

# Innovative Tourist Route Assignment through It Based Navigation System

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**Abstract.** Route assignment through navigation system has been used greatly by users and has been recognized as an efficient and ideal way to choose the best route for drivers. In spite of the advantages of the system, it still cannot fulfill all the needs of users and needs improvement. One unanswered demand in the system is the need for assigning the tourist route for users who travel to new areas without having enough information about tourist attraction locations, and how the routes are connected. The current trip planning problems for travelers are lack of information about the tourist attractions, wasting a lot of time on gathering information and the problem of how to find the best route to join the points. With improvement of information management, innovative ways should be introduced to help users find the best route in any new area without needing to have any information about the place in advance. This paper aims to have a statistic look to the current information problems of users in tourist route assignment. After recognizing the problems and prioritizing the user's needs, introduce an innovative IT based solution to solve these problems by connecting information management and traffic engineering.

**Keywords:** Route assignment, Information management, Tourist route, Satellite navigation, GNSS

## 1. Introduction

Image segmentation is one of the important missions in the image process and computer vision field. In this paper, we focus on the color image segmentation, it can be divided into two categories, one is based on color space division, the other is to use clustering segmentation. In the color space segmentation method, often used in color space are RGB, YCbCr, HSV and so on. Although the RGB color space is the most direct expression of the form, it is not necessarily suitable for color analysis[1], the YCbCr and HSV have good effect in some applications and has often used algorithms in recent years[2][3][4]. The clustering method in recent years than the classic method is K-means, it is not only the data clustering classification, the color can also be classified[5]. In this paper, we used color space segmentation pallet images, there are some research results to engage pallets automatically in the past[6][7], due to the pallets color being similar to skin color, we refer to the Jain AK articles as "face detection in color images" [8], this is the use of statistical skin color distribution method in different color space, to find the closest color of the threshold. In our method, we measured the pallet images in different color space to find the color of threshold. The rest of this paper is organized as follows. Section 2 describes the basic image process method in the past. Section 3 describes the proposed method, including color statistic and experimental procedure. Section 4 describes experimental results. Finally, section 5 presents our conclusions.

Satellite navigation has been known as an efficient way of finding routes and being guided since it was introduced [1]. By adopting the city maps to the system, satellite navigation took a step into vehicles and

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acted as an efficient assistant to the drivers helping them find the best route to their destination [2]. Nowadays it is possible to find the shortest path between the location you are in (Origin) to the location you aim to go (Destination) [3]. With new technologies, and getting help from traffic monitoring cameras and combining the data with automobile navigation systems; finding the way with the least traffic that provides the fastest route for the users has become possible [4]. The two mentioned route assignments (shortest path and fastest path) have been greatly welcomed by the users and attracting more and more users every day. However, some needs still haven't been met with in the system.

One of the unfulfilled needs in Satellite navigation nowadays is the needs of tourists in new areas where they have no information about the tourist attractions and routes in the place they are visiting. In the traditional ways of getting around in new areas, the tourist had to find information about the area they travelled to, and then adopt the locations on the map, connect the points and then plan the journey. Having comprehensive information about the area is a key point in comfort and efficiency of the touristic journeys and as such journeys usually takes place in new and areas. Lack of enough information about the area is the biggest problem for the visitors which disturb the comfort of their journeys. This is the point where the necessity of new methods of getting information is felt. Information management enters the field of traffic engineering and the connection of these two lead to innovative suggestions.

## 2. Procedure of the Paper

This paper is divided into three main parts. In the first part a comprehensive survey has been done about the current situation of touristic journeys to find the weaknesses and the problems the users are face in their journeys. Their most important demands are recognized. In the second part, based on information management and traffic engineering science, the suggestions to the above recognized problems are introduced. In the third part a demo model of the way the system works is sampled and the conclusion of the paper is introduced.

## 3. A Survey on Current Situation

Before thinking about the solution, understanding the problem well, clarifying the current situation and knowing the exact weak points and users' demand seems to be necessary. In order to achieve such a step a survey has been done to identify the current situation. This survey has been done in Iran, and shows the current situation in this country, however, the simple adoptive and comparative study shows the situation in other countries of the world is somehow the same so the result of this survey can be in a way generalized to reflect the current situation in the other countries as well.

