

# INTELLIGENT DECISION SUPPORT SYSTEM FOR TOURISM

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**Abstract:** This paper is case study of an Intelligent Decision Support System for Tourism Industry, which is a tour planning application to assist users for their leisure schedule. Firstly, the developed software provides the user a list of tourist places with specific interest of the user viz. the local culture, fairs and festivals, eco-tourism, art, craft & trade. Secondly, a planning module helps user to schedule the selected places from the list of recommended places according to his/her convenience. Finally the system prepares the final tour plan which has a detailed itinerary along with the list of recommended shopping list and accommodation options available..

**Keywords** – Intelligent system, expert system, decision support system, recommender system, Tourism

## I. INTRODUCTION

“Tourism” to the layman simply means going on a holiday, visiting friends and relatives or on a casual tour away from the hustle and bustle of routine life. However tourist places shelters not only attractions such as places of historic importance, museums, temples and sight-seeing but a host of leisure activities such as adventure sports, trekking and shopping as well. After two decades of economic liberalization in India, the horizon of tourism has extended itself further to new regions and new areas of tourist interest such as eco-tourism and socio-economic activities including cultural know-how. These diverse areas of specific tourist interest also help to promote national integration besides serving the purpose of national and regional economic development. Tourism industry is an unconventional and complex segment; where the development of the industry can happen only when there is positive participation of different stakeholders at the same time and also existence of coordination and collaboration at various levels. It can help the society not only at small level which can be quickly seen but also on big level by continuously contributing through large amount of revenue. Tourism is not only the reason of advancements in human abilities but the infrastructure created for it is utilised by other sectors as well.

Regarded as an economic sector, tourism has been defined as: “the sum of those industrial and commercial activities producing goods and services wholly and mainly consumed by foreign visitors or domestic tourists” [1].

For a diverse country like India; Tourism silently plays an important role in accomplishing the national objectives of national integration. At the same time it is also considered as

a major engine of economic growth. The Kumaon Region of Uttarakhand is one of the popular tourist sites of India. This region has sufficient tourist attractions like snow laden mountains, endless mountain ranges, the only lake district of India, adventure sports, country’s unsurpassed Tiger reserve, several glaciers, places of pilgrimage, to name a few. Although being a treasure trove of natural heritage, the Kumaon region attracts few domestic tourists and even lesser is the number of international tourists, when compared with other popular tourist destination of India like the Golden Triangle (New Delhi – Jaipur – Agra), Rajasthan, Kerala and even Himachal Pradesh [2]. Also, the twenty first century has extended the horizon of tourism further to new regions and new areas of tourist interest such as socio-economic activities and eco-tourism. In this regard a research project was undertaken to develop an intelligent decision support system called Intelligent System for Tourism Industry (IST) for this region. IST is a tour planning application which help users plan schedule of leisureliness.

## II. IST PROJECT

The Tourism Industry is an industry which based completely on information. And at the time of decision-making, only information about the product is available [3]. Traditional tourism technology is a major factor for the slow growth of the tourism industry [4]. Though enough information about the region is available from different sources, it is not in a directly usable form for a general

tourist. In order to escalate the number of tourist visits to this region there is an emergent need of a modern technology based Tourist Information System that would not only provide filtered information but also go beyond adding geographical parameter to some database query and take care of the tourist's itineraries before, during, and after their travels. IST Project (An Intelligent Decision Support System for Tourism Industry) is a step in this direction. The IST Structure is shown in Figure 1.

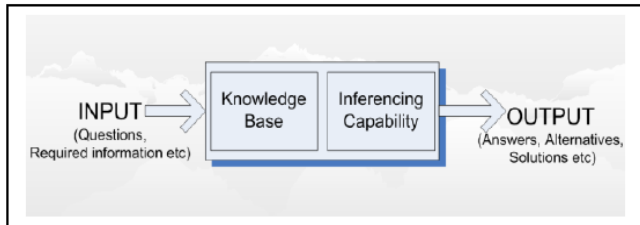


Figure 1. IST Structure

This paper tries to bring forward the approach adopted by the IST project; the basic structuring of the socio-economic content and the technical design of the IST portal are briefly sketched out.

