IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 3, March 2025

The Role of AI and Public Transportation: A Study on Accessibility, Efficiency, and Satisfaction of Commuters

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Abstract: *This study looks at how artificial intelligence (AI) is affecting public transportation networks, specifically how it impacts accessibility, efficacy, and overall user satisfaction. As AI technologies like automation, machine learning, and predictive analytics become more integrated, public transit systems are evolving to offer more customized, efficient, and accessible services. The study examines passengers' perceptions of AI's capacity to improve public transportation and assesses consumers' overall satisfaction with respect to AES. An online survey was utilized to collect data from 110 respondents, and chi-square tests and descriptive statistics were employed for analysis. Finding out if gender influences perceptions of AI in transportation was the original objective. The results demonstrated that gender and perceptions of AI do not significantly correlate. The second goal focused on user satisfaction, and the data revealed that there had been a notable rise in user satisfaction with AI-driven public transit systems. This study demonstrates that AI can greatly increase the efficacy and accessibility of transit systems, resulting in higher levels of user satisfaction, even though gender does not appear to have a significant impact on perceptions. The findings suggest that future research should focus on expanding AI systems to accommodate a range of user needs in order to allay societal worries about AES.*

Keywords: Artificial Intelligence (AI), Public Transportation, Accessibility, Efficiency, User Satisfaction.

I. INTRODUCTION

The use of artificial intelligence (AI) into public transportation is radically changing how cities function and deliver transportation services. AI technologies like automation, machine learning, and predictive analytics have the potential to significantly improve the overall passenger experience, accessibility, and efficacy. These technologies give commuters a more reliable, useful, and cost-effective form of transportation by improving scheduling, predicting demand, and streamlining route design. However, there are also serious concerns regarding the shift to AI-powered systems, particularly in regards to public opinion, concerns about job displacement, and potential modifications to the current transportation infrastructure.

This study aims to explore how the general public views the use of AI in transportation, with a focus on the effects on efficiency, accessibility, and usability. The study will assess consumers' expectations for AI-enhanced systems, concerns about automation replacing traditional services, and current experiences with public transit through input from passengers. A better grasp of public sentiment is required to guarantee the successful adoption of AI technology and to provide mobility solutions that satisfy the diverse needs of all users.

II. LITERATURE REVIEW

McKinsey & Company (2020) – "Artificial Intelligence in Public Transport: A Case for Efficiency": This report explores the potential of AI in optimizing public transportation by improving route planning, managing traffic, and enhancing user experiences through demand prediction and schedule adjustments. The study emphasizes that AI can alleviate congestion and increase the efficiency of transit services, leading to better resource management. Additionally, AI can detect patterns in passenger demand, enabling transit agencies to adapt to fluctuating needs. However, the report

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also highlights challenges in implementing such systems in older or less developed infrastructure. Ultimately, it suggests that while AI holds significant promise for transforming public transport, it requires substantial investment in technology and infrastructure.

Zhao, Y., et al. (2020) – "AI-Driven Public Transportation Systems: A Review": This review discusses various applications of AI in improving public transportation, particularly in demand forecasting and route optimization. The authors argue that AI can greatly enhance system efficiency by analyzing real-time data and adjusting routes to align with demand patterns. The study also notes that AI can reduce idle vehicle time and minimize delays, thus improving operational performance. However, it points out the need for more research into the practical challenges of deploying AI across different urban environments.

Huang, Y., & Zhang, L. (2019) – "AI and Public Transit: A New Approach": This study investigates how artificial intelligence (AI) might improve traffic management and real-time scheduling in networks of public transit. The authors stress the importance of dynamic scheduling adjustments based on real-time data in order to improve passenger flow. AI's ability to increase dependability and predictability, which boosts customer satisfaction, is also highlighted. The report does point out that system integration is challenging and that these AI systems require accurate data to function.

Lin, Z., et al. (2022) – "The Impact of AI on User Satisfaction in Public Transport": This study explores how AI might improve customer satisfaction with a focus on features like personalized trip recommendations and real-time updates. The poll found that passengers who engaged with AI-powered services were more satisfied with their transit experience overall. However, it also raised concerns about the accessibility of AI services, particularly for older or less tech-savvy tourists. The authors suggest more research to ensure that these technologies are accessible to all.

