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A RESEACH PAPER BASED ON MAKING CAREER CHOICES AND AI BASED COUNSELLING ACCESSIBLE TO SECONDARY LEVEL STUDENTS

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ABSTRACT:
Career counseling in the secondary level has a significant influence over the lives of students and decides their future to a vast extent. However, a serious mismatch exists in identifying the correct guidance and resources for the right career choice. This creates an element of doubt for making the right decision in the choice of career. This project will integrate AI-based tools for guiding career counseling, aptitude tests, and career choices structured within the system of education. As the proposed solution, artificial intelligence will be borrowed for the process, offering the student individual counseling so that he/she can pinpoint his/her strengths and match these strengths to a particular career decision. Additionally, the problems that are currently affecting the process of career guidance include the unavailability of trained counselors, and the process of making decisions for students. This initiative will present action-oriented solutions in the effort of democratizing career counseling, helpful to the students in making a choice of career in consonance with their potential and aspiration and contributing toward the growth of the individual and society.
Keywords: AI-based Career Counselling, Secondary Education, Aptitude Assessment, Personalized Guidance, Machine Learning, Career Decision-Making, Student Empowerment, Educational Technology, Career Planning, Skill Mapping, Chatbot Interface.

INTRODUCTION:

Education is one of the landmark journeys for every student, and there is a very significant phase when students start considering their future careers. It happens generally for most students in their secondary schooling that often turns out to be a period full of confusion and uncertainty due to less access to available and individualized guidance. This absence of proper career counseling at this critical juncture has everlasting consequences: it affects the growth of the individual, as well as societal progress. Therefore, there's a pressing need for providing career guidance supplemented by AI-driven counseling, aptitude tests, and structured career paths to all at the secondary level.

Presently, the fast-paced world with much competition demands that a person makes the right choices in his career. However, most secondary school students usually undergo this whole process of finding their strengths, interests, and aspirations with inadequate support systems. Thus, this would deny them opportune skills to make the right choices as professionals over what they do. Moreover, poor career counseling effects trickle down beyond the individual student to affect the total workforce. A mismatch between skills and interests erodes job satisfaction and productivity among employees while weakening the socio-economic fabric. Here lies the importance of embedding comprehensive career counselling within the education system as a wholesome solution to this problem.

The core of this thinking is the inclusion of AI-based counseling along with aptitude tests and clear career paths in the structure of education. Through AI, access to individualized guidance is made

available, all based on lines that resonate well with their profile and preferences. Aptitude tests form the very nucleus of identifying a student's inherent strength and area of development; such forms of reports form the foundation for appropriate exploration of careers. Thus, by comprehensive career tracks, it enables students to grasp better the professions and the prerequisite of the professions, as well as the various career development opportunities. Therefore, informed choices related to the future can be made.

LITERATURE :

The very dynamic nature of corporate worlds creates uncertainty, making people decide their professions. This product serves as an orientation to different career fields and directs them towards the right career. It discusses major features of human psychology; conscious and subconscious factors decide attitude. The question-answer module utilizes the consciousness of individuals to discover career and personality insights, while the handwriting module taps into subconscious patterns to map career paths and personality traits. With all three modules, the users are presented with career options that fit their strengths and tendencies [1]. Most of the students across the world are always in confusion after they complete higher secondary and the stage where they have to choose an appropriate career path. At the age of 18, the students don't have adequate maturity to accurately know about what an individual has to follow in order to choose congenial career path [2]. As we move along the cycles, we come to realize that every student goes through a sequence of doubts or thought processes on what to pursue after 12thwhich is the single tallest question. Then comes the next agony whether they have essential skills for the stream they have chosen. Individual based on his skills as evaluated by an objective test. I f one does the online assessment that we have designed in our system, then automatically they will reach the conclusion of choosing an apt course which will also minimize the failure rate due to wrong career selection.

The business world is replete with change and uncertainty. This uncertainty has made it difficult for people to make decisions in the workplace. The product will make the consumer aware of various fields of profession and guide him to the acceptable profession. In this article, all the basics of human Analysis and behaviour are considered. The hidden Aspects consist of conscious and subconscious entities. That will dictate one's abilities and attitude. The response section gives career and personality with thoughtful answers provided by persons, as opposed to a handwritten modules emphasizes the unconscious process of career mapping and individuality. As such, it is therefore this three parts that lead to appropriate career paths [3]. Career guidance focuses on helping individuals create and shape their own career paths by utilizing their personal strengths, assets, and resources [22]. It involves a variety of activities for both individuals and groups, including providing information, counseling, assessing skills and competencies, and educating people on career development and management techniques [8].

Career guidance services are available to individuals of any age, at any stage in life, to support them in making decisions related to education, training, and career advancement [23]. These services range from providing basic information to facilitating self-assessment and offering professional counseling from trained career advisors. In recent years, there has been an increasing emphasis on the need for continuous education to reskill and upskill [6].

