# Optimization For Shared Rides Of Cab Systems In Terms Of Profit And Shortest Paths

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**Abstract**
In recent times, Car sharing is a collective transportation model based on shared use of private cars. The objective of car sharing is to reduce the number of cars in use by grouping people. By exploiting car sharing model, it can significantly reduce congestion, fuel consumption, air pollution, parking demands and commuting costs. Propose system is design for driver as well as passenger where passenger request for ride. If driver accept that ride and next nearest passenger request for ride but his route is different than current route then that ride also suggest to driver to boost the income.

***Keywords*** *– Ride sharing, flexibility, green mobility, GPS, Haversine, Dijkstra, KNN.*

## I. INTRODUCTION

The city brings together high-density population and socio-economic activities and
is an incredibly complex and dynamic system. Residents' activities in different places of the city and their movement constitute a complex urban activity system. Resident movement, in fact, is derived from the activities in people's life, reflecting the inhabitants' characteristic. Based on the individual behavior, resident behavior analysis traces the travel of the resident in chronological order, and then analyzes the micro-mechanism of traffic travel and studies people's travel behavior characteristics. Travel demand comes from activity needs. Humans face constraints of conditions such as time and space, family and life cycle. By studying people's travel needs, we can have a more in-depth understanding of their activities. In recent years, advanced technology has been developed to improve the overall efficiency of the taxi's system. In the
traditional taxi model, passengers always call a cab in the street, which is of relatively low efficiency, especially during the peak hours or rainy days when people has to wait for an available taxi passing by for more than half an hour. At the same time, it's arduous for a driver to find passengers nearby when driving. Propose system design to solve these problems. Propose system is design for driver
as well as passenger where passenger request for ride. If driver accept that ride and next nearest passenger request for ride but his route is different than current route then that ride also suggest to driver to boost the income. Propose system can reduce the time to find clients and allow an automated way to
pay taxi costs. Propose system is not only beneficial to individual participants but also has significant social benefits. By sharing vehicles, we could reduce congestion, fuel consumption, Pollution, save parking space and also save money.

## II. MOTIVATION

If cab driver accepts shared ride then system suggest shortest path for ride and cab driver get suggestion of

users request which comes into route. This could be cause to lose passengers from another area but which is near to cab driver. To overcome these problems propose system could be helpful.

## III. USAGE SCENARIOS

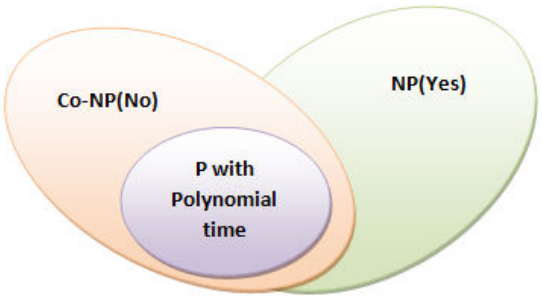
User: register him/herself in system with personal information. Request for cab by providing details about pickup location and destination location.
Cab driver: register him/herself into system. Accept or reject passenger request
System: display user request to nearest cab driver. Generate bill as per distance.
Database: store information of user, cab driver.

Table I: Use Cases

| Sr no | description | Actor | Assumption |
|---|---|---|---|
| 1 | User register into system | User | Information stored into system |
| 2 | User request for cab | user | User provide pickup and destination location |
| 3 | Search nearest cab driver to users pickup location | system | GPS of cab driver is on |
| 4 | Accept or reject user request | Driver | Nearest user request displayed to cab driver |

## IV. PROBLEM COMPLEXITIES

**P:** In the traditional taxi model, passengers always call a cab in the street, which is of relatively low efficiency, especially during the peak hours or rainy days when people has to wait for an available taxi passing by for more than half an hour. At the same time, it's arduous for a driver to find passengers nearby when driving.



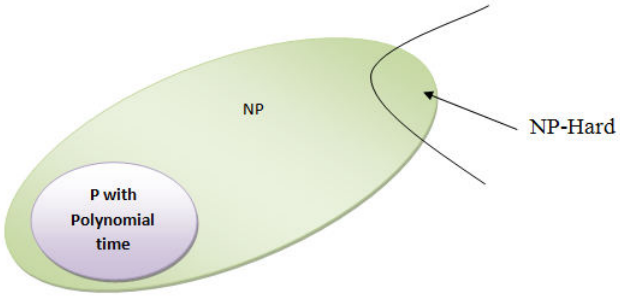

"NP" means "we can solve it in polynomial time if we can break the normal rules of step-by-step computing".

