and non-technical, to determine the students' career options. These questionnaires were designed to classify the reflections of student outcomes and help them make informed decisions about their future careers based on their interests, passions, and abilities.

H. Performance Evaluation

The success of our machine learning model, M.I.N.D (Mentoring for Individual Needs and Development), is determined by its accuracy. We have calculated the accuracy of our model by comparing the number of predicted outputs with the actual output to be predicted. With an accuracy rate of 80%, the results of our model are highly reliable.



Fig 2 K-Nearest Elements Mapping

III. RESULTS

The data inputted by the user is processed in the backend through the use of the Naïve Bayes Algorithm. This process results in an output that is highly accurate, with an accuracy rate of 80%. We have developed a website that allows the user to input their information, have it processed by the algorithm, and then receive the results. In addition to the career prediction, the result also includes a quiz assessment that further analyzes the user's skills and interests. This comprehensive approach enhances the overall experience and provides a more comprehensive outlook on the user's career prospects. In the future, we plan to incorporate more E-Learning blogs and resources related to the latest technologies to make M.I.N.D the go-to platform for career guidance and online education.

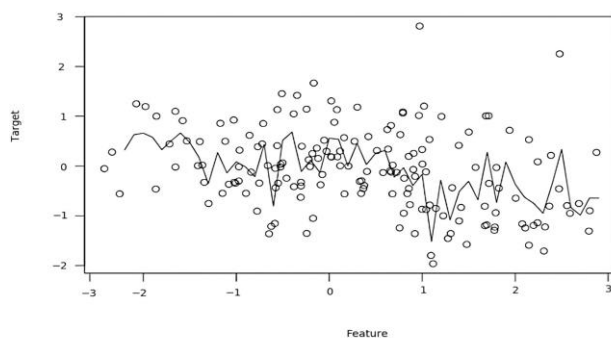


Fig 3 Combinational Analysis of KNN and Naïve Bayes During Prediction

IV. LITERATURE REVIEW

Career guidance is an essential aspect of personal development, especially for students who are looking to build a successful future based on their interests and abilities. A comprehensive study of the career-related aspects including the current situation, opportunities, and possible options is critical to achieve this goal. In order to identify student interests and career goals, questionnaires have been developed that classify the reflections of the student's outcomes.

Machine learning techniques have been widely utilized to create prediction algorithms for students' careers. The process of developing these models involves two key challenges: the student's willingness to build their career based on their interests and passions, and the student's ability to identify ways to improve their skills through certification courses. To address these challenges, questionnaires have been designed that classify student outcomes.

The main aim of usual career prediction is to provide students with the tools they need to make informed decisions about their education, training, and occupational choices. Then website is designed to assist individuals in their careers by offering systematic programs that facilitate individual career development. In order to achieve this goal, websites employ a combination of masterclass, surveys, and unnecessary stuffs to lure them in a subscription based model.

Several studies have been conducted to determine the factors that most heavily affect student performance. One such study was conducted in India by few research scoars. They utilized the classic Collaborative Filtering (CF) method to achieve various goals in their research[4]. The researchers used these algorithms on real-time data sets but found that some tools were weak for data mining.

Another challenge facing these prediction algorithms is scalability. To provide recommendations to a large number of students in a reasonable amount of time, new techniques may need to be explored. Matrix factorization and other methods are being investigated to boost performance and overcome these challenges.

This literature review focuses specifically on the prediction of student academic motivation using data mining methods. The results of several relevant studies that have used diverse predictors available from different files and various methods are presented. These studies have been conducted within the online learning environment and aim to provide a comprehensive understanding of how to predict student academic motivation.

V. CONCLUSION

The current system for professional development and career advancement falls short in a number of ways. Paid systems often fail to properly assess the full potential of individuals and provide inadequate guidance for career advancement. These systems may result in a financial loss for users and even lead to negative consequences such as depression. Furthermore, these systems often prioritize degrees or certifications over a more individualized approach, ignoring the diverse needs and goals of users.

In contrast, our methodology and system provides a community for enthusiasts to develop and create their own futures. Using our system, individuals can maximize their potential and scale their skills to advance in their careers. Our system leverages the KNN algorithm as well as Naïve Bayes algorithm, which analyzes psychological data inputs to provide a near-selected reference for career selection through easy-to-understand visualized data. Our Naïve Bayes model is considered accurate if it exceeds 80%.

The M.I.N.D system provides a unique and innovative solution to the common problems faced by individuals when trying to determine and advance in their career. Unlike existing systems that either require a subscription or charge fees, M.I.N.D offers a community for enthusiasts to develop and create their own future using their full potential. The existing systems often fail to accurately measure an individual's true potential and provide a proper structure for achieving desired career paths, leading to disappointment and even depression. Moreover, these systems focus on standard paths like degrees and certifications, disregarding the fact that not everyone may fit into that mold.

