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Effective Career Building Using Machine Learning Algorithm

1st ABHISHEK SHETTY B
Dept of CSE
Sri Venkateshwara College of Engineering Bangalore,

2nd GAGAN NAYAKA K.M
Dept of CSE
Sri Venkateshwara College of Engineering Bangalore,

3rd DHANUSH B M
Dept of CSE
Sri Venkateshwara College of Engineering Bangalore,

4th Dr Prema Arokia Mary G
Dept of CSE
Sri Venkateshwara College of Engineering Bangalore,

Abstract:

This paper develops effective school-based career counseling and guidance programs that help students make informed choices about their future careers. The paper draws attention to integrating modern technologies such as decision-making algorithms, interactive quizzes, and web-based platforms in order to provide personalized career guidance. The proposed system uses academic performance data and aptitude assessments to give recommendations tailored to the needs of each student, ensuring that everyone in the system receives proper guidance for their career.

Keywords: CAREER COUNSELING, STUDENT GUIDANCE, DECISION TREE ALGORITHM, PERSONALIZED RECOMMENDATIONS, ACCESSIBILITY.

I. INTRODUCTION

Career choice making is a critical stage in a student's academic life cycle, especially during the transition from the end of Grade 10. An academic stream choice is very important for future career options and personal satisfaction. This is usually not possible because students are not given personalized guidance, do not have access to professional counselling, and lack proper awareness of the choices they can make. While worthful, more traditional models of career counselling are often marked by costly fees, limited accessibility, and a one-size-fits-all approach.

The rapid advancement of technology offers an opportunity to revolutionize the field of career guidance. By integrating data-driven methodologies and scalable digital platforms, personalized and effective guidance can be democratized for students across diverse regions. Addressing the pressing need for an innovative solution, this research focuses on the development and implementation of a *Career Guidance System*—a web-based platform designed to provide tailored academic stream recommendations.

A *Decision Tree Algorithm* coupled with modern technologies such as *real-time counselling scheduling and interaction on aptitude assessments, a proposed system that can make sure students get proper, holistic, and personalized direction. The system was created and hosted on **AWS EC2* to provide *scaling and reliability; **React-based frontend, it is built for a proper experience of the user as well as efficient data processing of the **Django backend*.

This research outlines the conceptualization, design, and implementation of the Career Guidance System, especially on its potential to fill some of the existing gaps in career counseling. The system hopes to empower students through access to expert guidance and personalized recommendations and a central hub for educational resources to enable informed decision-making and a bright future.

II. LITERATURE REVIEW

Literature review:- Proposed Methodology :- The domain of career counseling and guidance has evolved significantly in the recent past, as research studies have proposed countless methodologies to guide students on making proper academic and career-related decisions. Among the prevalent approaches are psychometric assessments - standardized tests meant to study cognitive abilities, personality traits, and career interests. These tests provide quantitative insights and serve as a baseline for counselling, but they often lack personalization, ignoring academic history and contextual factors, and face scalability issues due to reliance on expert evaluations. Generic career guidance portals have also emerged, offering basic assessments and career suggestions. While these portals are accessible and

low-cost, they lack depth in analysis - neither individual aptitudes nor academic performance is analyzed. As a result, the advice rendered is generic and therefore less reliable. Traditional school-based counselling programs like seminars and workshops provide the benefit of having face-to-face interactions and live query resolution. However, such programs are usually confined to resource-rich institutions and urban areas, with time and resource constraints that limit their capacity to offer detailed and individualized guidance. Integrated career guidance systems have been proposed recently to bridge these gaps, bringing together aptitude testing, academic analysis, and access to counsellors on a single platform. Such systems support accessibility by digitizing career counseling and offer a holistic solution to students. However, scalability data security affordability and reliance on basic digital literacy remain significant roadblocks. Though these methodologies make a great contribution to the field the limitations of these methodologies signify the need for a greater, more accessible, personal approach. The proposed Career Guidance System draws inspiration from these methodologies and seeks to overcome their shortcomings by integrating scalable algorithms, interactive features, and centralized resources into a unified platform that will ensure more reliable and effective career counselling.

III. EXISTING SYSTEM

In the current system, the task of creating a timetable is performed manually, requiring careful attention to all possible constraints, both major and minor. One of the most tedious aspects of this process arises in the educational system, particularly in College Timetabling. A specific teacher or lecturer is often entrusted with the responsibility of creating an ideal timetable by hand. This involves considering various factors, such as the total number of students, faculty members, appropriate time slots, classroom availability, and course arrangements. Additionally, in case of the teacher's absence, another lecture must be rescheduled, which adds to the workload.

