

Systematic Literature Review On Efficient way to compare fare listing of ride sharing platforms for passengers

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Ride sharing is a popular concept to transportation now a day. It has become more general, effective and efficient way of transportation rather than other type of transportation services. It helps to have a convenient, trouble free travel for the passenger and the drivers also get paid. We have performed systematic literature review on nine different ACM and IEEE conference and journal papers to identify the flows and how to override them and propose different ways for price listing. On reviewing the papers we have identified solution on three different ways. Auction based, proceeding with appropriate dataset considering different relevant dimensions. We have also analysed the price listing given from the platform. Two different aspects also been identified and discussed here to make the price listing competitive. Article selection been done with keyword search and manual selection on different digital libraries.

Additional Key Words and Phrases: ride-sharing, auction, datasets, platform pricing, neural networks, data mining, Markov decision process

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1 INTRODUCTION

In modern life ride sharing is a very common thing. Uber and Lyft are main digital ride sharing platforms. And the ride sharing services are car and motor bike. In our country ride sharing services are also available and day by day it also popular. In our country, ride sharing services are available in capital city. But we cannot use it efficient way of ride sharing platforms for passengers. Driver use ride sharing for earn money and passenger use ride sharing for like a taxi. Sometimes passenger use hole car for one person but there is also three space available. For that, we use more car in the road at a same time and that cause traffic jam. So, we use the efficient way that can help driver and passenger and also do not cause any problem that effect our country.

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2 RESEARCH METHODOLOGY

2.1 Research Objective

We have done systematic literature review on nine ACM and IEEE conference and journal papers. It was our aim to identify the efficient fare listing for the ride-sharing platform. For efficient pricing, it was our aim to review different papers, identifying several models provide on the papers, discuss about those models and how to improve those models.

2.2 Research Questions

Category	Research Question	Motivation
Target	What could be the efficient algorithm to proceed with Markov decision process[5] (MDP)?	Identify algorithms suited best with Markov decision process (MDP)
	How the dispatch region[6] for the vehicle can be chosen?	Identifying the best dispatch places for the vehicles
	What could be the best suited strategy for pricing e.g. auction based, static or dynamic pricing [9] or the platform given pricing	Provide the discussion which way to proceed based on the selected articles
Approach	What more dimensions can be explored or added to provide efficient pricing?	Along with reviewing the articles, what more can be done to addition on the articles
	What could be the efficient algorithm to proceed with Markov decision process[5] (MDP)?	Identify algorithms suited best with Markov decision process (MDP)
	What is the effectiveness of the algorithm[4] from the aspect of economy?	Improvement section on the algorithm from the aspect of economy
	What could be the efficient algorithm to proceed with Markov decision process[5](MDP)?	Improvement section on the algorithm from the aspect of economy
	What could be the relevant dataset for country like Bangladesh if we proceed with neural network based price prediction?	Determine the specific areas that can influence the pricing on the platform
	Adding or removing the dataset given on the[8], how much impact on pricing it provides to our current platform?	Efficiency measurement on the current dataset to have better pricing
	How the platform would respond on Markov decision process (MDP) with auction based system?	Dispatching the vehicle after the auction been done
	How an optimal pricing can be generated from each or combined solution given in [2], [8], [9]?	Determine the evaluation strategy on each of the proposed platform
Outcome	What could be other alternative of Markov decision process (MDP)?	To identify more effective dispatching of the cars
	How the given approaches in [2], [8] and [9] been validated?	To identify the more possible efficient pricing on the given solution

2.3 Article Selection

2.3.1 *ride sharing, pricing, fare, ride on demand, ride and sharing and pricing, ride and demand and fare, vehicle and dispatch.*

2.3.2 *IEEE, ACM, Google Scholar.*

2.3.3 *ride sharing, pricing, fare, vehicle, dispatch, ride on demand and ride sharing pricing, efficient pricing in ride sharing, optimal vehicle dispatch .*

2.3.4 . Dispatching Through Pricing: Modeling Ride-Sharing and Designing Dynamic Prices

Optimal Vehicle Dispatching for Ride-sharing Platforms via Dynamic Pricing

Optimizing Order Dispatch for Ride-sharing Systems

An On-line Truthful and Individually Rational Pricing Mechanism for Ride-sharing

Dynamic Price Prediction in Ride-on-demand Service with Multi-source Urban Data

Pricing in Ride Sharing Platforms: Static vs Dynamic Strategies

Pricing in Ride-Sharing Platforms: A Queueing-Theoretic Approach

Optimization for dynamic ride-sharing: A review

Fast Detour Computation for Ride Sharing

3 DISCUSSION

3.1 What could be the best suited strategy for auction based [1] pricing?

On the articles, we have identified several possible ways to efficiently provide pricing to the passengers. On auction based pricing, though minimal pricing will get the ride but the timing needed to complete such process is a challenge. Several passengers can request for the same destination on the same time, again several drivers may give the same pricing, sorting dimension of them is also need to be considered carefully.

