R4TLI
ISSN: 2513-2504

USE OF DYNAMIC ADJUSTMENTS FOR TRANSPORT PLANS

Bamunusingha A. D. D. Harshana, D. L. Chamara P. Liyanage
Department of Information and Communication Technology, Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka.
mail.harshana.lk@gmail.com

ABSTRACT - Efficient transportation planning incorporates convenience, economy, and environmental considerations to create well-integrated systems that meet the needs of the community that represents drivers, travelers, and other roles involved in transport planning while minimizing environmental impacts. Furthermore, in unexpected situations, operation-level roles such as drivers struggle to make proper decisions and find suitable locations or contact the necessary people, even though they may have a lot of experience. Therefore, the recommended system with strategies like flexibility, adaptive management, and empowering personnel enables effective handling of unexpected challenges, and they are highly required. The proposed system will give suggestions and alternatives in real-time based on localized services to overcome any issues faced and complete the transportation smoothly by utilizing a centralized database and dynamic suggestion system. However, the success of this approach relies on the active participation of an adequate number of service providers across the target area. In conclusion, integrating these factors into transportation planning leads to an efficient network with positive environmental and economic outcomes.

Keywords: Real-time service offers; Transport plan; Dynamic adjustments

1. INTRODUCTION

Transportation planning needs to achieve important goals can create efficient and well-integrated systems that meet the needs of communities while minimizing negative impacts on the environment and ensuring fairness for all. By incorporating convenience, economy, and environmental friendliness into transportation planning, efficiency can be enhanced further. Such planning ensures that transportation systems are user-friendly, cost-effective, and contribute positively to the environment, resulting in a more efficient and sustainable transportation network. But most of the current transportation systems travelers, firms, and customers do not perceive the full social costs of transportation because true cost includes the cost that causes problems such as carbon emissions, congestion, noise, and air quality [1]. It indicates the importance of a more efficient transport planning system that can apply to a wide range of transportation needs and is feasible for many entities involved in the transportation industry. However, when it comes to practical use, transport plans are often disrupted by unexpected circumstances. Therefore, transportation planning often becomes a challenging task due to temporal dependencies [2]. Further, disruptions in transportation can arise from various sources such as natural or catastrophic events like earthquakes, floods, or terrorist attacks. They can also stem from economic or financial crises such as currency fluctuations or social events like strikes. Additionally, machine breakdowns can also cause disruptions in transportation [3].

On the other hand, public transportation systems also arise a need to become dynamic according to real-time transport demand [4]. Although authors suggest a predictive model for the public transportation system, it also increases the challenges that come with sudden changes in transport plans. Although there are traditional models that have been developed to predict transportation disruptions based on historical data, it is not possible to predict every possible disruption. In the other hand it takes vast number of parameters to make accurate prediction, which is not feasible for many small-scale entities in transport industry [5] [6]. This research intends to take different approach by proposing a system that can dynamically adjust the transport plan at a disruption, to achieve Its original goals by adopting to situation.

The approach, which allows practical and real-time adjustments to ensure the efficient functioning of transportation services. Further, by implementing a centralized database and a dynamic suggestion system, transportation services can better handle unexpected challenges. The system can provide operational-level users with relevant information and alternative service options, empowering them to make informed decisions and adapt to dynamic situations effectively. The proposed solution allows service providers to publish service offers and provide real-time suggestions to the transportation plan enhance coordination, responsiveness, service options, resource allocation, and decision-making. This solution empowers transportation planners to optimize the system based on current conditions, leading to a more efficient and adaptable transportation network.

2. MATERIALS AND METHODS

Implementation of the proposed solution needs a central database that keeps data of the services related to transport operation. Since the availability of the data is very critical, users should be able to use application software using mobile devices or as a web service. The application connects to the database and provides real-time suggestions or adjustments depending on parameters. First, service providers who provide services for the transport industry such as food, vehicle maintenance, accommodation and warehouses should self-register on the system providing information related to their business and services they provide. At the end of service for consumers, the system will consider the user's preferences, such as the types of places they prefer (e.g., restaurants, gas stations, scenic spots) and any specific requirements they have (e.g., parking availability, pet-friendly places). By analyzing the user's past travel routes, the system can identify the places they frequent or the destinations they often forget and recommend them when relevant. The system will access real-time data, such as traffic conditions, weather, and events, to provide timely recommendations for service offers, from nearby mechanics, hospitals, or roadside assistance that suit the current situation.

As mentioned in future updates, the system could analyze comments and feedback from the driver's social media networks to better understand their preferences and interests, enabling more accurate and personalized recommendations. The system will use machine learning algorithms to continuously improve its recommendation accuracy based on user feedback and behavior patterns.