**NP-Hard:**

Propose system is design for passenger as well as driver. In propose system passenger can request for private or shared ride. Passenger pay ride bill as per the prize. If passenger select shared ride then it will displayed to the nearest driver if driver accept that request then ride will be started and new nearest passenger which are on other path also suggest to the driver. Propose system focuses on three main modules; in first one nearest user will get know share ride is started for ABC location to XYZ location. In second one, whenever new shared ride get started it will inform to those users who were traveled before from that location. In third one, if two parallel paths are available for driver to reach any destination then system will suggest that path which can provide maximum passenger to driver.

So here in this case the 'P' problem is NP hard.

i.e. P=NP-Hard

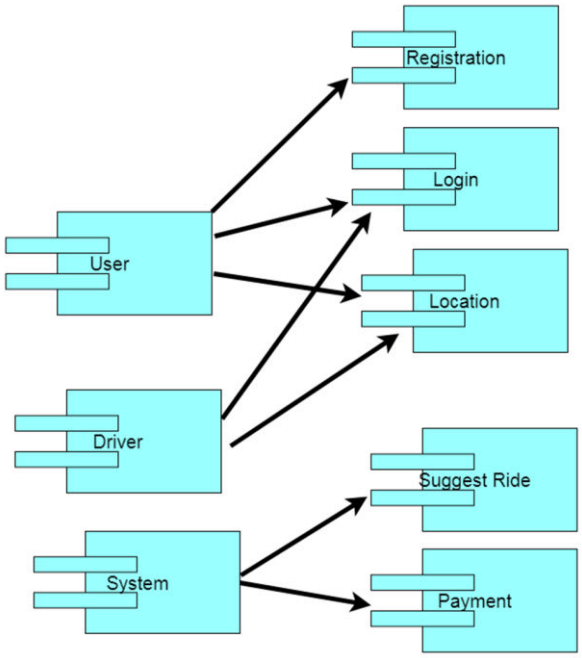



**NP-Complete:**

We have use Haversine algorithm for distance calculation. System find beneficial route to increase drivers income.

Hence the 'P' is NP-Complete in this case.

## V. COMPONENT DESIGN




## VI. MATHEMATICAL MODEL

Let 'S' be the system
Where
S= {I, O, P}
Where,
I = Set of input
O = Set of output
P = Set of technical processes
I = {user pickup location, user destination location, cab driver current location, ride type}
Let 'UD' is the User Data

UD={UD1,UD2,UD3,UD4…..$UD_N$}
$UD_K$={UPLAT,UPLON,UDLAT,UDLON,URT, UPD}
K=0,1,2,3,-----N

UPLAT=User pickup latitude

UPLON=User pickup longitude

UDLAT=User destination latitude

UDLON=User destination longitude

URT=User ride type

UPD=User personal details

Let 'DD' is the Cab Driver Data

DD={DD1,DD2,DD3,DD4….$DD_N$}

$DD_K$ ={DCLAT,DCLON,DCD,DRT,DPCD}

DCLAT=Driver current latitude

DCLON=Driver current longitude

DCD=Driver car details

DRT=Driver ride type

DPCD=Driver personal and car details

- Identify the Process as P

  P={SND, SNR, SR, SNU}

  SND= Use UD and DD to Search nearest driver

  SNR= Use UCLAT and UCLON to Search nearest route for private ride

  SR= Use UD and DD to Search route that provide more passenger to driver for shared ride

  SNU= Use UD, DCLAT, DCLON to Search nearest shared ride user request

- Identify the output applications as O

  O = {BPR,BSR,DSP,DPSRU,PPD}
  BPR=Use DD to Book private ride
  BSR=Use DD to Book shared ride
  DSP=Use DCLAT to Display shortest path for private ride
  DPSRU=Use UD to Display path that provide more shared ride
  PPD=Use UCLAT, UCLON, UDLAT,UDLON to calculate bill

## VII. CONCLUSION

Sharing ride is an effective way to reduce air pollution, parking problems, fuel consumption and commuting costs based on shared use of transportations cars or vehicles. In propose system we try to solve car sharing problem and develop a prototype of car sharing system to realize car sharing based on smart phone platform and Google Map API.

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