Vocational Counseling

*Ms. Shanu Priya Chauhan*

*Department of Computer Science & Engineering*

*IMS Engineering College*

*Ghaziabad, India*

*Shanu.chauhan@imsec.ac.in*

*Prathemesh Jain*

*Department of Computer Science & Engineering*

*IMS Engineering College*

*Ghaziabad, India*

*Prathemeshjain340@gmail.com*

*Harshita Gupta*

*Department of Computer Science & Engineering*

*IMS Engineering College*

*Ghaziabad, India*

*Harshitagupta1021@gmail.com*

*Muskan Gupta*  
*Department of Computer Science & Engineering*   
*IMS Engineering College*  
*Ghaziabad, India  
muskanog12@gmail.com*

*Prince Sharma*

*Department of Computer Science & Engineering*

*IMS Engineering College*

*Ghaziabad, India*

*P2prince00@gmail.com*

*Mohd. Saif Khan*

*Department of Computer Science & Engineering*

*IMS Engineering College*

*Ghaziabad, India*

*Sk5380730@gmail.com*

Abstract— Career counselling plays a critical role in guiding individuals toward making informed career choices based on their skills, interests, and market trends. However, traditional counselling methods often fail to address the unique needs of each individual due to limited personalization and scalability. This research proposes a career counselling system leveraging Machine Learning (ML) and Artificial Intelligence (AI) to provide personalized and data-driven guidance.

The proposed system integrates psychometric analysis, skill assessment, and real-time labor market trends to recommend career paths tailored to individuals. Utilizing supervised and unsupervised learning algorithms, the system evaluates user data to predict suitable career options and provide actionable insights. AI-powered chatbots further enhance user engagement, offering continuous support and addressing queries.

Keywords: Vocational Guidance, Career Planning, Skill Assessment, Aptitude Tests , Personality Assessments, Career Opportunities, Career Decision-Making, Education Pathways, Skill Development,Job Market Trends.

# **Introduction**

Vocational counseling is a process that helps individuals, especially students, explore career options, understand their strengths, and make informed decisions about their professional future. In today's fast-changing world, choosing the right career can be overwhelming due to the wide range of opportunities available. This project aims to provide personalized guidance to people based on their skills, interests, and aspirations, helping them navigate this important decision-making process.

The project focuses on assessing individual abilities, identifying their strengths and weaknesses, and matching them with suitable career paths. It provides insights into various industries, job roles, and future trends, ensuring individuals are well-informed about their choices. Through tools like aptitude tests, personality assessments, and one-on-one counseling sessions, the project helps individuals gain clarity about their goals and how to achieve them.

Additionally, the project seeks to empower individuals by equipping them with the right resources, such as information on education pathways, skill development opportunities, and job market requirements. By addressing the unique needs of each person, vocational counseling not only supports career planning but also contributes to personal growth and confidence. Ultimately, this project aims to guide individuals toward fulfilling and successful careers.

The counseling process involves tools like aptitude tests, personality assessments, and career interest inventories to identify strengths, weaknesses, and preferences. Based on these insights, participants receive personalized advice on suitable career options, required educational qualifications, and skill development programs. The project also emphasizes educating individuals about diverse industries, job roles, and emerging market trends, ensuring they stay ahead in a competitive world.

# **Literature Survey**

Abutaleb, El-Bassiouny, and Hamed (2021) [1] investigated the consumer intentions toward carpooling in Egypt, applying the Theory of Planned Behaviour (TPB). The survey data from 500 millennials using structural equation modelling and they found that economic benefits and the shaped positive attitudes toward carpooling. These challenges like traffic congestion and environmental impact. Carpooling system can provide the reduce carbon emission and enhances the ecological health.

Zong, Zeng, Lv and Wang (2021) [2] investigated the environmental benefits of carpooling, focusing on its potential to reducing environment pollutants and vehicle usage. There are many benefits of using Carpooling including the reduced environment pollutants, economic benefits, and protected costs. Carpooling promoted to the environmentally friendly and the transportation modes.