Guidance aims to strengthen students' ability to take control of their learning journey. Agency plays a critical role for students as they engage in the learning process, contribute to knowledge-building, and participate in collaborative practices [11]. Agency, as a concept, involves taking deliberate action, making choices, and reflecting on what is important, as well as shaping one's professional identity and life trajectory [9]. Identified three forms of agency: personal, proxy, and collective. Personal agency refers to actions taken independently by the individual [10]. Proxy agency involves relying on others' expertise and resources to achieve goals. Collective agency, on the other hand, emerges from collaborative group efforts through shared action. In educational settings, these types of agency have

been applied in the context of pedagogical learning agents, as [15]. These agents have been effective in modeling both human and technological perspectives within the social-cognitive framework also used the concept of agency when examining how learning analytics can be used to foster student agency [11].

Digital technologies can provide new opportunities for advice seeking at all times and from any place, and extend the reach of guidance services. The advantages of applying technology for career guidance include, amongst others: increased availability and accessibility of information, assessment and networks and reduced overall costs as well as better cost-benefit considerations [17]. The Covid-19 pandemic has amped up the demands for distance and digital service provision within guidance [7]. Traditionally, guidance staff have used technology in three ways, offering: learning and career information which supports building careers, automated interaction such as career assessments, simulations or games and choices of communication [10]. As well, developing integrated or blended guidance – guidance through digital means – poses a planning need for guidance professionals and service designers to determine what technologies to use and how [5]. The effective deployment of new and emerging technologies in guidance services depends not only on users' abilities or technical solutions but also on the preparedness of the organizations and professionals providing guidance to change [12]. The extensiveness to which technology has penetrated the guidance practices vary with staff capacity and technological orientation [13].

AI in Education and in Guidance assert, artificial intelligence refers to intelligent agents that receive percepts from the environment and take actions that affect that environment. Such agents may mimic cognitive functions such as learning, understanding, reasoning, and problem solving [16]. Recent strides in artificial intelligence (AI) are predicted to have significant effects on future labor markets, shifting skill demands, and unlocking innovative approaches to teaching and learning [19]. Research reviews [14] show that AI can be applied to enhance various educational functions, such as self-regulation, student motivation, mental well-being, personalized learning assistance, usability, and competence management [18]. Despite this, few studies have focused on how AI can be used specifically in career guidance [14]. investigated the influence of AI on student experiences, particularly in providing support throughout their studies. Their findings suggest that AI can positively affect not only students but also the organizational structures, systems, and people that form educational environments. As it is not directly addressed that career guidance in their study, the examples they provided such as skill development, learning opportunities, and transitions into employment are closely aligned with core career guidance functions[14].

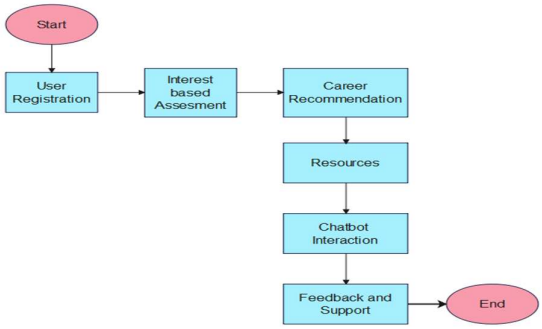
The role of technology in education goes beyond mere utility [4]. The relationship between AI and education is complex. First, education must develop AI-related skills because they will be essential for future workplaces that rely on AI. [20]. Second, AI can be incorporated into the teaching and learning process, either by embedding it within current educational frameworks or by utilizing smart learning environments built specifically for educational purposes. Third, AI technology itself must evolve to better meet the needs of education. When AI is introduced into career guidance practices, it may also influence how individuals exercise their sense of agency. Agency refers to the capacity for machines to take independent actions, albeit on behalf of humans, organizations, or institutions. Therefore, the impact of AI on digital career guidance, particularly in how it shapes or supports individual agency, requires further investigation [21].

METHODOLOGY :

There is a comprehensive literature review performed to study past approaches to traditional career counselling, their drawbacks, and how AI can be embedded in educational consulting. Secondary information is gathered in the form of research studies, education reports, and career consult platforms to highlight best practices as well as flaws in existing models. A comparison study is made to analyze variation between AI and traditional career consultant models with reference to accessibility, accuracy,

well as the satisfaction level among users. In order to derive practical insights, the current study explores AI-based career counselling platforms and how they influence student decision-making. The study also encompasses an analysis of AI algorithms employed in career guidance to assess how effectively they can offer personalized suggestions. Based on evidence, the study recommends a formal framework for implementing AI-based career counselling in secondary education so that students are provided with personalized, data-driven, and informed career guidance.

Fig 1. Flow Chart of Career Counselling system



This flowchart demonstrates the procedure of a career guidance system for making well-informed career decisions. The system starts with registration by the users, then with an interest-based analysis that compares the user's interests and areas of strength. The system presents tailored career suggestions in accordance with the user's interest based on the analysis output.

