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# E-business by PickMe – An Android based mobile app as a solution to transportation logistic


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**Abstract:** Any country's transportation system doesn't rely only on new roads or maintenance of infrastructure, it also depends on implementation of technology, usage of sensors, smart microchips, and communication devices that collect and disseminate information about the functioning of the transportation system. In this regard we present and Android based mobile application "PickMe" that addresses today's one of the key issues is logistics, especially for growing and metro cities. The product is versioned to solve the problem of local transportation for utmost reliability, effectiveness and efficiency. PickMe offers a mobile Android application for the Auto driver/Cab drivers, which allows them to see the position of passenger or loads needing Auto/Matador. For the consumer PickMe provides opportunity to publish their instant (or future) transport needs through an Android App or Mobile portal accessed from any smart device and also they can see available drivers within the nearby area. In short this PickMe service is to enable consumer to ease their current pain in personal mobility in city or urban areas while allowing the Auto driver/Cab drivers to improve their productivity and livelihood.

**Keywords***:* Logistics, e-business, Global positioning system, Android operating system, Graphical user interface.

## INTRODUCTION

PickMe is a product/service, that addresses today's one of the key issues i.e., availability and mobility in logistics, especially for growing and metropolitan cities. The product has a vision to solve the problem of local transportation for utmost reliability, effectiveness and efficiency.

In City and Urban areas personal mobility suffers a major gap. In one hand, Auto/tempo drivers spend substantial time waiting for passenger. On the other hand, passengers suffer in dearth of transportation needs at point of demand. While for planned travel like going to airport radio taxi helps a lot, they fail to help consumer for instant and unplanned mobility needs. Mumbai has more than 50K non-radio taxi and equal number of autos along with huge number of goods carriers and Bangalore has 15K of autos and very few non-radio cabs, 95% of the autos/tempo's individually owned making it difficult to provide technology solution.

PickMe offers a mobile Android application for the auto drivers/tempo drivers. PickMe provides an opportunity for the customer to publish their instant trip/goods transport needs through an Android App or Mobile portal accessed from any smart device, which allows them to see the position of passenger or goods in the nearby location that need an auto/tempo. And also they can see accepted drivers location via map view provided by PickMe application.

PickMe provide an opportunity for the customer to publish their planned trip/goods transport request where customer can provide planned trip details; customer request is published to all the drivers registered to provide the service.

In short, this PickMe service is to enable customer to have a fare trip and enable the auto drivers and tempo drivers to improve their productivity and livelihood.

## LITERATURE SURVEY

In urban areas personal mobility suffers a major problem i.e. auto/cab/matadors drivers spend substantial time in waiting for passengers. Passengers also suffer in dearth of transportation needs at the point of demand. In order to help passenger to make their life easier and auto drivers/tempo drivers to improve their revenue by reducing their idle time, this PickMe product/service is being introduced.. PickMe provides an opportunity for the passenger to publish their instant /planned transport needs through this Android App or Mobile portal accessed by any smart device. PickMe offers a mobile Android application for the auto drivers/tempo drivers which allow them to see the position of passenger or goods in need of auto/tempo.

This project is driven by the need to change the life of people who are at the bottom of the financial hierarchy. However, this also has serious opportunity for monetization by offering this service, as the volume of users is very high. Based on 2008 survey, in Bangalore alone we have around 70,000 auto-rickshaws which is equivalent to almost 600 auto-rickshaws per 100000 people. Across all Indian metros the number of passenger-autos is more than 600,000 with substantial growth rate. Even we assume each auto does 5 trips a day, we are talking about 30,000,000 passengers, whose life can be made better every day through this technology.

