INTELLIGENT TRAVEL PLANNER (FOR AUTOMATION IN TRAVEL PLANNING)

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Abstract: User specific results are quickly becoming a norm in almost every industry. Intelligent travel planner aims to bring user specific results to a new pinnacle in the travel industry using a combined application of Artificial Neural Networks (ANNs) and Fuzzy Logic. Artificial Neural Networks is an AI technique which emulates the human brain by learning from inputs and adapting accordingly .A demonstration with one hidden layer is used for implementing an importance based system. Fuzzy logic rules are utilized to ensure smoother decisions.

I. INTRODUCTION

Travel websites are frequently accessed by the masses in order to plan trips and check out reviews of locations, however, they do not completely automate the process as users have to first choose a destination. The idea behind Intelligent Travel Planner is to utilize artificial intelligence to understand every user's preference and then suggest places that they might like to visit, thereby increasing their probability to book a trip using the system. A personalized system provides specialized results allowing to cater to a much wider variety of users. A system is created which generates a preference schema for various types of choices available to the user based on the user's interactions within the website. Artificial neural networks is used to do so as it quickly adapts to changes in the user's behavior and adjusts the preference values accordingly. Fuzzy logic is then used to utilize the calculated preferences in a much more lenient manner and displaying results to the user.

II. NEED OF PROJECT

In the existing system travel websites do not in any way help the users to choose a destination without input, i.e. the current system is not yet automated. Many users visit said websites but log off quickly due to indecisiveness about the location. Bringing AI to help in customer facing applications such as travel management would provide with a substantial increase in the revenue from existing traffic. Furthermore it will also save a significant amount of user time as the entire process will be automated. By using the unique Artificial Intelligence engine, every new search or every new trip planned will have a refreshed set of suggestions which will aim at minimal user input requirement. Hence, one of the needs of this project is to minimize the number of times a user has to enter the details or the options for planning his/her travel.

III. LITERATURE SURVEY

We have referred the following papers for our project:

1. David Camacho introduces a MultiAgent Planning System to Solve Web Problems in the e-Tourism Domain. It is a system which used multiple types of intelligent agents to cooperate with each other, learn, plan and share knowledge between agents. The process to obtain, filter, and store the information is performed automatically by agents. This information is translated into a homogeneous format for high-level reasoning in order to obtain different partial solutions. Partial solutions are reconstructed into a general solution (or solutions) to be presented to the user. The system will show a set of solutions to the users that can be evaluated by them.
2. Gary Haq designed a system for Personalized Travel Planning in the State of New York. It recognized various factors such as traffic, nearest route, tolls and vehicle type to determine which path would be ideal for transit from point A to B.
3. For training our neural network module, we have adopted an algorithm from Multiplicative Weights update Method: A Meta algorithm and applications by Sanjeev Arora.
4. Codeproject.io has an extensive report on neural network which we have referred to create a basic design of our neural network architecture. Neural networks demystified was also a source of invaluable knowledge.
5. Calvin.edu has numerous articles on fuzzy logic which also proved valuable in implementing the same for our system.

IV. METHODOLOGY

A. User Reqirements:

Should have basic understanding of operating a computer and a web browser, preferably Google Chrome.

B. System Requirements:

Hardware requirements:

- Any computer/smartphone/tablet with access to the internet

Software requirements:

- A web browser
- PHP framework 3.0
- MySQL database

V. WORKFLOW

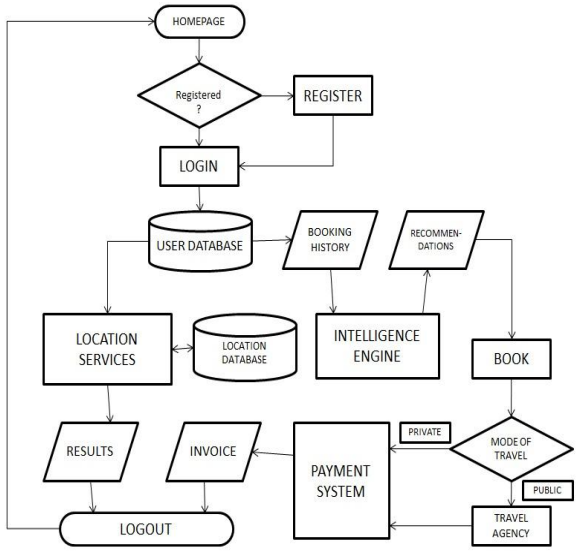

Fig 1: Complete workflow of the system

The Work Flow structure consists of the following broad sections:

A. Registration and Login section:

The customer may register themselves or login to the website whenever they want using their login ID and password.

B. Databases:

The Intelligent Travel Planner maintains exclusive databases for various activities. Some of which are maintaining a list of locations the user has planned the travel for and another database containing different areas of travel along with the various sub details of each location.

C. The Intelligent Engine:

This engine is the core of the system. It keeps a stringent log of user history, negative feedback and gives appropriate outputs regarding the same for the next travel plan.

D. Location Services:

This unique feature facilitates the customer with the whereabouts and details about all the hospitals, hotels etc. of the location he/she is at.