Hussain et al. (2022) [3] explored carpooling frameworks in large companies, focusing on algorithms that match employees based on factors such as location and schedule. They emphasized how intelligent transportation systems (ITS) can optimize carpooling efficiency, offering benefits like reduced carbon emission, cost savings, and reducing environmental pollutants. The study also addressed challenges including coordination issues, privacy concerns, security and solutions to enhance participation in carpooling programs.

Dai et al. (2022) [4] research on optimizing autonomous taxi ride-sharing systems, focusing on energy consumption, scheduling, and depot location. They optimization techniques management, including vehicle routing scheduling, scheduling algorithms, matching algorithms etc aimed at reducing energy usage while maintaining service efficiency. The various challenges in balancing operational saving costs, energy efficiency, and customer satisfaction in the carpooling.

De Palma, Stokkink and Geroliminis (2022) [5] to investigate the effects of dynamic congestion and scheduling preferences on carpool matching algorithm. These results give a better insight into the relationship between traffic congestion and efficiency in carpooling. The study therefore proposed the optimization techniques in the matching system, respect to departure time and route are depend on the part of the users. It presents a survey of different approaches—scheduling algorithms and congestion effects for improved the effectiveness of carpooling in emission and traffic congestion and reduced emissions.

The Gurobi (2023) [6] provides resources on the use of mathematical techniques in various industries, such as logistics, finance, and supply chain management. In contrast, private car-based carpooling refers to the sharing of a private car with other riders to share a portion of the entire route, with the driver having a pre-planned origin and destination. The site features case studies, research papers, and practical applications, focusing on how the software enhances efficiency and decision-making.

The Uber Pool (2023) [7] reviews the impact of Uber’s shared ride service, highlighting benefits like reduced congestion, lower emissions, and cost savings. the driver’s preferred route and the passenger’s tolerable detour length have been jointly considered in private car-based carpooling services. The former is represented by the buyout. It explores challenges such as route optimized, wait times, and the user satisfaction, destination while discussing the role of dynamic pricing and real-time matching algorithms in improving service efficiency.

Li, Zhang and Gan (2023) [8] review factors affecting college students' attitudes toward carpooling, focusing on environmental awareness, cost savings, improvement in the environment and social influences. They highlight barriers such as trust, safety concerns, and scheduling issues, emphasizing the need for tailored strategies to encourage carpooling adoption among students.

The Guangzhou Taxi Data (2024) [9] explores the use of taxi data to analysed urban transportation patterns, traffic congestion, and demand forecasting. It reviews studies utilizing carpooling trip data to optimize routes, improve service efficiency, and support transportation planning in Guangzhou.

1. **RELATED WORK**

Among other things, this is in the integration of location-aware devices and user-friendly interfaces to allow for real-time matching and communication between drivers and riders. Safety measures such as reputation systems must be incorporated because user trust can only be engendered through the use of the system. Thus, issues of user security and enhancing the overall reliability of a carpooling system remain concerns for sociotechnical approaches.[1]

There are various carpooling practices in West Africa, both formal and informal, which carry with them unique challenges and opportunities. Formal carpooling is typically done using online platforms that try to connect drivers with passengers for shared rides. In contrast, informal or popular carpooling thrives through social networks such as WhatsApp and community-based arrangements. This is a cheaper and more popular type of carpooling, mainly practiced in peri-urban and rural areas, but often less reliable and unsafe.[2]

The D-SPAC framework was developed to address the unique challenges in private car-based carpooling, particularly those related to driver bargaining and congestion management. Unlike traditional ride-sharing models, this approachintroduces double-sided preferences, which consider both driver-specific factors—such as routes and costs—and passenger constraints like waiting time and acceptable detour limits.[3]

The system highlights user management with strong processes related to user registration and authentication to improve participation security. Both passengers and drivers must be verified, so that this platform can be trusted and rely on it. The system puts emphasis on its environmental orientation and encourages practices that help in saving the fuel consumed and also bring down pollution. At the same time, the economic benefits of reduced travel expenses and lesser traffic congestion is also emphasized.[4]