As the user of the system is the whole society and it is not limited to any specific age, gender or educational level, the participants have been chosen without any limitation. Participants from all categories have been chosen in order to have more accurate and extensible results. The survey is done in two forms of paper based and internet based methods by distributing a questionnaire. Since the questioners have been distributed and collected carefully, the response rate in the survey is 100%. Below are the chart and figures obtained from the survey.

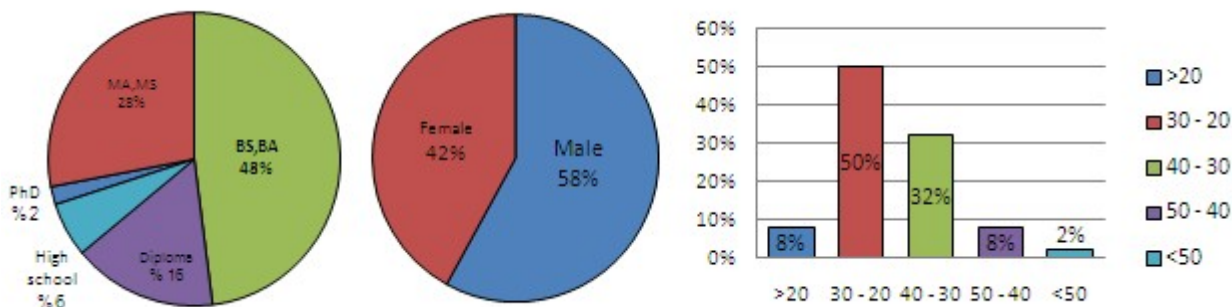


Fig. 1 – General information of participants

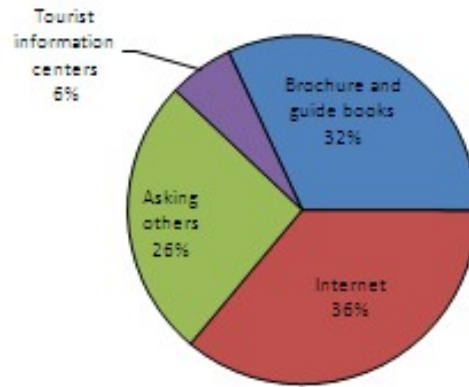


Fig. 2 – Current information sources for tourists



Fig. 3 - Information awareness of tourist attraction locations

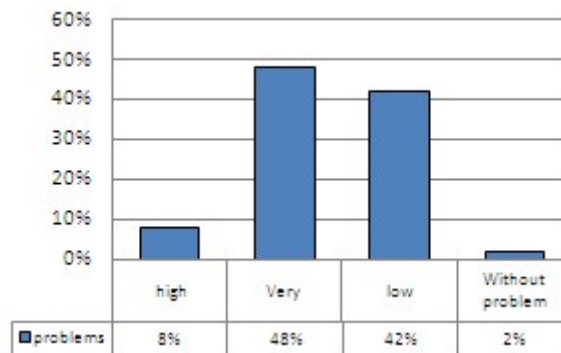


Fig. 4 – Percentage of problems the users are facing in current trend of informing