Sivakumar, A., & Kumar, S. (2020) – "AI in Public Transport: A Customer's Perspective": This paper presents survey results from passengers regarding their opinions on AI-powered public transportation systems. While many passengers appreciated the convenience of real-time updates and personalized routes, the study uncovered significant concerns about AI's reliability and the potential displacement of jobs. Privacy and safety issues were also a concern, and the authors recommend further research into public perceptions to improve trust and address concerns surrounding AI in transit.

Zhao, M., & Wang, Y. (2021) – "The Role of AI in Making Public Transportation More Accessible": This article looks at how artificial intelligence (AI) can make public transportation more accessible, particularly for passengers who are elderly or disabled. Promoting inclusion in transportation is believed to require AI-powered services like personalized trip planning and real-time assistance. The authors suggest that artificial intelligence (AI) could help address the needs of aging urban populations. The paper calls for greater investigation into how AI might be used to meet the particular needs of these vulnerable groups in order to guarantee a more accessible travel experience.

Research Gaps

Although a lot of research has been done on the subject, little is known about commuters' impressions of how artificial intelligence (AI) affects accessibility, efficiency, and user satisfaction. Even though research emphasizes technological advancements and operational efficiency, it usually overlooks how different demographic groups perceive these developments. This study aims to bridge these gaps and promote a more inclusive view of AI's role in shaping future transit systems by looking at gender-based differences in perceptions and evaluating the effect of AI on user satisfaction across a broad variety of public transportation users.

III. RESEARCH METHODOLOGY

Data Collection: Google Forms was used to generate a structured questionnaire that collected the key data for this investigation. Research journals and various websites were used to collect secondary data. The survey aimed to understand The Role of AI and Public Transportation: A Study on Accessibility, Efficiency, and Satisfaction of Commuters. A convenient sampling method was used to select participants who use public transportation. The survey included questions on participants' demographic characteristics, their experiences with AI in public transportation, and their perceptions of how AI influences the convenience, safety, and overall satisfaction of transit services. In total, 110 individuals participated, providing a broad yet focused representation for analysis.

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Sampling Strategy

Users from different age groups, gender, and socioeconomic backgrounds were targeted to ensure a diverse representation of opinions. Respondents from major urban areas with well-established public transportation networks to ensure that the findings are applicable to a broad range of cities.

Sample Size: The sample consisted of 110 participants,While the sample size provides valuable insights into trends and patterns, it may not fully represent the broader population of public transit users, especially considering factors like geographical or socio-economic differences.

Statistical Tools Used:

- **Chi-Square Test:** Used to evaluate the correlation between variables, such as how various age groups view AI's influence on their travel experiences.
- **Descriptive Statistics:** Used to highlight the overall trends in data, such as the frequency of AI usage in public transit and satisfaction levels with different AI-driven features.

Limitations of the Study:

- The sample of 110 participants may not represent the broader public transportation user base, especially in areas with different infrastructure or AI usage.
- The study doesn't account for regional differences in public transport systems or AI tools used across networks.
- The study only reflects participants' views at one point in time, without considering future changes in AI technology.

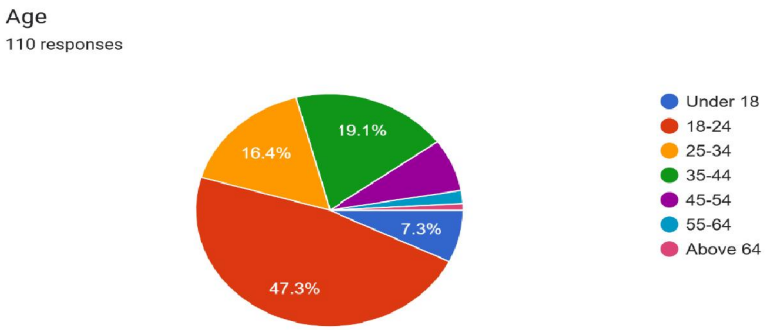
Objectives and Hypothesis

- To evaluate whether gender affects perceptions of AI's role in improving accessibility and efficiency in public transportation.
- To Measure Overall User Satisfaction with AI-Enhanced Public Transport.

Hypothesis Testing:

- **H0:** Gender does not influence perceptions of AI's impact on public transportation.
- **H1:** Gender significantly influences perceptions of AI's impact on public transportation.
- **H0:** The implementation of AI in public transportation systems will not lead to a significant improvement in overall user satisfaction.
- **H1:** The implementation of AI in public transportation systems will lead to a significant improvement in overall user satisfaction.

