MyPTNow - How to go from here to anywhere in public transportation

Rui Enes Alves
Instituto Superior Técnico / Universidade de Lisboa
Av. Rovisco Pais, 1
Lisboa, Portugal
rui.raen@gmail.com

ABSTRACT
There are few systems that actually inform people immediately and effectively on which public transport they should use, when it arrives, where it is coming from and where it is going. People who use Public Transportation do it because it is the best alternative or because it is the only one available. For some reason they can't, or they don’t want to use a private car or other means to move.

In this work we give more emphasis to people’s needs, helping them to plan their trips in a more effective way. In addition, we can help them to make the best decision, taking into account various factors external to the Public Transport itself. We go further than other existing applications to implement some innovative parameters, such as the capacity of the transport or the type of ticket/pass owned by the customer.

More than a hundred people were surveyed and, based on those results, we found the desired features, either when approaching the station or in other contexts. They were also useful to evaluate the importance of public transportation in people's lives. We developed an application in android system that has the advantage of helping to give the fullest possible information in real time. Tests with users show that MyPTNow is really required, with an application where the client can manage their personal information, while contributing to a larger system that keeps learning and helps other people to make decisions on the use of public transportation.

Keywords
Public Transportation; Personal Information Management; Customer Satisfaction; Information Sharing; Knowledge Base; Decision Support Systems.

INTRODUCTION
The growth of large cities and their modernization affects the services offered by Public Transportation such that people increasingly demand improvement in their mobility [Herrero 2011]. Public Transportation companies are concerned above all with the efficiency and costs of their transport but begin to realize that customers want information in real-time to help them also to have good mobility, without delays and other problems [JAO-HONG 2010]. However, many of the same Public Transportation companies still see transportation as a product derived from the result of the need to transport people and goods, while people begin to be more aware that their mobility has value to their quality of life and leisure time [Banister 2008].

Even with huge computerized systems that larger companies have, most of the information systems the customer use are a "top-down" approach, starting from the needs of the company and then to the client. On the other hand, there are few systems that use the Client's needs as the starting point of their services [Gillam 1999]. Advanced search existing data, or more a different view of the same information does not imply that the system has significant improvement in the end-customer perspective, because you are not taking into account what each person needs at the time you wish to travel [Gillam 1999]. One of the most important factors for the customer is to be able to obtain information in real-time. This importance is even greater for frequent users who always travel the same route, because for them the options of search paths are less necessary, as opposed to the need to know the actual time of arrival and the length of the route [Magrini 2011].

In related work, we focus our analysis on the use of extra services that the various transport companies in large cities of Europe and other continents use to satisfy the customer or for other purposes. Additionally, the cities for our study are a sample of those cities that provide a wide service in the field of Public Transport.

RELATED WORK
There are several types of public transport that we all know. Some of them we classified as deterministic, and the others non-deterministic. Those means of transport that have fixed schedules and meet these times accurately, unless exceptional circumstances, are those which we call deterministic, as in the case of the plane or train. The others are those who have fixed schedules or some defined but usually where there is some disparity frequency, or ignorance. For instance, the time of arrival or departure, such as the bus or Metro.

On the other hand the non-deterministic transport are more centered in cities, where there is always more movement,
traffic spikes and higher possibility of unexpected events. These are transport companies that also provide few services to the end customer, in addition to transportation. Their main concern is in the numbers: the number of buses, the people, the ticket bought, among others. This perspective of companies running from top to bottom [Gillam 1999], ie, companies focus first on transportation and then all intermediate processes is reaching the final information for the Customer. On the other hand, the bottom-up perspective, which starts at the Client to build information systems to support their travel, is very little used, [Gillam 1999].

As the scope of this project is part of Customer Satisfaction, we chose not deterministic transport as the basis of study for the reasons that we presented. It is a challenge to provide value added services to the end user. In simple terms, if you want to avoid that the client becomes an indefinite waiting to transport to go the same tight within the transportation, you do not know what comes next transport, among other factors, time to which end customers place great importance.