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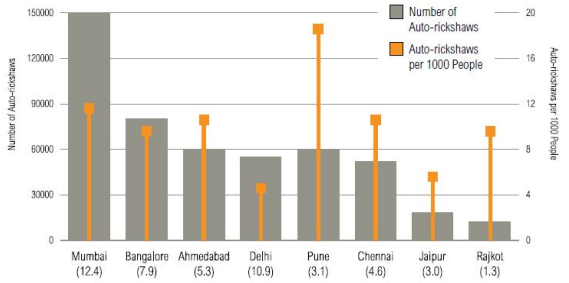


**Fig 1:** Industry survey data for public transport in selected cities

Apart from this, huge number of auto-rickshaws, there is another equally huge opportunity for small or medium sized goods carriers such as tempo which provide services to carry goods from one location to another within city. One of the major challenges in the goods transportations is that unlike passenger-auto, the carriers are expected to wait at some fixed location/hub of the city and the person needing their service has to somehow call them for the service. In most cases, the vendors/sellers of the goods help the buyers to locate such tempo drivers. It is well known that in many cases these tempo drivers will spend the whole day in just doing 1 or 2 goods trip and hence asking for disproportionate money for their service. In short, idling time for these small good carriers are fairly high, and any help to discover the opportunity to reduce this idling time is of considerable help to the tempo drivers as well to the customer of their services.

However, in general, there is certain difference in passenger-auto, as typically passengers can pay through metered mechanism which is well regulated. But for the goods carriage, neither there is such regulation market exist through which customer can discover their price nor at least some benchmark exist.

## ANDROID ADVANTAGE

Recent market penetration of Google's open source Android platform has lead to a new smart phone era which is going to be truly mass-market phenomena. As more and more hardware vendors move to take advantage of openness and market value, it appears that Android is going to be default choice of OS for majority of devices in the very near planned future. With the volume of smart phone, capacitive touch screens price also going down dramatically making Android smart device truly mass-market phone.

With Android phone ruling the market and with more than 50% of all smart phones sold, it is natural for us to leverage Android as choice of technology platform for our application, especially for the driver. We believe a GSM/CDMA phone with GPRS and GPS capability with a reasonable size of touch screen will soon be available at a cost of Rs. 2000-5000, while affording high-end smart phones is quite difficult for auto drivers/tempo drivers. We believe that bulk deals and prolonged service opportunity can easily reduce this cost of ownership drastically. With this assumption, we have decided to create our native App for drivers over Android.

## NATIVE APP V/S WEB PORTAL.

Now the question is why Native App instead of a portal? Our major associates are auto drivers/tempo drivers who are beginners, few illiterate to utmost a degree holders and asking them to start a browser and then go to book mark and then start the page may not be best thing expected from them. On the contrary, we believe that Native App is easy to use, can be really made easy to use through icon based design, which can be intuitive for them to use. Apart from this GUI advantage, Native App is also helpful as this can support 'Push Notification'. Assume that a passenger needs an auto just-in-time. This information, in our model should be visible to all the auto drivers around the nearest area of that passenger. So, either the browser in auto driver's phone pulls at a quick frequency (at least every minute) to make it close to real time update or the server use Android 'Push Notifications' to update all those relevant auto driver's instantly.

One must also remember that browser refreshing at quick intervals will drain out the battery of the auto driver's device relatively, which may not be acceptable for the obvious reason.

## METHODOLOGY

PickMe project has been divided into two major parts, one is client part and the other is server part. Client part is implemented in android mobiles and server part is implemented in PHP and is hosted on website to provide access to the database residing in the designated server.

### Technology stack

Figure 2 encompasses the proposed technology stack for development and deployment of PickMe system.

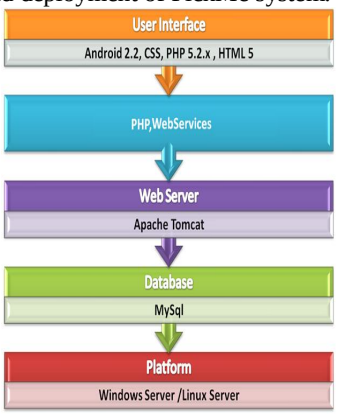


**Fig 2:** Technology Stack

Cascading Style Sheets (CSS): This script is used to describe the presentation semantics (look and formatting) of document written in a markup language.

MySQL: It is an open source RDBMS, which runs as a database server providing multi-user, access to a number of databases.

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Linux: It is Unix-like computer operating system assembled under the model of free and open source software development and distribution.