IV. DATA ANALYSIS



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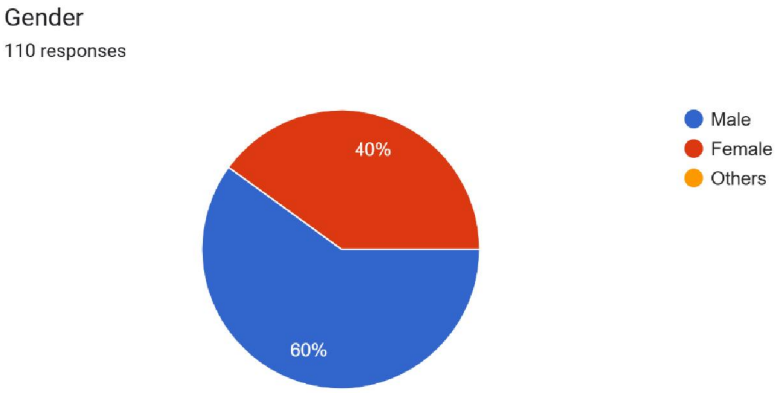
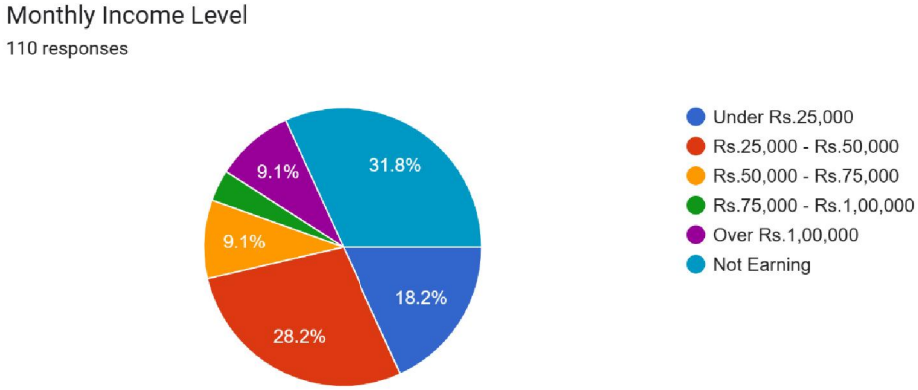
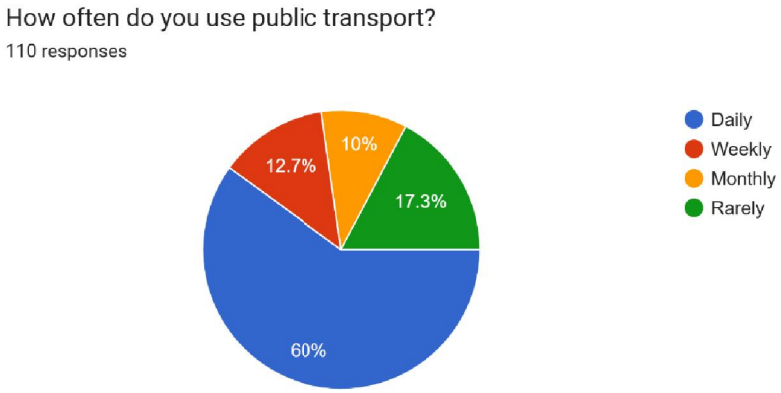
The age distribution reveals a youthful population, with 19.1% of respondents in the 35–44 age range and 47.3% of respondents in the 18–24 age group. The underrepresentation of older age groups implies that middle-aged and younger folks are given preference.



The gender distribution of the respondents shows that 60% identified as male, while 40% identified as female. There were no responses from individuals identifying as other.



The income data reveals that 28.2% of participants earn between Rs. 25,000-50,000, while a smaller percentage (9.1%) earn Rs. 50,000-75,000 and Rs. 75,000-1,00,000. The largest group, however, is those who earn less than Rs. 25,000, comprising 18.2%. Additionally, 31.8% of respondents reported no income, which could reflect students, unemployed individuals, or other groups not currently earning.