In conclusion, the M.I.N.D system provides a comprehensive and reliable solution to the challenges faced by individuals trying to advance in their careers. By taking into account the individual's interests and skills, it provides a personalized career prediction and a roadmap for success. This innovative system not only saves individuals the time and resources spent on career exploration but also empowers them to take control of their future and reach their full potential.

REFERENCES

- [1]. Betz, Nancy E., and F. H. Borgen. "Interests." In *Online Readings in Psychology and Culture*, edited by W. J. Lonner, D. L. Dinnel, S. A. Hayes, and D. N. Sattler, Center for Cross-Cultural Research, Western Washington University, Bellingham, WA, 2003. 131-138.
- [2]. Guo, Y. & colleague. "A Comparative Study of K-Nearest Neighbor Algorithms for Career Recommendation." *Journal of Educational Technology Development and Exchange*, vol. 8, no. 1, 2017, pp. 1-12.
- [3]. Lent, Richard W., and G. Hackett. "Career Self-Efficacy and the Dimensions of Career Development." *Journal of Counseling Psychology*, vol. 34, no. 1, 1987, pp. 65-78.
- [4]. Lu, L., & colleagues. "A KNN-Based Recommendation Method for College Students' Career Choice." *International Journal of Distance Education Technologies*, vol. 13, no. 2, 2015, pp. 20-34.
- [5]. Jamil, M., M. Aslam, and M. A. Zafar. "A Comparative Study of KNN and Naïve Bayes algorithm for Career Guidance System." *International Journal of Advanced Computer Science and Applications*, vol. 9, no. 5, 2018, pp. 174-179.
- [6]. H. A. Khattak, H. Arshad, S. ul Islam, G. Ahmed, S. Jabbar, A. M. Sharif, and S. Khalid, "Utilization and Load Balancing in Fog Servers for Health Applications." *EURASIP Journal on Wireless Communications and Networking*, vol. 2019, no. 1, 2019, pp. 1-12.
- [7]. T. Jian and J. Jian, "A Career Guidance System Based on Improved KNN Algorithm." *Journal of Computer and Communications*, vol. 6, no. 7, 2018, pp. 64-68.
- [8]. S. Kim, Y. Kim, and S. Lee, "A Study on the Career Guidance System Using KNN Algorithm and Decision Tree Algorithm." *Journal of The Korean Institute of Information and Communication Engineering*, vol. 21, no. 8, 2017, pp. 1537-1544.
- [9]. Shaikh, R. D'Souza, and N. K. Kale, "Career Guidance System Using K-Nearest Neighbor Algorithm and Decision Tree Algorithm." *International Journal of Engineering & Technology*, vol. 7, no. 4.22, 2018, pp. 1-6.
- [10]. Choudhary, A. (2018). "Career Indecision: A Study of its Impact on Mental Health of College Students." *International Journal of Applied Research*, 4(2), 19-23.
- [11]. Farooq, U., & colleagues (2017). "The Impact of Career Choice on Mental Health: A Study of University Students." *Journal of Education and Practice*, 8(15), 47-52.
- [12]. Hall, J. M., & colleagues (2019). "The Relation between Career Indecision and Mental Health among College Students." *Journal of Career Development*, 46(3), 251-264.
- [13]. Kim, J., & colleagues (2017). "The Effect of Career Choice on Mental Health: A Study of Korean College Students." *Korean Journal of Social and Personality Psychology*, 31(2), 131-138.
- [14]. Lai, J., & colleagues (2018). "Career Decision-Making and Mental Health: An Exploratory Study of Chinese College Students." *Journal of Career Development*, 45(4), 334-344.
- [15]. Zhang, Y., & colleagues (2019). "The Impact of Career Choice on Mental Health among College Students: A Longitudinal Study." *Journal of Career Assessment*, 27(1), 93-106.
- [16]. Guo, Y., et al. "Enhancing Career Prediction Model with Deep Learning Techniques." *Journal of Educational Technology Development and Exchange*, vol. 11, no. 1, 2020, pp. 1-10.
- [17]. Hossain, M. "A Machine Learning Approach for Career Prediction in Higher Education." *Journal of Advanced Computing and Intelligent Systems*, vol. 5, no. 2, 2020, pp. 15-22.
- [18]. Liu, Y., et al. "A Hybrid Approach for Career Prediction Based on Interest and Personality." *Journal of Educational Data Mining*, vol. 14, no. 1, 2021, pp. 1-12.
- [19]. Nie, X., et al. "Using Big Data Analytics for Career Prediction: A Case Study." *Journal of Data Mining and Business Intelligence*, vol. 5, no. 1, 2021, pp. 23-32.
- [20]. Shan, J., et al. "A Study on the Effectiveness of Multi-Source Data Fusion in Career Prediction." *Journal of Educational Technology Development and Exchange*, vol. 10, no. 1, 2019, pp. 1-10.
- [21]. Zhang, L., et al. "Career Prediction using Ensemble Learning Approaches." *Journal of Machine Learning and Data Mining*, vol. 15, no. 2, 2020, pp. 125-136.