Windows IIS/Apache web server: Web server is used to host web sites, for data storage and to run enterprise applications.

Android: It is an operating system for mobile devices such as smart phones and tablet computers. It is developed by the Open Handset Alliance led by Google. Developing Apps for Android2.2 is facilitated by a group of tools that are provided with the SDK.

HTML: It is a markup language for structuring and presenting content for the World Wide Web, and is a core technology of the Internet, and originally proposed by Opera Software.
PHP: It is a general-purpose server-side scripting language originally designed for web development to produce dynamic web pages.

**Architecture**

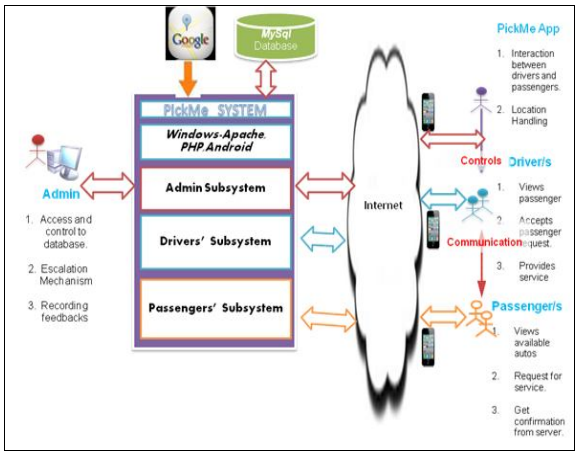


**Fig 3:** PickMe System Architecture

Figure 3 emphasizes on the overall system architecture of PickMe system. It represents the technology stack, user profiles, external interfaces, means for accessing the application. These aspects are explained in brief in subsequent sections. There are mainly 3 actors in PickMe system:

1. Administrator
2. Driver
3. Passenger

Driver and passenger will use the system through smart phone with a native Android PickMe application. The PickMe application will get the data through web services provided by server side over internet.

The PickMe system has 4 main subsystems and they are:

1. Admin subsystem.
2. Driver subsystem.
3. Passenger subsystem.
4. Core logic subsystem.

Administrator will have the following functionalities:

1. Admin can update/delete the information about driver and passenger.
2. Admin will also handle the escalation mechanism.
3. Admin can record the feedbacks given by the passenger and driver.

Driver will have the following functionalities:

1. Driver can view all requested trip details and passenger location via PickMe application.
2. Driver can accept any of the passenger requests based on his/her convenience.
3. Driver can cancel any accepted passenger request within specified time.

Passenger will have the following functionalities:

1. Passenger can request for instant/planned service for trip/goods transport within city.
2. Passenger can view the driver location via PickMe application.
3. Passenger will get the accepted driver details from server.
4. Passenger can view the distance and route path from his/her current location to destination.
5. Passenger can view the trip cost once he/she publishes the request.
6. Passenger can cancel any accepted request within specified time.
7. Passenger can give feedback on journey completion.

Core logic subsystem is responsible for all the operations in the system. It handles all the requests from the clients.

1. It works on IIS/Apache web server.
2. It has all the web services needed to serve client requests.
3. It is implemented using PHP.
4. On client request it will retrieve data from database and send it to client.

**Design specification**

This section contains the design specification of PickMe and its sub modules. In PickMe, there are two parts one is client side and another is server side. Again in client side there are two

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modules driver side and passenger side. This section also covers the data flow design of each module, internal interfaces and external interfaces of PickMe.

**Administrator subsystem design**

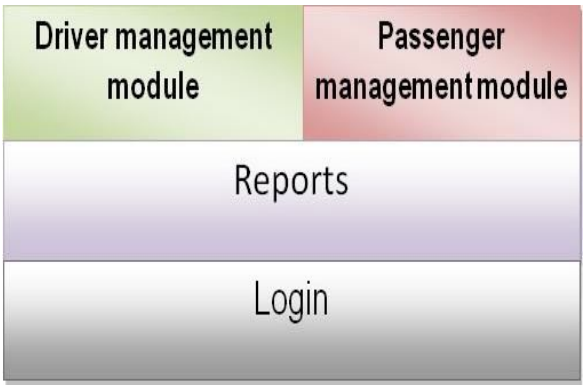


**Fig 4:** Administrator Functional Block Diagram

Administrator is provided with username and password for login. If administrator forgot his/her password then he/she can get back his/her password through forgot password feature. Admin has facility to generate the report, can update the information of driver and passenger. Admin can also delete any record or information of passenger and driver through GUI. Admin can view driver and passenger information.