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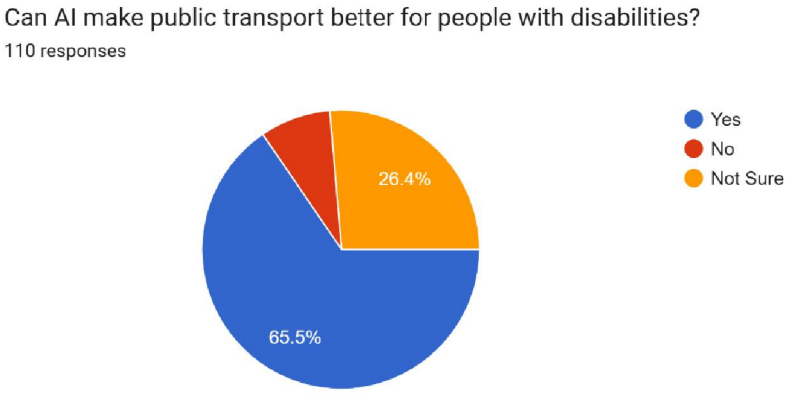
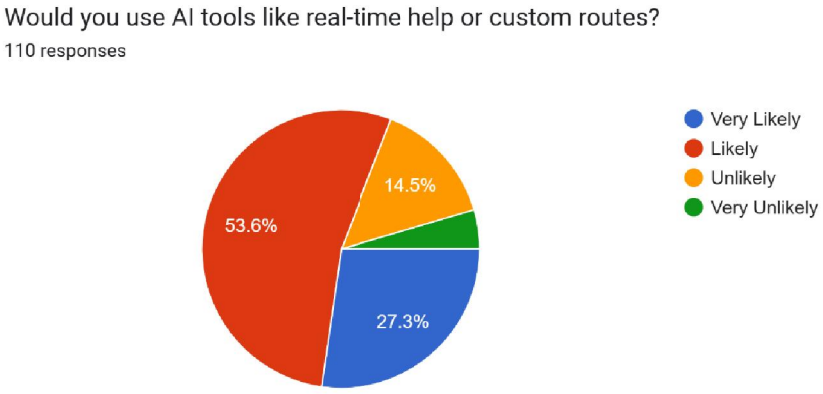
In terms of public transport usage, a majority of respondents (60%) use public transport daily, indicating a high level of dependence on it. A smaller percentage (12.7%) use it weekly, while 10% use it monthly. A noteworthy 17.3% of respondents reported using public transport rarely, suggesting occasional users or those with alternative transportation methods.



The majority of respondents (65.5%) expressed agreement with the idea of AI being used to assist individuals with disabilities. A smaller group (26.4%) remained unsure, and only 8.2% disagreed. This indicates strong support for AI's potential to improve accessibility for people with disabilities in the transport sector.



When asked about the likelihood of using AI tools for real-time help or custom route suggestions, 53.6% of respondents said they were likely to use them, and 27.3% were very likely. This shows a positive reception to AI tools that can enhance the efficiency and convenience of public transport. Only a small percentage (14.5%) were unlikely, and an even smaller 4.5% were very unlikely to adopt such tools.

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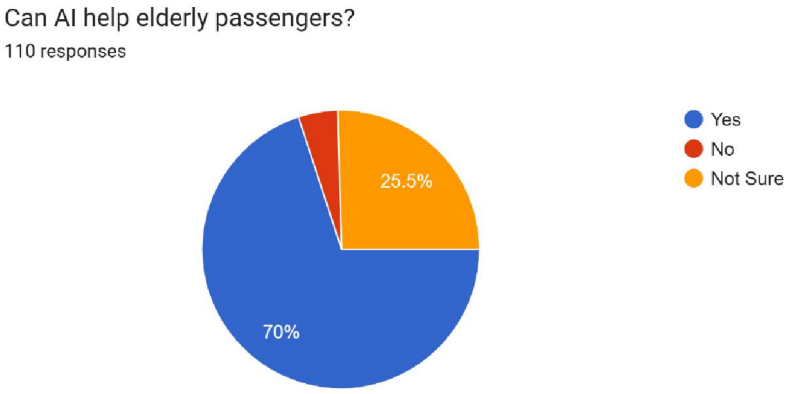
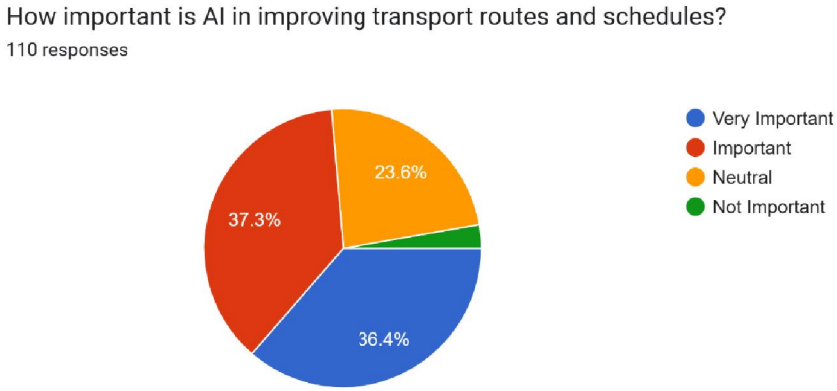
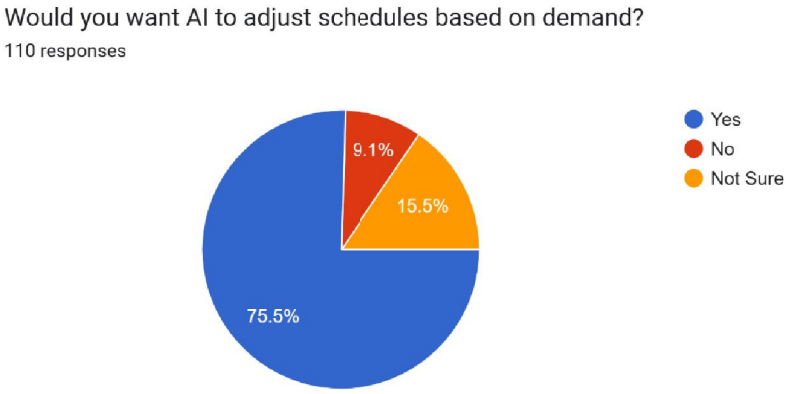