This significantly reduces traffic congestion, decreases carbon emissions, and minimizes travel costs for its users. However, several factors prevent its widespread adoption. These include logistical barriers like the need for efficient matching algorithms and route planning as well as social barriers like issues with trust, privacy concerns, and gender-related sensitivities. To overcome these, numerous innovations have been introduced to include dedicated carpool lanes, dynamic ride-matching algorithms, and using incentives and policy interventions to make the program more attractive.[5]

1. **CONCLUSION**

If used, the ride sharing apps can help reduce traffic jams as well as pollution in developing countries. Service providers, therefore, can draw users in by: New Users: Get free first rides and the first month of discounts for all tasks. Rare Users: Create a commute area for traveling with coupons for a specific number of trips. Frequent Users: Even special offers on the number of years’ service and additionally based on demand. To improve on the societal utility: Local community champions should be hired and trained to get eyeballs for the thought of carpooling. Adding other social components such as social friends, and group messages Additionally, we will pay them incentives for referring the service to their family, friends, and colleagues. Carpooling system works on the economics of passenger demand and supply from the driver and aggregates the traffic at the place. System effectiveness relies on the targeting of the customers: More Customers: More new customers mean less wait time and more drivers efficiency. Spreading Customers: the efficiency of the system is related to the amount of rides taken, through soft detours and the employment of optimized waiting times and credit. This multi-level temporal constraint-based model is also accompanied by a heuristic improvement that ensures high throughput while maintaining low precision overhead. Based on our experience the model can be run in scenarios in which model degeneracy or large sized charts exist. We also built an agent-based model that simulates ride sharing and the ease to collaborate, and negotiate. In the estimate, the agents adjust the times and paths of their journey as an optimized output, the chains of joined rides are constructed when determining the best sequence.

1. **FUTURE WORK**

This research examines the use of behavioral intention with a note that focusing on the intention to use an app-based carpooling is not enough, as such intention does not always lead to the actual use of the service. Future improvements include extending personalization of ride offers using more advanced machine learning frameworks while safeguarding user privacy. To minimize pollution, the states of the vehicles (i.e., vacant, solitary passenger and more than one passenger) will be monitored in real-time for the purpose of optimal assignment and emission minimization. More attention may be paid to the improvement of the models of scheduling, negotiation, and scoring which would also increase scalability and synergies, together with integration of dynamic traffic information for higher precision. Furthermore, internet applications could be created whereby the carpooling would be presented graphically to facilitate the analysis and comprehension of the phenomenon.

**REFERENCES**

[1] Abutaleb, S.; El-Bassiouny, N.; Hamed, S. Sharing rides and strides toward sustainability: An investigation of carpooling in an emerging market. Manag. Environ. Qual. Int. J. 2021, 32, 4–19.

[2] Zong,F.; Zeng, M.; Lv, J.; Wang, C. A credit charging scheme incorporating carpool and carbon emissions. Transp. Res. Part D Transp. Environ. 2021, 94, 102711.

[3] Hussain I, Knapen L, Bellemans T, Janssens D, Wets G (2022) A matching framework for employees to support carpooling in the context of large companies. IEEE Trans Intell Transp Syst 23(2):159–1170.

[4] Dai, R.; Ding, C.; Gao, J.; Wu, X.; Yu, B. Optimization and evaluation for autonomous taxi ride-sharing schedule and depot location from the perspective of energy consumption. Appl. Energy 2022, 308, 118388.

[5] De Palma, A.; Stokkink, P.; Geroliminis, N. Influence of dynamic congestion with scheduling preferences on carpooling matching with heterogeneous users. Transp. Res. Part B Methodol. 2022, 155, 479–498.

[6] The Gurobi Offical Site. Accessed: Oct. 27, 2023.

[7] (2023, Aug.) Uber pool. Accessed: August 12, 2023.

[8] Li, L.; Zhang, H.; Gan, Z. Factors affecting college students’ attitudes toward carpooling. Transp. Saf. Environ. 2023, 6, tdad025.

[9] Guangzhou Taxi Data. Accessed: Jan. 14, 2024.