Smart Traveller System

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Abstract: *In order to provide reasonable as well as user-oriented result for this question, this model automatically observes famous and nearby places when someone visits some location and it will suggest useful information according to its current location, preferences, and past visits. Afterwards, the traveller guide allows for the user to provide feedback about each visit. The proposed solution is making use of machine learning techniques and recommendation systems to simplify the travel planning process for the end user. Various methods could be utilized to find patterns in given user's past behaviour or to find similarities and correlations between known points of interest. These smart systems could be used to give personal experience and suggestions for user. These suggestions could be dependent on their schedule, preferences and budget. Machine learning would also automate the travel, its planning process and make the finding of the new impressive places easier for wider crowd of people.*

Keywords: Random Forest, Bootstrap aggregating, Greedy algorithm, Bayesian algorithm for Information filtering, Smart information, Travel Information

1. Introduction

Normally Travellers have to do a research on a lot of websites to get important information and routes about the destination and this takes a whole lot of time, thus making it baffling. While tourists are travelling somewhere, many a times they don't have necessary information about the places thus having a tough time finding accurate destination as per their taste and budget.

The current system will take a lot of time to solve such problem. The traveller might have to restrict themselves into only few places to visit if they don't have enough time.

The proposed system is helpful for people that want to visit a place without having that much of information about it. The main idea is to design a system that is able to find information and route for that place using user criteria. It should also be able to estimate time needed to travel from one object to the nextand if a possibility is there, it should be able toadvise the traveller which bus line or other public means of transport may be used. It should also track the user's location using GPS.

To build an application, itshouldbe aware of the context and be assistive for the user, the concept of machine learning and predictive algorithms are needed. The application should update its suggestions, when it detects that the user is in a foreign country and connected to Wi-Fi-network. The current location and date would be used as a context, and it should automatically suggest activitiesbased on the past interests. More the travels made by the user, the more attractive recommendations should be made for the user. The chosen machine-learning algorithm should be able to recognize patterns in users' preferences and use these patterns, as base for the suggested points of interest.

2. Literature Survey

In the current system, the traveller has to search a lot of websites in order to get the information regarding the routes or about the particular place. Hence, in the current system, it will take a lot of time to get such information. The traveller might have to restrict themselves into only few places to visit if they don't have enough time. This system has no such functionality to find information about the place and its route using user criteria. We are not able to estimate the time required to travel from one place to another and know which bus line or other public transport to use in order to reach our preferred destination. It is difficult to find accurate location of the destination since the current system is not adapted to 'Global Positioning System' which tracks user's current location.

Features such as online forum which makes the system more user friendly and gives users a chance to communicate with each other for better feedback is also missing which should be added to make the system more comfortable to use. Also, the modification to furnish the specific requirements of the user is missing thus making it not a very user friendly.

Ref. No.	Key findings	Approach	Proposed Solution
[1]	Machine-learning, recommendation systems, data science. Techniques in Decision Tree Algorithm: 1.Random Forest, with n=5 Trees 2.Bootstrap aggregating or bagging with k=10 members 3.Greedy algorithm	To build an application, itshouldbe aware of the context and give assistance for the user, the concept of machine learning and predictive algorithms are required. The application would be required to update its suggestions, when it detects that the user is in foreign country and connected to Wi-Fi-network.	Categorical data is found out to be the difficult one to deal with Scientific Python libraries, and after pre-processing those values to numerical representatives, so rather than using numerical values, weshould use different values which are much easier to deal with.
[2]	Recommender system, machine learning, systematic review. Bayesian algorithm	Recommender systems (RS) are used to assist users find new items or facilities, such as transportation or even people, based on information about them, or the suggested	RS development lacks to study analysing in early stages, such as requirements and design, and at late stages, such as maintenance. Different open questions in these stages must be investigated to