A significant 70% of respondents agreed with the use of AI to assist the elderly in transport, reflecting a positive view on the potential of AI to enhance mobility and safety for older adults. Only 4.5% disagreed, while 25.5% were unsure.



Regarding the role of AI in transport system improvement, 36.4% of respondents considered it very important, and 37.3% deemed it important. This demonstrates the broad consensus about how AI may enhance the efficiency, security, and usability of transportation networks.
However, 23.6% were neutral, and only 2.7% thought AI's role was unimportant.



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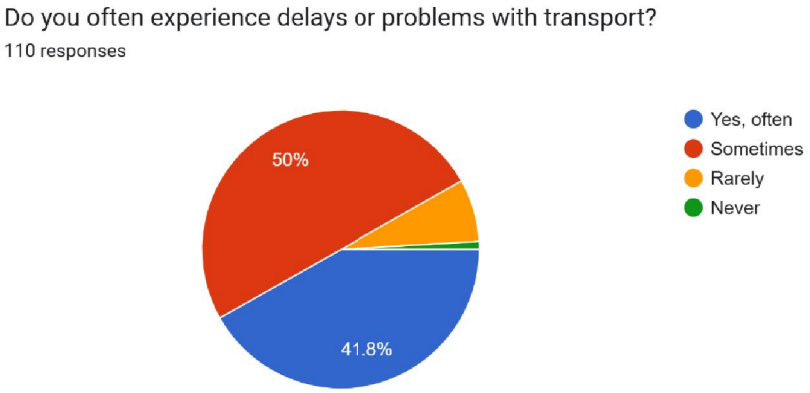
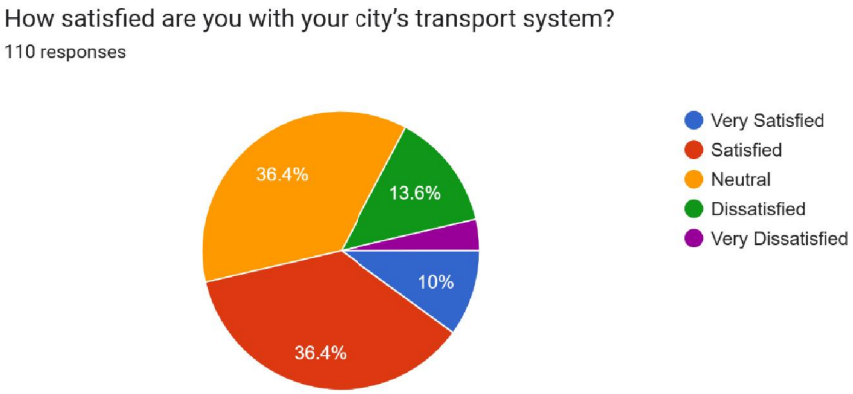
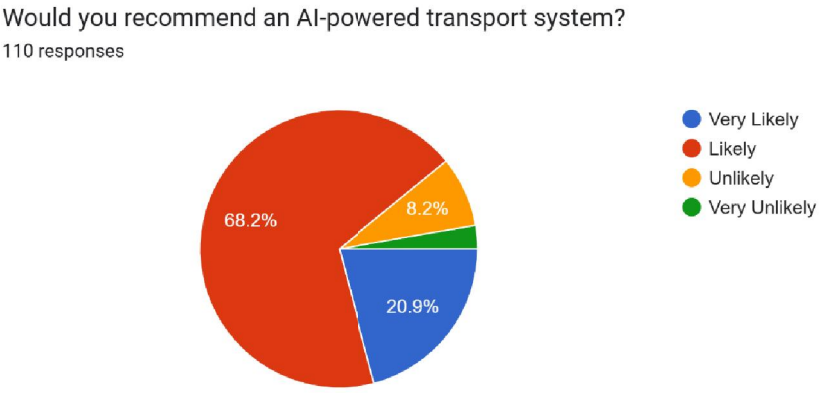
A strong majority (75.5%) of respondents supported the idea of AI being used to adjust transport schedules, indicating broad acceptance of AI for optimizing public transport timetables. Only 9.1% were against this idea, with 15.5% uncertain.