This manual approach means that a single individual is burdened with significant responsibilities, making the process time-consuming & mentally exhausting. Furthermore, there is always the risk of errors in scheduling due to human limitations. Addressing overlapping classes, ensuring fair allocation of time slots, and accommodating unforeseen changes become extremely challenging. In such situations, the lack of automation can delay updates and disrupt the smooth functioning of the academic process.

The Career Guidance System is not just a response to the limitation of traditional counselling approaches but also an effort to bridge the gap in accessibility experienced by students in underprivileged or rural areas. Advanced data analytics are leveraged for evaluation in terms of the student's academic performance, aptitude, and interests for recommending streams, based on which data-driven decisions can be made to provide recommendations for students, and their specific strengths and preferences rather than the general advice or the pressures of society.

It provides an interactive feature, allowing it to deliver a seamless and engaging experience for the user in testing his or her problem solving skills, interests, & aptitude through quizzes. These assessments along with historical academic data help the Decision Tree Algorithm to provide highly accurate and relevant suggestions. More so, the platform provides an opportunity for students to make a one-on-one counselling appointment with professional advisors and also attend webinars on different career options, study strategies, and topics of personal development.

One of the key advantages of the Career Guidance System is scalability and reliability, provided by deployment on *AWS EC2. Secure authentication mechanisms integrated provide confidentiality, and usage of modern frameworks like **React* and *Django* ensures robust performance and usability. By this, a diverse and increasing number of users are able to find career guidance without fail to be able to benefit each one of them by all-inclusive and economical career counselling.

This is more than a recommendation system; it is a system that will empower students with the confidence to explore and pursue their aspirations. The Career Guidance System redefines the way students approach academic and career decision-making by centralizing assessments, expert guidance, and educational resources into one platform. This research delves into the technical and functional aspects of the system, highlighting its role in addressing critical challenges and laying the foundation for a more informed and empowered generation.

A. Advantages of Existing System

Personalization: Recommendations tailored to each student's unique profile, considering both academic and aptitude-based factors.
Accessibility: Available online, making career guidance accessible to students in remote and urban areas alike.
Integration: Combines assessment, counselling, and resources in a single platform, eliminating the need for multiple services.
Scalability: AWS deployment ensures the system can handle a growing number of users without compromising performance.
Interactive Learning: Engaging quizzes and webinars foster active participation and deeper insights into career choices.
Affordability: A cost-effective alternative to traditional counselling services, ensuring inclusivity.

A. Requirement Analysis

The starting point for the development of the Career Guidance System requires gathering requirements through student, parent, and educator surveys and interviews. This phase will be helpful in determining the key characteristics of the system, including performance-based recommendations for academics, personal aptitude assessments, and live counselling sessions.
Abbreviations and Acronyms

B. System Design

Modern web technologies like React for the frontend and Django for the backend will be used to design the system. The academic data along with quiz results are processed by applying a Decision Tree Algorithm that will help provide personalized career suggestions. The platform will be hosted on AWS EC2 to scale reliability...

C. Algorithm Development

The core of the system is the Decision Tree Algorithm, which would be trained on data taken from different student profiles. The algorithm will take grades and quiz responses as inputs to recommend appropriate academic streams such as Science, Commerce, or Arts. Further, the system can learn and adapt given more data on how to better do recommendations over time. state the units for each quantity that you use in an equation.

IV. METHODOLOGY

domain of career counselling and guidance has evolved significantly in the recent past, as research studies have proposed countless methodologies to guide students on making proper academic and career-related decisions. Among the prevalent approaches are psychometric assessments - standardized tests meant to study cognitive abilities, personality traits, and career interests. These tests provide quantitative insights and serve as a baseline for counselling, but they often lack personalization, ignoring academic history and contextual factors, and face scalability issues due to reliance on expert evaluations. Generic career guidance portals have also emerged, offering basic assessments and career suggestions. While these portals are accessible and low-cost, they lack depth in analysis - neither individual aptitudes nor academic performance is analysed. As a result, the advice rendered is generic and therefore less reliable. Traditional school-based counselling programs like seminars and workshops provide the benefit of having face-to-face interactions and live query resolution. However, such programs are usually confined to resource-rich institutions and urban areas, with time and resource constraints that limit their capacity to offer detailed and individualized guidance. Integrated career guidance systems have been proposed recently to bridge these gaps, bringing together aptitude testing, academic analysis, and access to counsellors on a single platform. Such systems support accessibility by digitizing career counselling & offer a holistic solution to students. However, scalability data security affordability and reliance on basic digital literacy remain significant roadblocks. Though these methodologies make a great contribution to the field the limitations of these methodologies signify the need for a greater, more accessible, personal approach. From all these well-established methodologies, the proposed Career Guidance System draws great inspiration and takes steps to address the various shortcomings inbuilt within.