E. The Payment System:

The payment system enables the customer to make transactions over a secure server.

VI. ARTIFICIAL INTELLIGENCE ENGINE

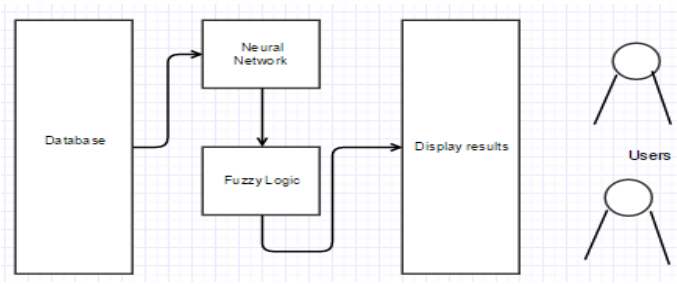

Fig 2: Breakdown of the AI engine into key modules

The Artificial intelligence Engine works mainly on two modules, the neural network module and the Fuzzy logic module. The neural network module gathers input from the database, modifies it to minimize errors and then passes it onto the fuzzy logic module. Once the fuzzy logic module receives this data, it creates a smooth curve and leniently displays all results.

VII. NEURAL NETWORK MODULE

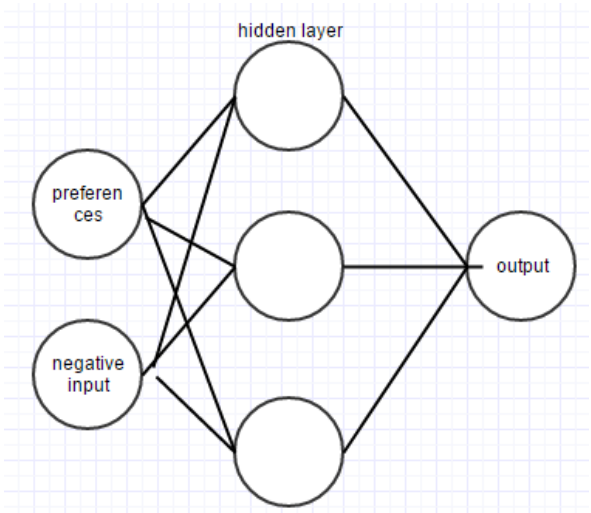

Fig 3. Architecture of the system's Artificial Neural Network

For the system architecture, we have considered a neural network architecture with two input nodes, one hidden layer with 3 calculating nodes and one output layer. The input nodes are realized as a matrix and multiplied with weights across each synapse. Each node has a sigmoid activation function which sends its output to the consecutive node. The output node accepts results from hidden layer as input, applies one final activation function to it and then provides an output. This part is called forward propagation.

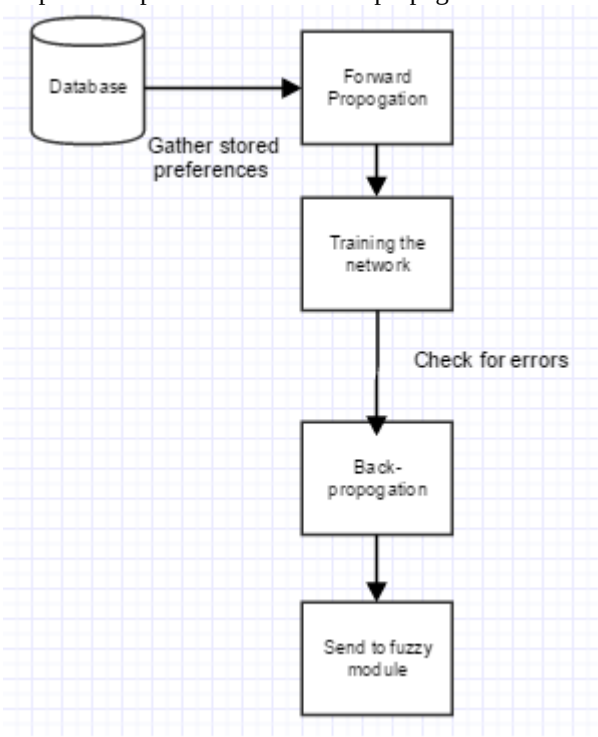

Fig 4. Neural learning procedure

Once forward propagation is complete, the network is trained by minimizing the cost function, i.e. the function which multiplies all output from a node with its corresponding synapse. This minimized form is used for training. The current output of the network is compared to the expected output and the difference is distributed amongst the nodes in a way that the nodes that contributed the most to the output are adjusted the most. This is called back propagation. Once back propagation is complete, the output is sent to the fuzzy module for further processing. The fuzzy module accepts the output from the output node of the neural network and then decides on the order to display results according to relevance, omitting all results it deems irrelevant.

VIII. CONCLUSION

Using neural networks to learn more about preferences of every user has greatly improved the accuracy by which it predicts places the user would love to visit. Addition of more hidden layers will result in a deeper learning by the system and would be worth the effort in the future, provided that the database is extensive.

Acknowledgment
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