Transport delays are a frequent issue for respondents, with 41.8% indicating they experience delays often, and 50% encountering delays sometimes. Only 7.3% rarely experience delays, and a small percentage (0.9%) reported never facing delays.



The satisfaction with the current transport system is mixed. While 36.4% of respondents expressed satisfaction, an equal percentage (36.4%) remained neutral. A smaller percentage (13.6%) were dissatisfied, and only 3.6% were very dissatisfied.



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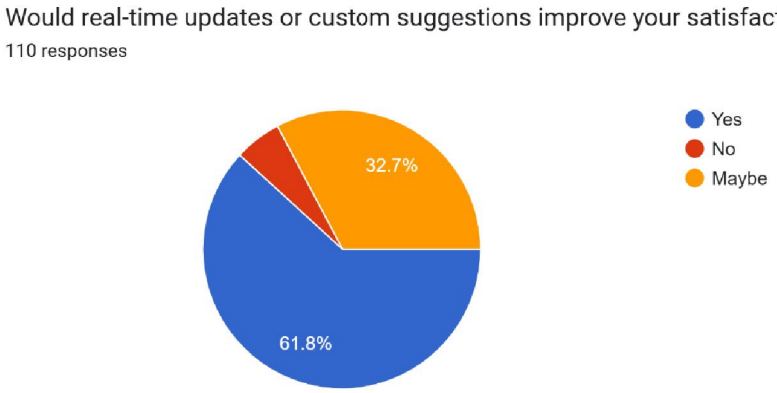
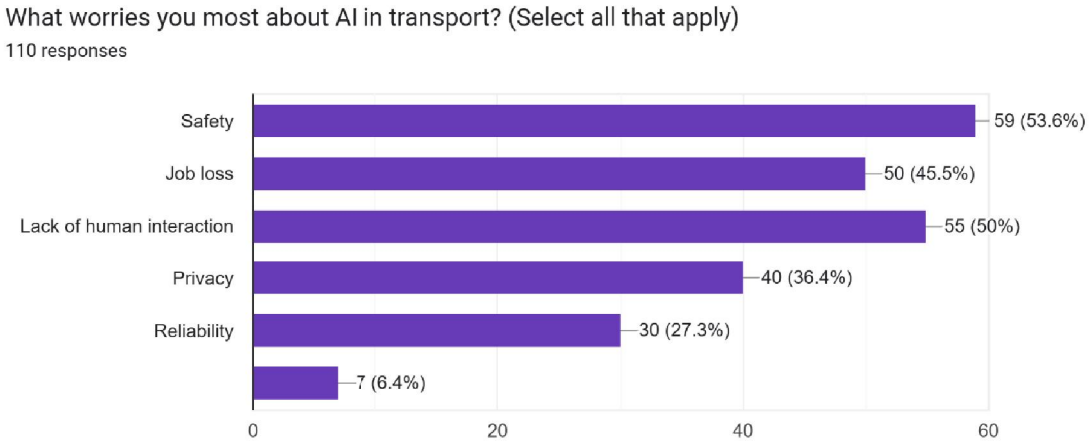
When asked if they would recommend an AI-driven transport system, 68.2% of respondents were likely to recommend it, and 20.9% were very likely. This indicates a high level of interest in AI-driven transport solutions. Only 8.2% were unlikely, and 2.7% were very unlikely to recommend such a system.