3.2 What could be the effective datasets for influencing the minimal pricing?

We could use different dataset to get pricing, but we need to find the appropriate and effective dataset to provide us the correct and efficient pricing both for the driver or the passenger. If we apply neural network on the given dataset how does it impact on the pricing need to be validated. But here dataset needs to be dynamic as different environment or dimensions need to be considered.

3.3 How effectively can the platform pricing be generated?

As studied Uber, Pathao, they provide pricing based on the desination distance, available riders and the passengers demand. They simply do not consider several other very relatable dimensions which are very relatable to the passengers. So the current platform provided pricing can be made more efficient considering the provided dimension in [2].

4 FUTURE RESEARCH DIRECTIONS

4.1 Provide pricing based on appropriate dataset

Here [2] dataset along with neural network based solution been identified. Which may be one specific solution approach. We have to identify the correct dimension related to the passenger and driver and put the price then. However, here we can also add the auction based solution after getting the pricing from the dataset.

4.2 Effective platform pricing

Currently uber has launched uber pool but considering the pricing, it's not effective at all. Provided static and dynamic pricing in [3]. Here [3] queueing solution been given. Putting the driver or the passengers in queue. But we can come up with non queue solution on here [3]. Here [3] platform's revenue been considered whereas we can put the platform's revenue as a static revenue.

4.3 Correcting auction based pricing

On the auction based solution, vehicles are suggested to be allocated in a stand, but here we can provide the running vehicle as well. Drivers can put base fare for certain distance and after a passenger put a destination request, based on each driver's base fare auctions can be made. And if multiple drivers are tend to have the same pricing for the passenger then best profiled drivers can be displayed as sorted to the passengers.

5 VALIDITY THREAT

For the efficient price listing, several factors varied. Platforms current price listing based on the distance covered, timing, supply and demand do generate the pricing but not efficiently. Several other options as discussed in the articles e.g. dispatching vehicle from specific location on the passenger demand, auction pricing, dataset based pricing, or the static or dynamic pricing from the platform can be performed. Markov decision process (MDP) can be integrated with the auction based solution though the placement of the vehicles can also be improvised using datasets.

6 CONCLUSION

Ride sharing platforms are so useful of our drivers and passengers. Because, it is solved driver's economic problem and passenger's transport problem. It is also solve passenger's time and safety problem. In this research we learn some good and bad things for ride sharing platforms. And we know that if the ride sharing platforms is use efficient way then all problem will be solved. So ride sharing services need to analysis this problem and use it efficient way as long as possible. If they solve it, it is also benefit of their service and profit. Although we believe that these technologies service more better in the future.

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A CONTRIBUTION RECORD

A.1 Paper Assessment

Student id & name	Paper No frm Ref	Paper Title
15-28410-1 & M. Ashraf Hassan	[5]	Dispatching Through Pricing: Modeling Ride-Sharing and Designing Dynamic Prices
Section: C	[4]	Optimal Vehicle Dispatching for Ride-sharing Platforms via Dynamic Pricing
	[6]	Optimizing Order Dispatch for Ride-sharing Systems
15-28405-1 & M. Mahmudul Hassan	[2]	An On-line Truthful and Individually Rational Pricing Mechanism for Ride-sharing
Section: E	[8]	Dynamic Price Prediction in Ride-on-demand Service with Multi-source Urban Data
	[9]	Pricing in Ride Sharing Platforms: Static vs Dynamic Strategies
16-32089-2 & Md. Irfan Hossain	[3]	Pricing in Ride-Sharing Platforms: A Queueing-Theoretic Approach
Section: E	[1]	Optimization for dynamic ride-sharing: A review
	[7]	Populate the following table with the required information.

Table 1. Paper collected and read by the group member

Fast Detour Computation for Ride Sharing

A.2 Paper writing contribution

Student id & name	Section No	Section Title
15-28410-1 & M. Ashraful Hassan	2.1, 2.2, 2.3, 5	Research Objective, Research Question, Article Selection, Validity Threat
15-28405-1 & M. Mahmudul Hassan	2.2, 3, 4	Abstract, Research Question, Discussion, Future Research Direction
16-32089-2 & Md. Irfan Hossain	1, 6	Introduction, Conclusion

Table 2. Section(s) Written in the paper by the group member