**Driver subsystem design**

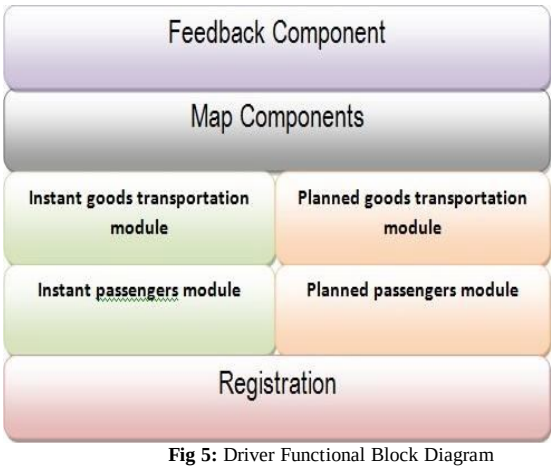


**Fig 5:** Driver Functional Block Diagram

The Driver needs to register with PickMe App to use this application. Driver can then access the application by logging in. Driver is provided with three options – Planned Trip, instant Pickup and Goods Transport, based on his/her registration to these options, driver can use that service. Driver can view his/her and passenger's location and get service for his requests.

**Passenger subsystem design**

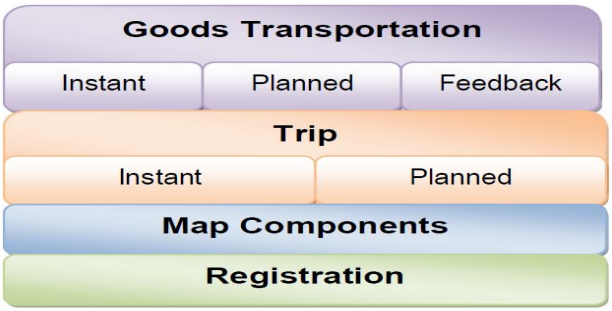


**Fig. 6:** Passenger Functional Block Diagram

Passenger can use the PickMe application after registration. Passenger need to login to get the service. After successful login passenger is provided with following services such as instant pickup, planned trip, instant goods transportation and planned goods transportation. Instant pickup allows passenger to request for an auto instantly, similarly the instant goods transportation request service to transport goods instantly. Planned trip module and planned goods transportation module provide the passenger with facilities to plan for trip and goods transport. Mapping component display the map with the passenger and driver location pointing on it and displays the route path to destination, by this component passenger can track accepted driver autos once his/her published request is accepted. Feedback component is used to get feedback from passenger to measure the quality of service.

**RESULTS AND DISCUSSION**

In order to evaluate and asses the performance of our application, we conducted following experiments and recorded the result. The experiment results present performance as well as focuses on issues which shall be addressed in future.

**Experiment to analyze response time for publishing**

Here we have downloaded apk of the passenger and driver module of PickMe application in two different android mobile phones, and then we have installed that software's. It displays the login page. Then we logged in as driver and passenger in the respective mobiles, then we publish the request from passenger mobile phone and note down the time. Then in driver mobile after the login we waited for the driver icon on the map and calculated the time duration which took to display driver icon on the map. Then we waited to see the icon of passenger on driver's mobile also calculated the time duration. Then we accepted the request of the passenger by tapping on the passenger icon. Then we waited for confirmation message of acceptance and calculated the time duration of acceptance. And also calculated the time it took to notify it in the passenger application. Next action is cancellation here we cancelled the accepted request and calculated the time duration to notify about the cancellation.