Certain companies have realized that to contribute to this customer need and, consequently, to their satisfaction, they provide tools to assist in planning your travel. However, what we see is that most of the information is static and/or must be purchased in advance, usually via the web.

In almost all major European cities analyzed in this chapter the company bus and metro are the same, except for Lisbon and Madrid. In situations where this is not so customers have to use different websites and applications, which leads to greater difficulty in research, for example, when dealing with transshipments.

The various companies use various channels to deliver their services. For greater detail and understanding of the overview of public transport we divided our study on the services provided by companies in four channel groups: the Public Site, Personal Site, Mobile devices and At the transport stop.

As expected most services are centered on the Public Site. However, with the Internet boom many services came by extension, which allows to combine the technological developments needed to respond to customer concerns. Thus, the emergence of smartphones, integrated GPS and Augmented Reality came to help address the lack of services for the client in progress, with geolocalization of your location. Therefore, most companies begin to rely more on SmartPhone, currently providing more services in this way than the public site, in most cases. Moreover, mobile phones from previous generations are being replaced and less used, which explains the little bet of companies in a medium that does not allow the provision of services with additional value to what is already on the public site.

Again, the provision of information on personal sites falls far short of what is desirable, since most services could be provided in addition to the creation of personal routes.

At the stop the client has services related to their location (usually through maps available) and with the schedules. It is possible to trace the client and/or routes not simulate, since it implies dynamic data.

REQUIREMENTS

The motivation of this work is part of personal experiences that require confirmation. Thus a thorough investigation was conducted online to anyone who would respond.

First we wanted to assess whether people are interested in Public Transport, including whether or not to use, and why. Realizing the current situation we asked about advantages and disadvantages, where customers (or not) of the Public Transportation services could respond.

Understand how people use Public Transport is one of our goals. Another is the acceptance of new ways to get information on public transport, or if this information is insufficient. On the other hand we realize which services they use and/or want to use.

The questionnaire was made available online via google docs where it stayed three months, open to answer any part of the globe. An English version to have that coverage was available. The questionnaire was presented with 29 questions, very thorough in order to assess the requirements. Most questions are multiple choice, with most hypotheses gifts, always with the other option, for suggestions of respondents.

The statistical population of this study are citizens from Portugal and abroad, who daily travel to certain locations, routine or not, using any means available. To this end, we chose a random sample of 150 adults who responded to the online survey available.

Analyzing the results from the perspective of collecting the necessary requirements need to look at the results a perspective higher level. Thus, if about 50% are regular users of public transport, 50% have little or no interest, confirm that came when some people refused to answer, who provided us the main reasons for which: - Or not using public transport: Or use and some say they have problems with current systems, they say provide everything they need.

The main reasons that respondents do not have to use all or some public transport are as follows:

- Few transport available.
- Travel time consuming.
- Prefer to use own transport.
- High tariffs.
These issues are related to cost versus benefit, if one take less time own vehicle can weigh twice about using public transport. If beyond the time the price is higher in Public Transport Then there are two weights to measure the willingness of people to use public transport:

- Time Course.
- Price.

The limited availability of transport can not ascertain for sure why it happened but hope to show users all possible paths. Therefore, by our analysis there are several available alternatives.

When you talk about the disadvantages of using Public Transport have 4 main reasons:

- Delay and Timeout
- Temporary Interruption of services
- High prices
- Full Transportation

In addition to the travel time customers also find that the waiting time is quite disadvantageous, since a person’s own vehicle or on foot is not expected. Delays or even service disruptions are another factor that bothers the client when using public transport. The client usually does not know when the next shuttle is in these circumstances that are beyond his control. You will need to understand which external factors are happening and provide alternatives to the client. Again, the price appears as a major disadvantage. Finally shipping too full is a very important factor for comfortable transport but is beyond our scope, the only part of our project that may influence the decision of the customer are the alternatives presented. Thus we have three requirements:

- Timeout
- External factors that disrupt normal functioning.
- Alternatives

It will be necessary to inform the client about how long shipping will take for him to decide to wait or shrink an alternative. On the other side if the waiting time is unknown, the faster alternatives as possible should be provided. The external factors are often known by the company but appear to the end user as an interruption. If the information is more complete the client can decide better.