A majority (61.8%) of respondents felt that real-time or custom suggestions could improve their transport experience, suggesting a strong desire for personalized and dynamic support in travel planning. However, 32.7% were unsure, and only 5.5% did not think it would be helpful.



Respondents expressed several concerns about the introduction of AI in transport, with safety being the top concern (53.6%). Other notable concerns included privacy (36.4%), job loss (45.5%), and the lack of human interaction (50%). Reliability (27.3%) was also a concern, though less.

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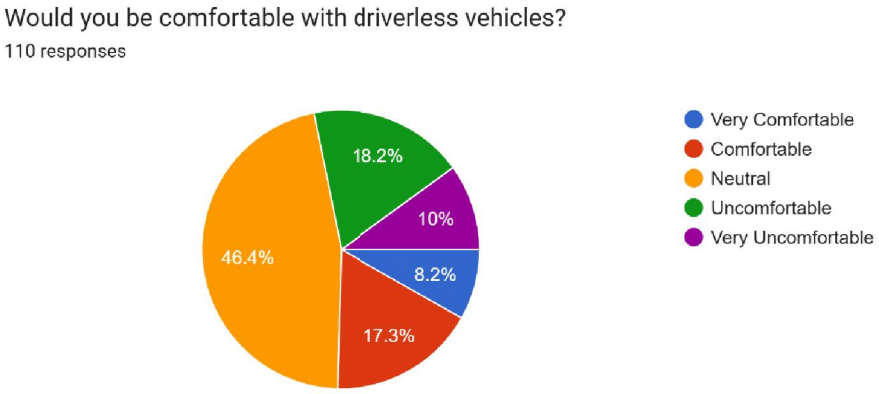
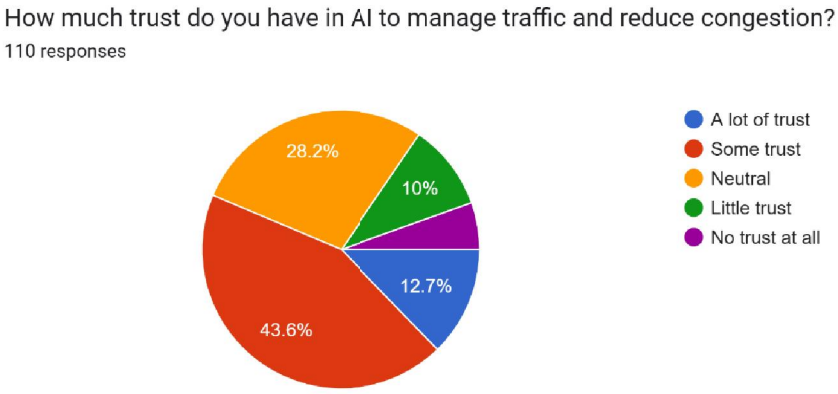


When asked about their comfort level with driverless vehicles, 46.4% of respondents were neutral, while 18.2% were uncomfortable and 10% were very uncomfortable. Only 8.2% were very comfortable, and 17.3% were comfortable with the idea.



Regarding trust in AI for traffic management, 43.6% of respondents expressed some trust, while 12.7% had a lot of trust. On the other hand, 28.2% were neutral, and 15.5% had little to no trust.

For 1 Objective

Objective: To evaluate whether gender affects perceptions of AI's role in improving accessibility and efficiency in public transportation.

Hypothesis:

H0: Gender does not influence perceptions of AI's impact on public transportation.

H1: Gender significantly influences perceptions of AI's impact on public transportation.

Observed Values:

Gender	Agree (Obs)	Unsure (Obs)	Disagree (Obs)	Total
Male	42	18	6	66
Female	30	11	3	44
Total	72	29	9	110

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Expected Values:

Gender	Agree (Exp)	Unsure (Exp)	Disagree (Exp)	Total
Male	43.2	17.4	5.4	66
Female	28.8	11.6	3.6	44

Chi-Square Contributions:

Gender	Agree (O−E)	Agree ((O−E)²/E)	Unsure (O−E)	Unsure ((O−E)²/E)	Disagree (O−E)	Disagree ((O−E)²/E)
Male	-1.2	0.0333	0.6	0.0207	0.6	0.0667
Female	1.2	0.050	-0.6	0.031	-0.6	0.1

Calculating the Total Chi-Square Value:

$X^2 = 0.0333 + 0.0207 + 0.0667 + 0.050 + 0.031 + 0.1 = 0.3017$

Conclusion:

Since the calculated Chi-Square value (0.3017) is smaller than the critical value (5.991) at a 0.05 significance level and two degrees of freedom, we are unable to reject the null hypothesis (H0). This suggests that gender has little bearing on perceptions of AI in public transit.