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**Instant trip**

Action 1: Driver login
Action 2: Display of driver icon and passenger icon
Action 3: Driver accepting passenger request
Action 4: Driver canceling accepted passenger request

| Action | 1st attempt (in seconds) | Subsequent attempt (in seconds) | Strength of GPS |
|---|---|---|---|
| 1 | 10 | 2 | Medium |
| 2 | 120 | 5 | |
| 3 | 8 | 3 | |
| 4 | 2 | 2 | |
| 1 | 15 | 5 | Poor |
| 2 | 600< | 300> | |
| 3 | 60 | 50 | |
| 4 | 22 | 20 | |

**Table 1** Instant trip response observations

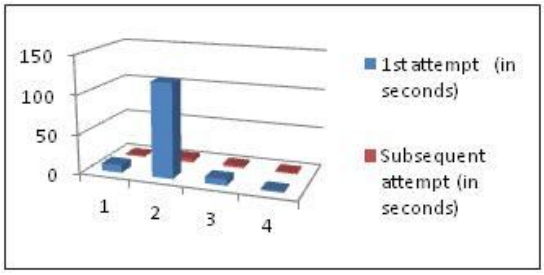


**Fig 7** Strength of GPS is medium

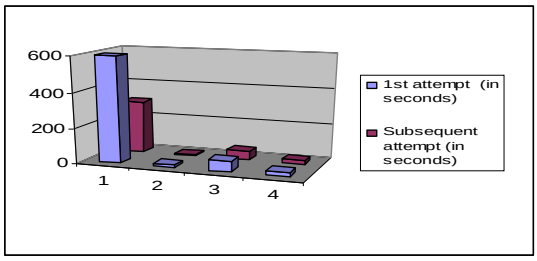


**Fig 8** Strength of GPS is poor

**Planned trip**

Action 1: Display all the planned trip request on driver's device upon submission of date
Action 2: Driver's acceptance of one planned trip request
Action 3: Driver canceling accepted planned trip request

| Action | 1st attempt (in seconds) | Subsequent attempt (in seconds) | Strength of GPS |
|---|---|---|---|
| 1 | 3 | 2 | Not needed |
| 2 | 4 | 2 | |
| 3 | 4 | 2 | |

**Table 2** Planned trip response observations

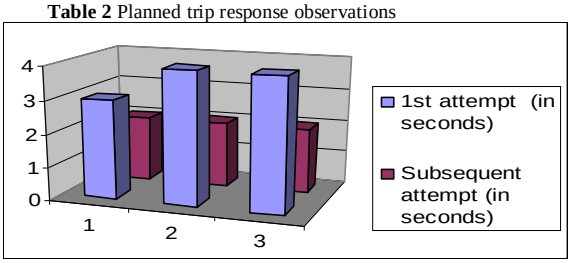


**Fig 9:** Response time for planned trip

The above first table shows that response time purely depend on GPS network and type of attempt. If GPS signal is very poor then it will take long time to respond on each action of Instant module. And if driver is performing the actions first time after login then also it will take more time to respond on each action. If driver is performing the actions subsequently and GPS is good then it will respond quickly. Second table shows that approximately it will take same time for both first and second attempt. If the number of passengers are more for that day then it will take time to display all passenger in driver's mobile it means the display time is depends on length of the passenger requests for that day. From above observations we conclude that future enhancement of this application can be made by improving the response time even in the first attempt.

**Experiment to analyze execution time at server**

Here we have use php function called microtime() to fetch the system time. In php script we provided all the inputs to the script and we fetch the system time, after execution of all statements of script again we fetch the system time and calculated the difference to get the execution time of script.

| Event | Start time (µ Sec) | End time (µ Sec) | Execution Time (µ Sec) |
|---|---|---|---|
| Publishing request | 0.7425 | 0.8387 | 0.0961 |
| | 0.8960 | 0.9974 | 0.1014 |
| | 0.1322 | 0.2804 | 0.1481 |
| Accepting Request | 0.9478 | 0.0544 | 0.8934 |
| | 0.9770 | 0.0669 | 0.9101 |
| Post cancel | 0.1241 | 0.3621 | 0.2380 |
| | 0.5896 | 0.8444 | 0.2547 |

**Table 3** Execution time at server

The above table shows that the execution time for any of the activity is less for first trial, but increases for subsequent trials. It is also observable that execution time for 2nd and 3rd activity almost doubles in the second trial compared to first trial.