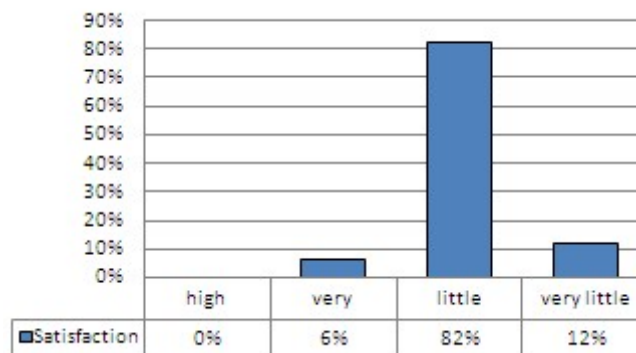


Fig. 5 – Percentage of satisfaction in current trend of informing

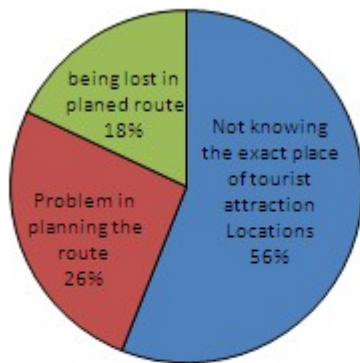


Fig. 7 – The main reason of time wasting in Touristic trips

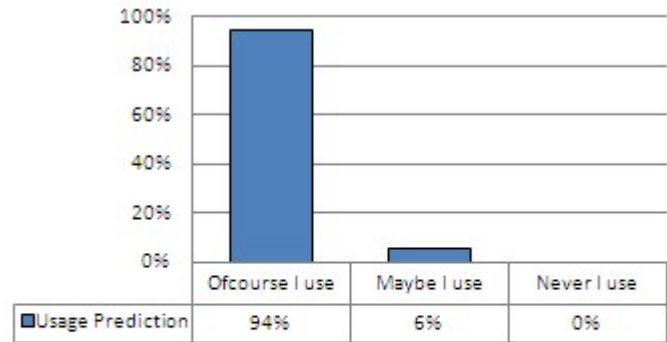


Fig. 6 – Prediction of using the automated IT based navigation system in touristic trips

According to the survey, most users don't have a good level of information about the tourist attractions in new areas and even in their hometown (Fig.3). Furthermore using the traditional methods of getting information about tourist attractions such as brochures and books which are costly and harmful for environment or obtaining information by asking others which is not an accurate method is still used by large number of people(Fig.2). As it is shown in Fig.7, lack of information about tourist attractions is the main reason of wasting time and disturbing the comfort of users. All the above statistics represent that one of the biggest problems the users face, is the way of presenting touristic information, so the first step that must be taken to facilitate touristic trips is providing efficient information through new ways.

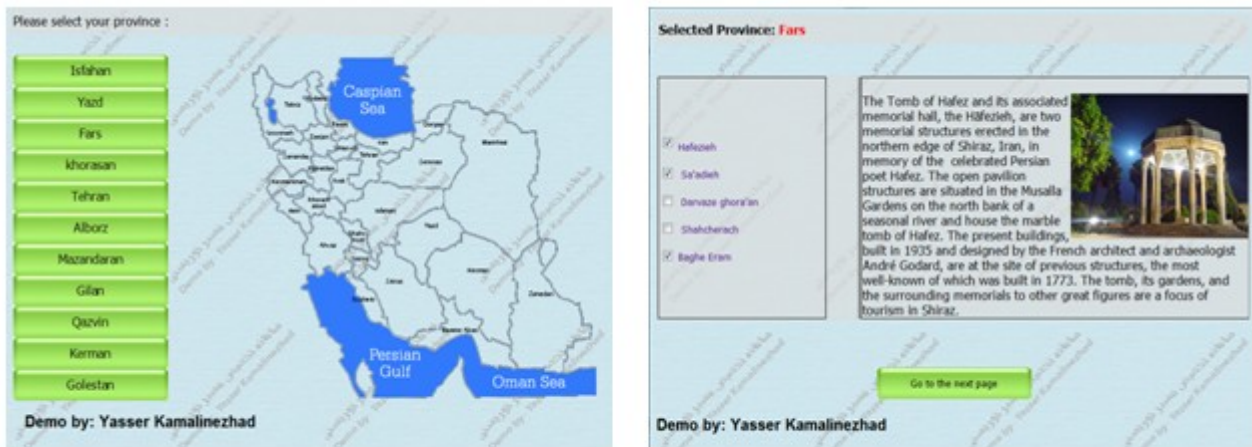


Fig. 8 - A demo of tourist attraction information system

The suggested solution in this problem is using a simple informative system which shows all the tourist attractions in the selected area that provides the user with brief information about each place. The users can then best find the desirable points without needing to have any information about the area in advance (Fig.8) After the user has defined the area he wants to get around in, the system detects the tourist attraction points in such area and shows brief information about each place. The user consequently selects the desirable points based on his interests. Then the coordinate of the selected points will be transferred to the GIS map which is linked with the system.