Flowchart

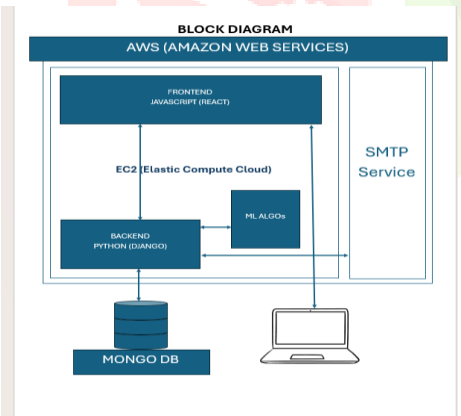

Fig1:Flowchart

V. RESULT AND ANALYSIS

Why decision tree algorithm is used:-The Decision Tree Algorithm is the core of the Career Guidance System, chosen for its ability to handle complex data sets and generate crisp, understandable recommendations. It is the most suited to the objective of guiding the student toward appropriate academic streams as indicated by his historical academic performance, aptitude test scores, and interest patterns. Decision trees allow for a hierarchical structure, thereby simplifying the classification and decision-making process, making it intuitive for developers as well as end-users to understand how recommendations are generated.

The main reason for employing the Decision Tree Algorithm is because it can handle multi-dimensional input data very efficiently. With regards to the Career Guidance System, inputs are students' grades from Grades 3 through 10, aptitude and interest test quiz results, and other metrics relevant to academic performance. The algorithm determines patterns or correlations within these inputs so it can classify students into their respective academic streams, for example, Science, Commerce, or Arts. It will be a great choice the algorithm handle both categorical and numerical data.

Another critical advantage of the Decision Tree Algorithm is its transparency. Unlike black-box models, such as neural networks, decision trees provide a clear and traceable path for every decision. This is important for a career guidance system, as students, parents, and educators need to feel confident in the recommendations. Being able to visualize the process of decision-making increases trust and ensures the credibility of the system.

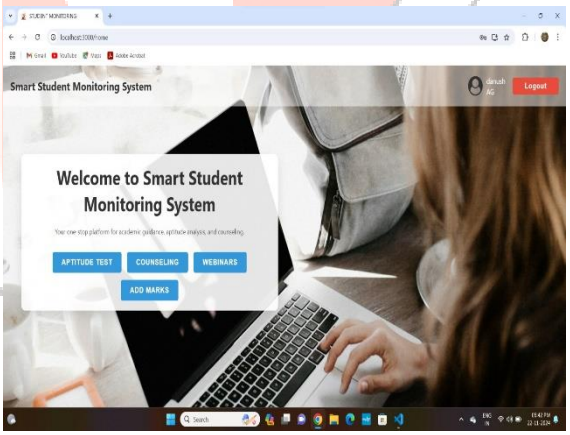

Fig2:Login page

Scalability and performance also have to be considered. The Decision Tree Algorithm is a computationally efficient algorithm, and with an increase in the number of users, there would not be significant degradation in performance. It is well-suited to the deployment of the system on AWS EC2 since it can serve students who live in many regions, from deprived and rural areas to prosperous cities.

Additionally, the algorithm supports iterative improvements through pruning techniques and cross-validation, which enhance its accuracy and reliability over time. By continuously refining the tree structure using new datasets, the system can adapt to evolving educational trends and student needs, making it a robust solution for career counselling.