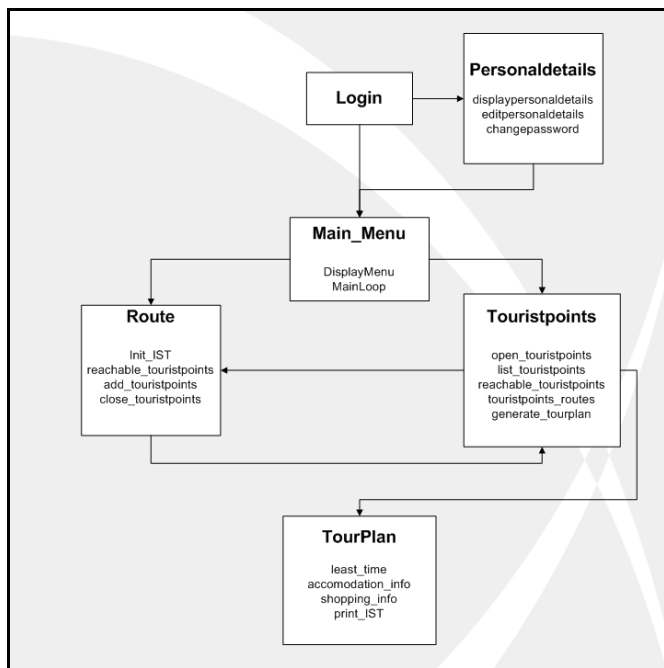


Figure 2: Architectural Diagram of IST

**A. Architecture of IST**

The prime component of IST is tourist place; the different modules as seen in the figure 2 work on the concept of tourist places. For the project 26 potential tourist places were identified from the region and different data were collected, analysed and stored which forms the knowledge base of the system.

**B. Technology Used**

The technology used to develop the Intelligent System is PHP and MySQL. At first the data collected through survey was compiled and analyzed. This was followed by

developing a well-structured and comprehensive Knowledge Base that was stored using MySQL.

The MySQL database being the most popular open source database worldwide was selected for its ease of use, high performance and high reliability. It also happens to be the database of choice for applications made using LAMP stack (Linux, Apache, MySQL, PHP / Perl / Python) [5]. On the other hand, PHP is one of the most popular general-purpose scripting language, used with HTML for Web development [6]. Because MySQL works very well with PHP, hence PHP and MySQL are excellent choice for the IST Project.

**C. User Interaction through Web**

The developed software is a web portal which can be implemented on a server and can be used by all the potential tourists. IST is a tour planning application to assist users frame their leisure schedule. Firstly, the developed system suggests the user a list of the tourist places with specific interest of the user viz. the local culture, fairs and festivals, eco-tourism and art, craft & trade. Secondly, a planning module helps user to schedule the selected places from the list of recommended places according to his/her convenience. Finally the system prepares the final tour plan which has a detailed itinerary along with the list of recommended shopping list and accommodation options available.



Figure 3. Interactive Web page of IST

**III.KNOWLEDGE BASE**

The knowledge base of the developed system comprises of the appropriate information designed in an organized manner which is essential for conceptualising and solving problems related with the tourists [7].

The various socio-economic activities of tourist interest of this region identified are categorized into three main categories [8] and are the basis of Knowledge Base of the System:

**A. Local Products**

Kumaon is a land of diverse culture that is reflected in the traditional and new crafts. Hand-made products by the local people with a unique touch of local skills are worth appreciating. The diverse art, craft and textiles identified in

this region are Aipan, woodcarving, wooden pots and boxes, metal ware, bamboo ringal craft, jewellery and ornaments, stone carving, woollen textiles, angora wool, pine bark craft and artistic candles. Beside handicraft Kumaon region is also engaged in trade of other products specific to this region. The entire region has fruit laden orchards abundant with apple, plum, peach, apricot, pears, oranges, berries, and other alpine fruits. It is also rich in mushrooms, honey, rhododendron, and other plants, shrubs and herbs that have medicinal effects. Local products also include masala, pickle, squash, jam, chutney, murabba, juice, aamla, canned peach, apiary honey, etc. Cosmetic products include olive oil, eucalyptus oil, face scrubs, etc. Tea garden is another attraction of the Kumaon Region. There are a number of tea gardens that yield high quality tea. This region produces organic orthodox tea and the tea produced here is of high flavour and export quality.

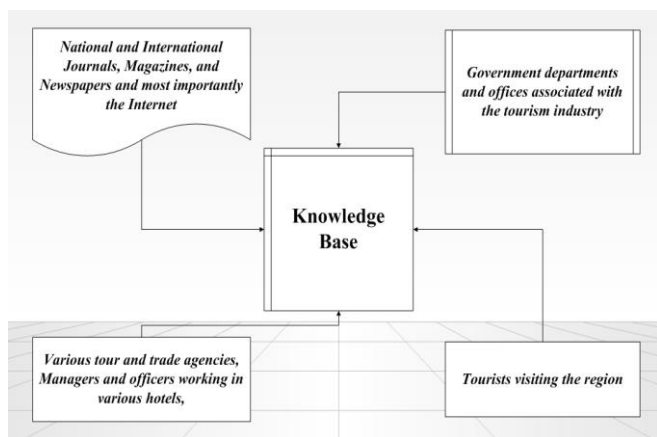


Figure 4: Inputs to Knowledge Base

**B. Local Culture**

Kumaon is also home to a number of fairs and festivals that are held in different places throughout the year. Some of the fairs are held for nearly forty days. These fairs and festivals depict the local culture, folk songs and dances. They are also a means of livelihood for the local people. The local culture and tradition of the region are also exhibited in a couple of local cultural museums. A couple of private businesses are also working for the preservation and conservation of the hill folk music, which also intend to promote new talent.