#### 4. The Suggested Algorithm for Route Assigning

After defining the desirable points on the GIS map through the above mentioned process, it's time to set up the system for assigning the best route for the user to best meet its needs. Most navigation algorithms start by defining the current position of the users and then ask for a destination. After the origin and destination

are defined, different algorithms are used to assign a route between these two points. However, tourist route assignment is totally different, as we don't have such unique destination. The algorithm suggested in this issue is a loop which crosses all the selected points connecting them disregarding where the user is. In another word such loop is formed based on the selected tourist attraction locations and it is not depended on the location of the user (Fig.9 ).

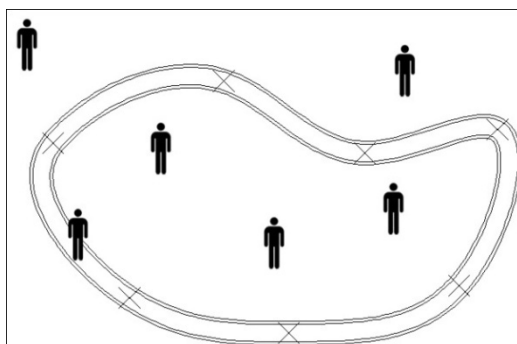


Fig. 6 – Loop assigning based on tourist attraction locations, regardless to user position

In this way, the route is not dependent to the location of user and different users in different locations with the same desirable points would have the same loop, and two users in the same location with different desirable points may have different loop.

After the loop is created, the current position of the user is detected by GPS satellites [5] and the shortest path between the current location of user and the loop is defined by using the shortest path algorithms [6]. Then the user is guided to the loop through the defined path and continues his travel in the loop. During the time the user is in the loop, his location is monitored by GPS satellites and he is supported by GNSS in order to make sure he is always in the correct path, avoiding any misleading. Any further information will be given to user during the path if needed.

## 5. A Sample Model

As the last part of this paper, a sample model of how the mentioned suggestions are linked to each other and work is presented. The sample is about Shiraz (A historical city in Iran with many tourist attractions). As the first step, the user defines the area he wants to get around, and then a list is presented to the user which lists all the tourist attractions in the defined area. The user selects his desirable points according to his favorites (Fig. 8 ) and then the coordinate of selected points is transferred to GIS maps. Then the GIS map which has already coded the streets and routes is now marked by the desirable points of user is presented (Fig 10-a).

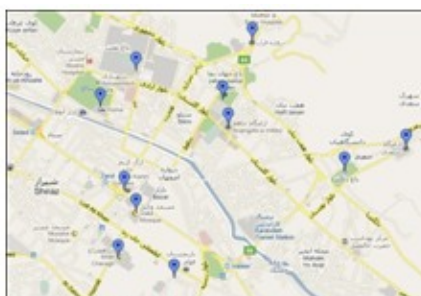


Fig. 10-a



Fig 10-b



Fig. 10-C

Fig. 10 – Sample model of how the suggested solution

Then a loop which crosses all the marked points is created regardless to the current location of user (Fig 10-b). Then location finding systems such as GPS technology detects the position of the user and by using the shortest path algorithms, the nearest route from the position of user to the loop are defined (Fig 10-c). Finally the user is guided to the loop through the shortest path and is accompanied and supported during the route by navigation system.

## 6. Summary

The results of the survey which was done in this research shows that the current trend of giving information to the tourist in their touristic trips is not efficient and needs to be taken into serious consideration. The innovation in this paper is joining information management and traffic engineering in order to solve the mentioned problem. This paper suggests an informative system in order to provide tourists with their required information and after this step, assigning the selected points to the GIS maps and directing the user through the shortest path to the loop which is crossing the selected points, so that the tourist who is visiting a new city wouldn't encounter any problem with obtaining his needed information and is directed and supported completely during his journey.

## 7. References

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