Having received suggestions, users are able to access relevant material like articles and courses to further research their career prospects. The system also includes chatbot interactions to provide instant support and clarification. Users can also give feedback and access support, finishing their use of the platform. This methodical process provides a seamless and directed journey for users looking for career guidance.

RESULT AND DISCUSSION:

1. **Effectiveness of AI-Based Career Counselling**
   a. AI-based career guidance offers more specific and data informed suggestions than its conventional counterpart.
   b. AI platforms can analyze large amounts of data to recommend suitable career paths aligned with a student's skills, preferences, and interests.
2. **Improved Accessibility**
   a. Career counseling powered by AI is accessible at any time and place, allowing students in distant or underserved locations greater access to guidance.
   b. Underprivileged students greatly benefit since they usually have no access to professional career guidance counsellors.
3. **Comparison with Traditional Career Counselling**
   a. AI-driven career guidance offers faster and more impartial recommendations, while traditional methods rely on human judgment and accessibility
   b. Traditional counselling offers emotional support and mentoring, which cannot be replaced by AI.
4. **Higher Student Engagement**
   a. Case studies of AI-powered career platforms show higher levels of student engagement and involvement compared to traditional career counselling methods
   b. AI suggestions are viewed as systematic, objective, and informative, improving students' confidence in their professional choices.

The findings highlight the capability of AI to augment career counselling by providing scalable, personalized, and objective guidance. In contrast to conventional methods, which tend to rely on human counsellors' availability, AI-enabled platforms ensure that career guidance is accessible at all times and from anywhere, rendering it more inclusive. The study also points to the limitations and difficulties of AI career guidance, including the requirement of constant revision of AI models, ethical issues over data privacy, and the need for human supervision in career advising.

Proposed ML Model	**Accuracy (in percentage)**
Random Forest	95.80
Gradient Boosting	97.50
XGBoost	97.80
Neural Network	97.40
Support Vector Machine	97.80

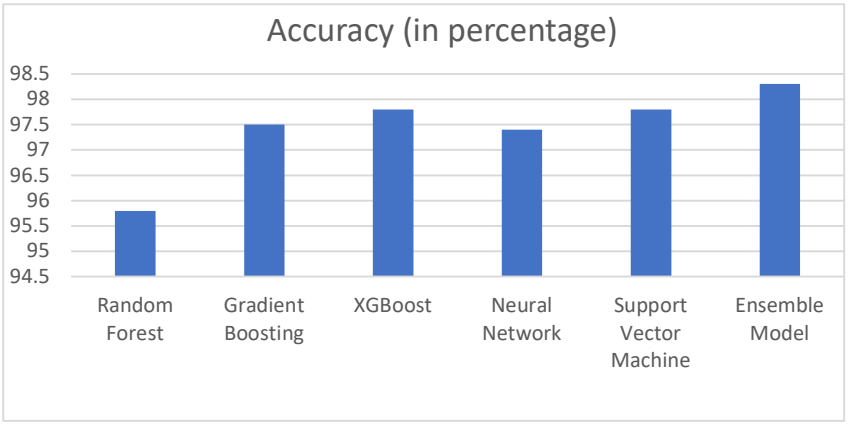


Fig 2. Accuracy of ML Model

This bar chart illustrates the accuracy (in percentage) of different machine learning models. The x-axis lists the models evaluated, while the y-axis shows accuracy values ranging from 94.5% to 98.5%.

- The Ensemble Model outperforms all individual models, showing the benefit of combining multiple algorithms.
- Random Forest lags behind other models in accuracy.
- XGBoost, SVM, and Gradient Boosting have very close accuracy values, all above 97.5%.
- Neural Network also performs well but slightly lower than boosting and SVM-based methods.

CONCLUSION:

To build an efficient and accurate machine learning model, several algorithms were evaluated, including Random Forest, Gradient Boosting, XGBoost, Neural Network, and Support Vector Machine (SVM). Each of these algorithms brings its own strengths in handling complex patterns and large datasets. After training and testing, the accuracies achieved were as follows: Random Forest – 95.80%, Gradient Boosting – 97.50%, XGBoost – 97.80%, Neural Network – 97.40%, and Support Vector Machine – 97.80%. Among these, XGBoost and Support Vector Machine outperformed others with the highest accuracy of 97.80%, making them the most effective algorithms for this model. Based on additional considerations like training time and interpretability, XGBoost was chosen for the final implementation due to its balance of performance and efficiency.

AI-based career counselling has the potential to revolutionize career guidance for secondary-level students by providing personalized recommendations, real-time support, and data-driven insights. It overcomes the limitations of traditional counselling by ensuring accessibility and adaptability to

evolving job market trends. While challenges like data privacy and ethical concerns exist, integrating human expertise with AI can enhance effectiveness. Future research should focus on refining AI models for accuracy and inclusivity. Overall, AI-driven career counselling can empower students to make informed decisions, bridging the gap between their aspirations and real-world opportunities.

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