However, looking at the positive aspects respondents say mostly, the Public Transport offers:

- Quickness
- Time
- Price
- availability for other tasks.

These points are also referred to in the less positive aspects or improving. The perspective is always positively inform:

- We talk about waiting time customer but present the possibility to choose the quickest route.
- Delays and talked Standby time but we must provide the customer with updated schedules and if possible for better decision when using public transport real-time.
- We talk about high prices but we must present to the user the possibility to choose the cheapest route.
- The availability for other tasks is central to handle mobile devices, here we emphasize the application usability, whose information should be provided as quickly as possible and with a user friendly application.

On the other hand, for customers of Public Transportation services obtain real-time information they need to use mobile devices. To obtain this information you must read it from external services that may have costs to the end customer. The client should at least be informed what will be spending.

As mentioned earlier, the MYPTNow is client-centered, ie, all services begin with your needs, since MyPTNow intended to be a system from the bottom up. Having focused on the client, regardless of where it is, it is from there that will meet your concerns and expectations in the use of public transport.

However, the client can be in several different places, but grouped the needs according to the use of the systems:

- Mobile;
- Web

![Global Network Identification of Stops Knowledgebase Pro-activity Web Create / Manage routes Real-time information Decision support Fault detection Mobile Waiting Time Destination Ticket Transport Capacity Network Disruptions Where Am I? Which stop is nearby? Where do I wanna go to?](image)

**Figure 1 - Global vision of Requirements**

**MYPTNOW ANDROID APPLICATION**

To provide information in real time to the customer at any time there is an application on your phone. However, since the system uses MyPTNow much information, the mobile system does not have sufficient resources to support this information and provide a credible response to the user. For
this reason, there must be a robust central server that receives requests from mobile devices, analyzes it and returns a response back.

Use case:

"Joao, Mario, Miguel and Maria are all registered in MyPTNow. Maria is the only with Smartphone.

It's 9 in the morning and John is quietly at home planning a trip to see the points of greatest interest to the Port, where it is going tomorrow. After all the planned information on their routes is available on your phone.

On the other hand, Mario is at stop and question the system via SMS how long before the next bus. The system upon receiving the request knows that Mary is the nearest bus and have a Smartphone with GPS.

Assessing the speed and location of the bus, crossing the system with other existing data, calculates the waiting time and sends it to Mario. Miguel now has a downer, just missed the bus for a second but then he immediately informs the MyPTNow SMS system on the event occurring.

Thus, the system could know the location of the SMS bus. The action had. Miguel wins praise (for further review ) offered by the system to compensate the customer, who despite having lost the conveyance help others and have information."

It is the interface that the client's eyes will be ready. The interface must be easy to use and meet the basic requirements. Moreover, given the small screen size, we bet a minimalist screen but that has all relevant information at the same time. However, we had many challenges ahead in developing features for handling screens, these features, related to the touch, in the case of a mobile solution with "touch screen".

**CONCLUSIONS AND FUTURE WORK**

In the big picture, as one would expect, the services offered to the end customer are clearly insufficient to address all the needs of travelers of public transport. On the other hand, there are several channels of information and services, but are all very sparse, it is getting the best services communicate with each other and function as a whole.

The MyPTnow is a system that will provide most of the existing services nowadays but which proposes to improve them, join them and learn from their use by the end customer. The biggest challenge will be getting people to participate in sharing information and, ultimately, to use public transport more, seeing in them a quick, convenient and effective alternative.

In terms of future work is there anything to do in relation to the interface in particular make the most appealing layout and implement maps and other interactions. However, the most important in our opinion is a service that was to be implemented, which itself took another thesis, the Transport Capacity.

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**REFERENCES**