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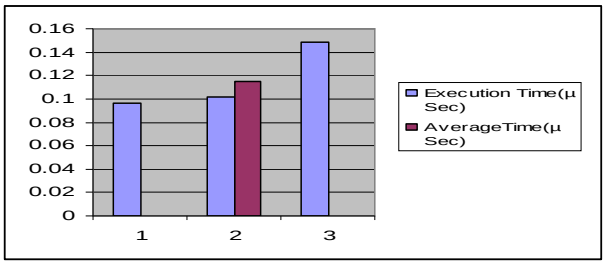


**Fig 10** Publishing request

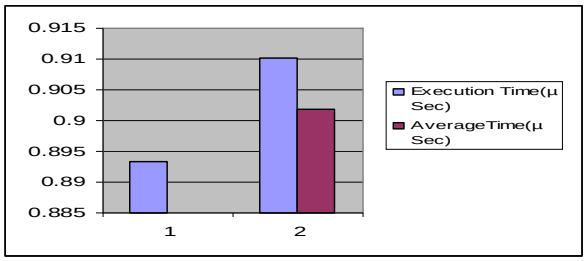


**Fig 11** Accepting request

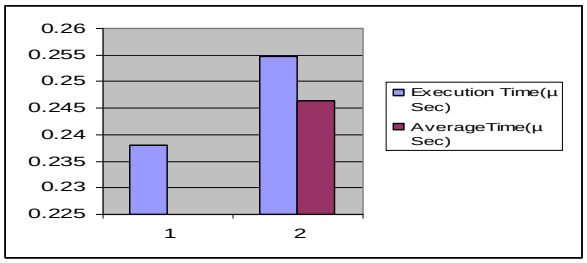


**Fig 12** Post cancel

From the above observations I conclude that the time taken by Pick me application for above listed three activities are in terms of seconds, while the same three activities are getting executed at the server, in less than micro seconds. Thus it is evidenced that for end user, the response time of application is largely dependent on network speed. The above readings are recorded on the server with following technical specifications Processor type: Intel i3 2.4GHz 3Mb cache, RAM: 2Gb DDR3 RAM 1066MHz, Hard disk: 16Mb buffer 320Gb Seagate Baracuda drive 7200 Rpm

**Experiment to analyze performance of application at various locations**

Here we have downloaded PickMe application in android mobile phone and used in various locations and observed the performance of application.

| Location | Remarks | |
|---|---|---|
| | Airtel | Vodafone |
| Open space | Working without any problem | Working without any problem |
| Room single floor | Working without any problem | First time faced problem and for subsequent action no problem |
| Ground floor in complex | First time faced problem and for subsequent action no problem | First time faced problem and for subsequent action no problem |
| Top floor complex | Working without any problem | Working without any problem |

**Table 4** Performance of application at various locations

We have observed that in open space application run without any problem, when we went inside the ground floor it was showing the problem of GPS and driver location was disappeared. Then when we went to top floor it was showing driver icon on the map and GPS was also good. Response at various locations depends on GPS strength and internet service provider for the device.

## CONCLUSION

PickMe offers a mobile Android application for the Auto driver/Cab drivers, which allows them to see the location of passenger or loads needing Auto/Matador. For the consumer PickMe provides opportunity to publish their instant (or future) transport needs through an Android App or Mobile portal accessed from any smart device and also they can see available Auto/Matador within the nearby area. In short this PickMe service is to enable consumer to ease their current pain in personal mobility in city or urban areas while allowing the Auto driver/Cab drivers to improve their productivity and livelihood. Response time of the PickMe application depends on strength of GPS and internet service provider. Display time of PickMe application depends on length of the passenger requests for that day. And for end user, the response time of application is largely dependent on network speed.

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