**C. Eco-Tourism**

Eco-tourism enhances the cultural and social uprightness of local people and helps formation of economic openings for the local communities. A large number of fascinating spots are there which are home to many rare animals, birds, butterflies and wild flowers (some of which have medicinal value). Jim Corbett National Park, Binsar Wildlife Sanctuary and Askot Wildlife Sanctuary are the places that depict the jungle life of this region. There are a wide variety of colourful and fragrant flowers, shrubs and trees. There are also over 300 different varieties of birds. However, bird sightings depend greatly on season, timing, and patience. Some of the other eco-tourism activities of the Kumaon region are paragliding, boating, canoeing, kayaking, river

rafting, skiing, trekking and fishing. Fishing can be enjoyed throughout the year except during monsoon, but only with permits from the State Government. Another attraction of this region are the hot water springs. Controlled intake of the waters of the hot springs under expert advice can be beneficial to health because of their mineral contents. Most of the countries have developed these natural resources into flourishing health resorts, popularly known as spas. The springs of Kumaon hold great promises of developing into similar resorts.

| Socio Economic Activities of Your Interest |             |          |                                     |                       |                               |   |
|--|-------------|----------|-------------------------------------|-----------------------|-------------------------------|---|
| Local Products                             |             |          |                                     |                       |                               |   |
| S.No.                                      | Place       | District | Name                                | Products Available    | Address                       | Contact(Phone / Fax / Email / Website)                              |
| 1  | Almora Town | Almora   | Kumaon Grassmoss Udyog              | Tender, Food products | Tara General Store, Pappatali | www.ikmora.in   |
| 2  | Almora Town | Almora   | Tea Board Regional Office           | Tea                   | Holiday Home (KMVN)           | Cottage No. C-2,3 and 4, Almora-263301                              |
| 3  | Almora Town | Almora   | Panchachuli Women Weavers of Kumaon | Tender                | Mall Road                     | www.panchachuli.com, e-mail: info@panchachuli.com, mob: 09456108486 |
| 4  | Almora Town | Almora   | Panchachuli Women Weavers of Kumaon | Tender                | Hotel, Shikhar, Mall Road     | www.panchachuli.com, e-mail: info@panchachuli.com, mob: 09456108486 |

Figure 5. IST recommends Socio Economic Activities of the region

| TOUR PLAN                     |                          |  |                             |              |
|-------------------------------|--------------------------|--|-----------------------------|--------------|
| DESTINATION                   | DISTANCE (approx in kms) | TRAVELLING TIME (approx in hrs & mins) | ARRIVAL DATE & TIME         | STAY TIME    |
| Kathgodam (Place of Arrival)  |                          |  | 24/12/2011 : 7Hr.           |              |
| Bhimtal                       | 22                       | 0 Hr 44 Min.                           | 24/12/2011 : 7 Hr. 44 Min.  | 1 Day 0 Hour |
| Almora Town                   | 63                       | 2 Hr 6 Min.                            | 25/12/2011 : 9 Hr. 50 Min.  | 1 Day 5 Hour |
| Haldwani (Place of Departure) | 86                       | 2 Hr 52 Min.                           | 26/12/2011 : 17 Hr. 42 Min. |              |

Figure 6: Generated Tour Plan

**IV. BENEFITS AND ADVANTAGES**

The Indicative benefits [9] from this new strategy are both tangible and intangible.

**A. Tangible benefits include:**

- Reduces the cost of printing tourist information brochures.
- Knowledge base results in standardization of tourism data.
- Better search and access record features

- Better in complex calculations.
- Better capability to comprehend data, useful for scheduling and decision making.

#### B. Intangible benefits include:

- Better quality of information.
- Increased tourist satisfaction.
- Better tourist decisions through focus on specific interests of tourist in knowledgebase.
- Development of rural tourism.

As regards the tourists, intangible benefits will outweigh the tangible benefits. It can therefore be analyzed that benefits from this new strategy will be more than offset the costs.

## V. CONCLUSIONS

The socio-economic activities of tourist interest of the hills call for full-blown recognition. The development of user-friendly technology providing intelligent guidance to the tourists will unveil this treasure and accelerate the development of the socio-economic condition of the local people. Focused and group efforts supported by the government should also be taken by the local communities to develop new initiatives for better and higher quality local products to attract more and more tourists. By highlighting the small and medium enterprises there is a possibility to draw interest of huge national and international tourists consequently giving way to sustainable development of this hilly region of India. In this way Uttarakhand Tourism Industry can expand its base and extend out to the masses of potential tourists, waiting for the right kind of information.

## VI. FUTURE WORK

The Intelligent Decision Support System developed for Tourism in this research project is a prototype which can be implemented on a full scale commercial website for socio-economic development of Kumaon region of Uttarakhand of India. The project can be further extended for entire state of Uttarakhand comprising of both Kumaon and Garhwal region of the state. The prototype can further be extended to include financial transaction for accommodation and local products.

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She has worked for a DST (Department of Science and Technology, Govt. of India) Project titled “Intelligent System for Tourism Industry”.

She is sincere and diligent and loves to train and guide young minds. Gifted with a curious mind, she strives for excellence at work and in research. She is a doer and a learner with positive attitude and gives importance to quality of work.



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