For 2 Objective

Objective:

To Measure Overall User Satisfaction with AI-Enhanced Public Transport.

Hypothesis:

H0: The implementation of AI in public transportation systems will not lead to a significant improvement in overall user satisfaction.

H1: The implementation of AI in public transportation systems will lead to a significant improvement in overall user satisfaction.

Observed Values:

Satisfaction Level	Observed Frequency (O)
Very satisfied	10
Satisfied	36.4
Neutral	36.4
Dissatisfied	13.6
Very dissatisfied	3.6
Total	**110**

Expected Values:

Satisfaction Level	Expected Frequency (E)
Very satisfied	22
Satisfied	22
Neutral	22
Dissatisfied	22
Very dissatisfied	22

Chi-Square Contributions:

Satisfaction Level	Observed (O)	Expected (E)	(O - E)	(O - E)²	Chi-Square Contribution (O−E)2E\frac{(O - E)^2}{E}E(O−E)2
Very satisfied	10	22	-12	144	6.545
Satisfied	36.4	22	14.4	207.36	9.427
Neutral	36.4	22	14.4	207.36	9.427
Dissatisfied	13.6	22	-8.4	70.56	3.213
Very dissatisfied	3.6	22	-18.4	338.56	15.373

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Calculating the Total Chi-Square Value:

$X^2=6.545+9.427+9.427+3.213+15.373=43.985$

Conclusion:

Since the calculated Chi-Square value (43.985) is more than the critical value (9.488), the null hypothesis (H_0) is rejected, and we conclude that AI-enhanced public transportation significantly increases customer satisfaction.

Recommendation

To enhance AI's effectiveness in public transportation, efforts should focus on making AI tools accessible to diverse users, including the elderly and those less familiar with technology. Addressing concerns about safety, privacy, and job displacement is crucial for gaining public trust. Continuous user feedback should drive improvements in AI features, and investments in infrastructure and staff training are key to successful implementation. Lastly, fostering public awareness and engagement will ensure broader acceptance of AI in transit systems.

V. CONCLUSION

AI technologies have the ability to greatly enhance public transportation by improving accessibility and operational efficacy. This study found that while consumers were more satisfied with AI-powered services, there was no noticeable difference in perceptions of the influence of AI by gender. Despite these positive outcomes, problems with data privacy, safety, and public trust persist. The study emphasizes how important it is to address these issues in order to ensure that AI is successfully incorporated into transit systems. Future study should focus on the long-term feasibility of AI in public transportation, its impact on the environment, and its ability to accommodate the diverse needs of all users, particularly those in disadvantaged groups.

REFERENCES

[1]. McKinsey & Company. (2020). *Artificial intelligence in public transport: A case for efficiency*. McKinsey & Company. https://www.mckinsey.com

[2]. Zhao, Y., Zhang, L., & Wang, X. (2020). AI-driven public transportation systems: A review. *Transportation Research Part C: Emerging Technologies, 118*, 102725. https://doi.org/10.1016/j.trc.2020.102725

[3]. Huang, Y., & Zhang, L. (2019). AI and public transit: A new approach. *Journal of Public Transportation, 22*(1), 45-59. https://doi.org/10.5038/2375-0901.22.1.3

[4]. Lin, Z., Zhang, Q., & Li, J. (2022). The impact of AI on user satisfaction in public transport. *Transportation Research Part A: Policy and Practice, 159*, 208-219. https://doi.org/10.1016/j.tra.2022.01.003

[5]. Sivakumar, A., & Kumar, S. (2020). AI in public transport: A customer's perspective. *Journal of Transportation and Land Use, 13*(3), 135-150. https://doi.org/10.5198/jtlu.2020.1261

[6]. Zhao, M., & Wang, Y. (2021). The role of AI in making public transportation more accessible. *Journal of Accessibility and Design for All, 11*(2), 67-82. https://doi.org/10.16910/jadaa.2021.1155