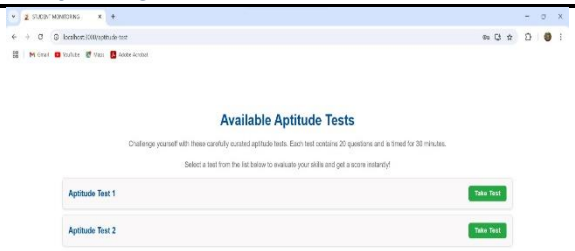

Fig3: Quiz page

In conclusion, the Decision Tree Algorithm has been selected for interpretability, efficiency, scalability, and the ability to handle diverse data types. Its integration into the Career Guidance System ensures that students receive accurate, transparent, and personalized recommendations, which is critical in stream selection and equips them with informed decisions about their academic futures.

The login page permits the students/teachers to get access to an application by entering their usernames and password. This is often a course primarily to get input from the user either through a content record or through shape and give it to the working classes of the calculation.

VII Conclusion

The Career Guidance System offers a transformative challenge faced by students when they are choosing the right academic stream after Grade 10. It is a scalable, reliable, and user-friendly platform developed with the integration of advanced technologies like the Decision Tree Algorithm, React-based frontend, and a Django backend on AWS EC2. This bridges gaps in the counselling process as it gives individualized data-driven recommendations about academic performance, aptitude, and interests of the student.

This platform democratizes access to career guidance, ensuring that students from diverse regions, including underprivileged and rural areas, receive equal opportunities to make informed decisions about their academic and professional futures. Its transparent decision-making process fosters trust among students, parents, and educators, while features like interactive quizzes, counselling session scheduling, and access to educational webinars enhance its holistic approach to guidance.

This scalable cloud infrastructure, along with secure authentication mechanisms, ensures that the system remains robust as well as accessible to everyone, catering to a growing user base without a compromise in performance. The modular design of the system further empowers the Career Guidance System for continuous improvements to adapt evolving educational trends and user needs.

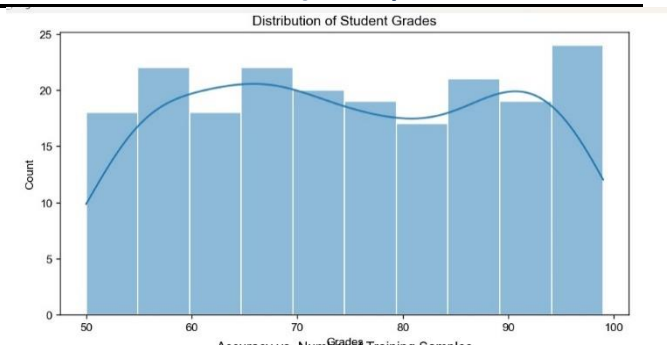

Fig4:Graph1

The Career Guidance System is the greatest advancement in modernizing career counseling with technology, empowering students to confidently and clearly navigate their academic and career paths. The system, addressing the shortcomings of methodologies, offers a comprehensive, accessible, and personalized approach to form a basis for a more informed and empowered generation that will usher in a brighter future.

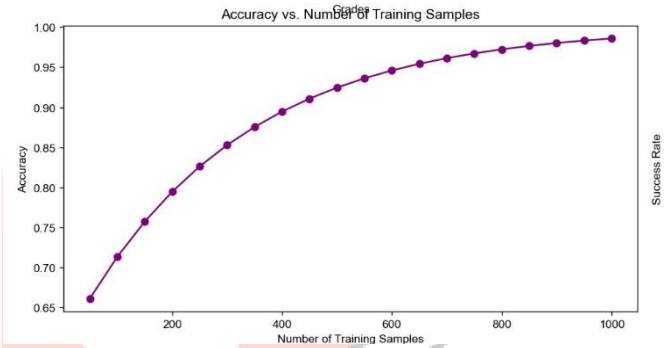

Fig5:Graph2

The Career Guidance System is a holistic, technology-based product which addresses students' key dilemma of what type of academic streams to pursue after completing Grade 10. It builds on the poor soft side support posed by legacy career counselling methods-that is, limited access, generic advice, and no personalization-and overcomes them using modern technology like the Decision Tree Algorithm, secure cloud infrastructure, and interactive user interface. It gives an integrated service of academic analysis, aptitude assessment, expert counseling, and educational resources for providing a holistic approach to career guidance.