		item. These systems also play an important role in decision-making, helping users to maximize profits or minimize risks	improve the knowledge about the field.
[3]	Tourist attractions EBM model Bayesian network ROC curve Google Maps. Phases of EBM 1)Problem recognition 2) Information search 3) Alternative evaluation 4) Purchase and post purchase evaluation	The primary purpose of this study is to suggest an Intelligent Tourist Attractions Decision Support System (ITAS) that has an intuitive and interactive user interface, combines CF-based data mining with the Google Maps API, and uses an ROC curve to evaluate the accuracy of the Bayesian network.	Continuation of this study can, with the same methods, extend to include information regarding accommodation to provide more comprehensive travel information.
[4]	Different Mobile devices recommendation, rating system Parameters- 1)c(center set)=NULL 2)KDE (Kernel density estimation) Mean-shift based GPS clustering	The system gives information about the preferred locations in the form of notifications and also provides the shortest path to reach the location. The application also provides information about the weather conditions of the location that tourist wants to visit and recommends him/her to take the suitable accessories according to the weather.	This system does not require machine learning. Due to this, new data is not updated, leading to the same dry results coming up and filtering produces the same results. Errors are also displayed sometimes due to multipath fading, which happens when a signal bounces off a building or terrain before reaching the receiver's antenna, and it also can reduce accuracy.
[5]	Information filtering, Intelligent information, Travel Information	Although there is numerous information provided on the web, the user gets confused in finding accurate data. In order to solve these web problems, the concept of semantic web comes into picture to have communication between human and computer. In this paper, we propose intelligent recommendation system	Since this paper takes the help of artificial intelligence, ratings given to places won't be suggested and so the same results will keep coming thus making the results cold. And hence, the proposed approach will be helpful in fetching good results.
[6]	Tourist Guide, Mobile Application, Web Application, Recommender System,	This Section presents the interpreted service architecture as well as the technologies used for the development of the different system components. The system is mainly comprised of a representational state transfer (REST) service with a data access layer which exposes a set of endpoints in order to be accessed by the client applications. Client applications are available as Web-based and Mobile applications.	Cold start or first-rater problem - which means that a new item added to the system cannot be suggested to any user until that item is rated. Scarcity - users tend to rate only a few items over the entire set, resulting in a very sparse matrix, i.e., a matrix with a high percentage of null cells. This compromises the ability of the systems at successfully locating neighbours, yielding bad suggestions. Good performances require that large number of people using this application have rated a very large number of items. Grey sheep problem - individuals whose opinions are unusual, rarely receive accurate suggestion.

Figure 1: Different Approaches and Solution

3. Problem Description

This system is useful for people that want to visit a place without having much information about it. The main idea is to design a system that is able to find a route and necessary information using user criteria.It should also be able to estimate time required to travel from one place to the next and if possible, it should also advise which bus line or other public means of transport may be used.It should also track the user's location using GPS.

Phase 1(Analysis and Planning):
We have taken reference of 6 literature survey papers that consist of knowledge including substantive data, as well as theoretical and methodological inputs similar to our topic. The reviews in these papers are secondary medium, and does not report any new or existing experimental work. It is associated with academic-based literature, and are found in academic journals. We have used the key date from these papers that add value to our project and elaborated them.

Phase 2(Design and Implementation):
The intelligent tree algorithm covers both **classification and regression**.As the name goes, it uses a tree-like model of decisions. To make sure that the front end (login forms and

the questionnaire) are related to the databases and function properly. Python will be used for coding the front-end

Phase 3(Testing):
To check if the data cleaning process works properly and try to use it with the GPS system to make sure thatrecommendations favouring the user's interests are given.

Phase 4(Deployment):
Application of the cleaning process and making sure the user's forum works properly.

3.1 Features of the project

Following functionalities are included in the project:
- Login and register: User should enter his/her information and should be able to use the services provided by our website.
- Interactive questionnaire: Series of questions are asked to find out where the user's interest is.
- Personalization: Gratifies to the specific needs of the user and makes it user friendly
- Location tracking- When the user logs in to our site, his current location is automatically tracked using GPS

enabled system, based on which nearby places are recommended to him**.**

- DataCleaning: With the help of machine learning, places interested and recommended by the previous users stored in the online database will be activated for the next user based on similar interest
- Online forum: Not only do they help in collecting useful feedback but it also helps the user in listing out some of the places he would like visiting.

3.2 Proposed Methodology

The Proposed methodology is illustrated in Figure. It contains following steps: -
- Data Extraction
- Data Preprocessing
- Data Integration and Transformation
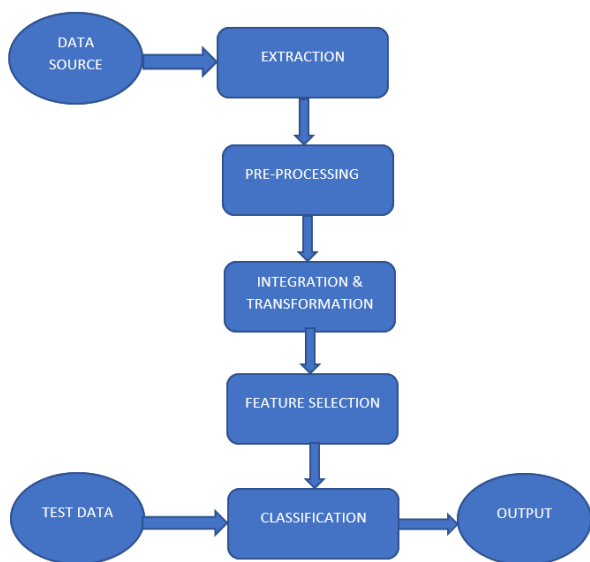- Feature Selection
- Classification

Figure 2: Proposed Methodology

3.3 Feasibility Study

- Technical Feasibility – The system will operate on Web Browser. The system will be completed using python, python framework, and web technology as required. Proven and approved mature technologies to give the proposed solution. It works on different platforms which supports python.
- Economic Feasibility– This system has the performance ability to find a route using user criteria. We are not able to estimate the time needed to travel from one place to another and know which bus line or public transport to use in order to reach our destination from the existing systems. This minimizes the cost of a tourist guide and the effort required to look for places in a new city.
- Legal Feasibility-The project is advancing under legal license of windows, python and other software's required. The data will not be used for some illegal work and will be used for making the news relevant to other users as well as for publisher for making under certain compulsion. Data will not be misused or misguided under any cause.