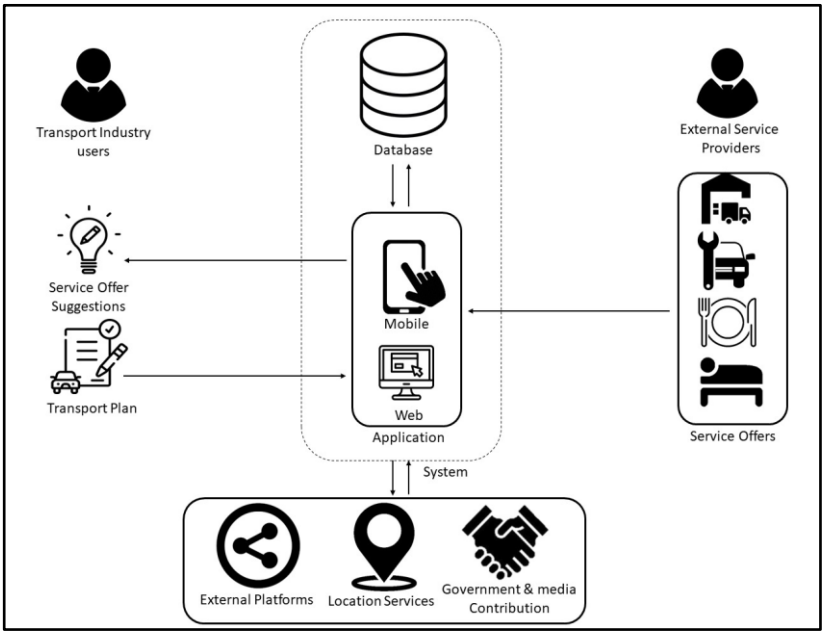

Figure 1. High-level view of the solution

ISSN: 2513-2504

Additionally, stakeholder collaboration, including government bodies (such as meteorological department, police), service providers, social media, mass media and technology partners. Operational level users of the transportation industry can use the system to find the services they intend to use along the way of operation. To use the system, they may enter their destinations and interests as they planned. After they start the travel, the system starts to locate services with use of geolocation services, external platform integrations as well as the database and analyze offer alternatives that match with user interests along the way. The user can select the most suitable option and the system will make necessary adjustments to the initial plan. (Figure 1)
Since the system can have many suggestions for one situation, users can gain maximum benefit out of competitive service offers.

3. RESULTS AND DISCUSSION

Implementation of proposed solution can improve the efficiency of transportation system by optimizing the transport plans and minimizing the loss of unexpected challenges. The system also supports small-scale service providers to bring their businesses to competitive market and deal with large organizations. The wide use of the system can optimize the transport industry can reduces the transport time and cost. This leads to growth of the economy as well as reducing environmental pollution. However, large number of service providers should use the system spread all over the target geographical area to achieve goals of the system. To overcome the challenge of collaborating with many businesses, the system could be enhanced to integrate with social media platforms such as Facebook and other existing marketplaces. To achieve desired nonfunctional requirements, it is important to collaborate with stable and resalable organizations such as government bodies, mass media and technology partners for deployment. In the context of a mixed economy, the system can be efficiently developed and implemented by a private body at the initial stage. Collaboration of responsible government authority can give a boost to the adoption of the system by the public. But it is not a necessity if private investors are willing to pay the price of mass media, social media collaboration, and other marketing techniques. Regardless of the choice from the above approaches, the initial phase should focus on developing the platform rather than expanding its community.

4. CONCLUSION

Integrated convenience, economy, and environmental factors create an efficient network with a centralized database and dynamic suggestions, benefiting small-scale providers. Wide implementation reduces transport time, cost, and pollution, but requires sufficient service provider participation.

REFERENCES

1. Eliasson, J., (2021). Efficient transport pricing–why, what, and when?, Communications in Transportation Research, 1,
2. Karami, Z., & Kashef, R., (2020). Smart transportation planning: Data, models, and algorithms, Transportation Engineering, 2, 100013
3. Zhen, X., Li, Y., Cai, G. (George), & Shi, D., (2016). Transportation disruption risk management: Business interruption insurance and backup transportation, Transportation Research Part E: Logistics and Transportation Review, 90, 51–68
4. Peled, I., Lee, K., Jiang, Y., Dauwels, J., & Pereira, F. C., (2021). On the quality requirements of demand prediction for dynamic public transport, Communications in Transportation Research, 1
5. Dewar, J. A., & Wachs, M., (2008). Transportation planning, climate change, and decision making under uncertainty Transport Planing
6. Iyer, L. S., (2021). AI enabled applications towards intelligent transportation, Transportation Engineering, 5