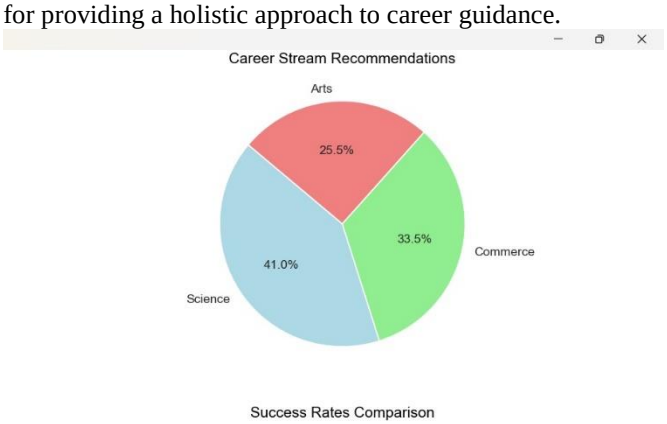

Fig6:Graph3

The system ensures that students get tailored recommendations based on their unique strengths, interests, and academic history using advanced decision-making algorithms. The decision-making process is transparent and

interpretable, instilling confidence in the students, parents, and educators. The Decision Tree Algorithm does not function as a black-box model. Instead, it gives clear, logical pathways to
recommendations, which makes system more reliable and credible.

The deployment of the platform in AWS EC2 ensures scale, reliability, and high availability, making it accessible to large numbers of users, even those remotely or underprivileged. These features include interactive quizzes on the platform, scheduling sessions for counselling, and online and recorded webinars, which take the utilization of the platform beyond just recommendations - an engaging and educational interface for students to discover and explore their potential.

The strength of the Career Guidance System lies in its adaptability, ensuring that user data is secure, protected by mechanisms for authentication, and thereby reaching the highest standards of data privacy and security.

System works to democratize professional counselling acc ess and educational resources through addressing gaps and inefficiencies within current career guidance methodologies. Plus, since this system caters to inclusive and low-cost, it works effectively for various socio-economic groups with equal opportunities available for all.

It embodies the idea of accessibility, personalization, and technological innovation-all paving the way for a world where every student has got the knowledge, resources, and confidence to achieve his aspiration. Bridging the gap between traditional ways and modern needs, this work has very significantly contributed to career counseling and sets precedence for future developments in the field.

Future Work

The program is still open to further improvement such as the integration of machine learning algorithms for more dynamic & adaptive recommendations. Further expansion in multilingual support can be made to include diverse demographics. Furthermore, real-time updates and adjustments can be done to adjust to the evolving landscape of academics & careers-making the system even more responsive to the needs of students.

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References

1] G. Eason, B. Noble, and I. N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955.

[2] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp. 68–73.

[3] I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[4] K. Elissa, "Title of paper if known," unpublished.

[5] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[7] M. Young, The Technical Writer's Handbook, Mill Valley, CA: University Science, 1989.

[8] Amane, Ade Putra Ode, Syahruddin Hattab, and Irwan Waris. "The Implementation of the Family Hope Program in Banggai Regency." Pena Justisia: Media Komunikasi dan Kajian Hukum 22, no. 3 (2023): 1413-1423.

[9] Bersan, Otilia Sanda, et al. "Training Teachers for the Career Guidance of High School Students." Education Sciences 14.3 (2024): 289.

[10] Patil, S., Rathi, S. R., Shewale, C., Bodakhe, S., Dusane, C., & Bhoye, N. (2024). AI-Based Career Counseling Chatbot for Secondary-Level Students. In Integrating Generative AI in Education to Achieve Sustainable Development Goals (pp. 201-220). IGI Global.

[11] Pranowo, Taufik Agung, Padrul Jana, Mohamed Nor Azhari Azman, Gulzhaina Kassymova, Drajat Edy Kurniawan, and Arip Febrianto. “Techniques in Group”

12]Gearns, Richard, Angela M. Kelly, and Mónica F. Bugallo. "School counseling practices
related to postsecondary STEM participation." The Career Development Quarterly 72, no. 1 (2024): 2-17.

[13] Budiyono, A. and Puryanti, L.D., 2024, April. Teman Sehati: An Innovative Guidance and Counseling Program in Higher Education. In PROCEEDINGS OF THE 2ND ANNUAL INTERNATIONAL CONFERENCE: Reimagining Guidance and Counselling in the Vuca Era (aicgc 2023). (p. 17). Springer Nature.

[14] Song, Q.C., Shin, H.J., Tang, C., Hanna, A. and Behrend, T., 2024. Investigating machine learning's capacity to enhance the prediction of career choices. Personnel Psychology, 77(2), pp.295-319.