- Operational Feasibility -An analysis of the process indicated that the proposed Machine Learning for Online Tourist System should be beneficial for news publisher to monitor the development and improvement in the future article content and also to the users to view and read the relevant content.
- Social Feasibility-All users have to go to the place where the system is there. Because of such reasons, the system affects the existing culture of the user. And itwastes a lot of time. Though it can also be a reason to avoid this system. People do not have any method to analyze old and new products. The system equips this facility to users.

3.4 Flow Chart

The following flow chart shows the collection of raw data from online archives and training the data using different machine learning algorithm like random forest, decision tree, KNN.
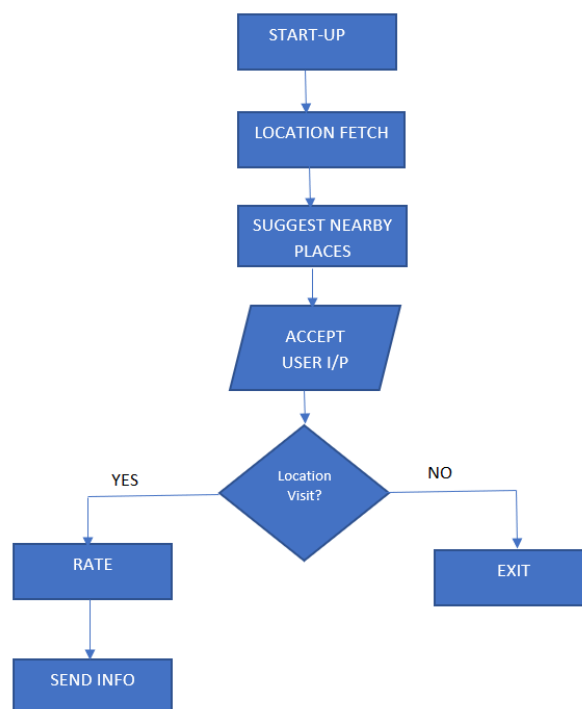

Figure 3: Flowchart

4. Results

In proposed system, the user will have to start the application in their mobile or any other devices they are using. They can get every important information related to the places they wish to visit. The searching mechanism and finding up of relevant path feature is the preferred one, this smart traveller information application contains.

Phase 1.1: Planning
- Introducing the statement of work, scope definition and scope boundary for devising the prototype from problem definition to determine what needs to be done and what's not to be done.
- Finalizing each and every condition and demands with the customer.

Phase 1.2: Analysis
- Finalizing the synopsis, literature survey and feasibility study for theeffective solution which will act as an input data to the design phase.

Phase 1.3: Design
- Proposing network architecture for the website and its modules to complete the case studies and synopsis.
- Creating a communicative questionnaire for determining user's query

Phase 1.4: Coding
- Various modules will be created.
- Creating the front-end using HTML,CSS and Python.
- Creating the Back-end using SQL.

Phase 2.1: Integration
- Developing the various modules of the proposed solution to combine them into a prototype.

5. Conclusion

Machine Learning (ML) uses machines to automate human learning and allows computers to analyze and gather knowledge from the real world, and raise performance on some tasks depending on this new knowledge.

This system understands and solves all problems of the users just by asking some questions. And it provides three best options that fit into user's requirements along with the place details and facilities. It saves their money and ample time in finding and contacting a travel agency where they charge more.

This application provides suggestions to the tourists of the nearby locations worth visiting automatically without any need to search for the locations. This system provides information about the places in the form of notifications and also provides the nearest path to reach the destination location.

So basically, this application provides authenticate recommendations according to user preferences and gives the other's users feedback and can even communicate with them using the online forum

References

[1] J. Kämppa: "Recommendation systems in the context of tourism." (2016).
[2] I. Portugal, P. Alencar, D. Cowan D: The use of machine learning algorithms in recommender systems: a systematic review. (2015)
[3] Hsu, Fang-Ming, Yu-Tzeng Lin, and Tu-Kuang Ho. "Design and implementation of an intelligent recommendation system for tourist attractions: The integration of EBM model, Bayesian network and Google Maps." *Expert Systems with Applications* (2012).
[4] S. Walunj, P. Bhalere, Y. Bhaidkar: "Machine Learning Based Tourist Place Recommendation System"(2016)
[5] C. Choi, M. Cho, J. Choi: "Travel Ontology for Intelligent Recommender System"(2009).
[6] A. Umanesta, A. Ferreria, N. Leita: "(GuideMe) A Recommender system with social interaction"(20