Intripid: Road Trip Optimizer

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1 INTRODUCTION

Intripid is a system that provides the user with the optimal road trip route, combining user interaction, data visualization, and a greedy algorithmic approach to optimize time, cost, and enjoyment.

(1) Provide a web service that optimizes personalized road trips for users, recommending points of interest, keeping within time limits, and minimizing gas cost.
(2) Individual research has been done on the topics of route optimization, tourist site recommendation, and calculating the beauty of a route. The limit of these approaches is that they lack scalability and personalized user interaction.
(3) Intripid utilizes the Google Maps, Yelp, and Flickr APIs for route optimization, tourist site recommendations, and scenic route calculates, compiling all into one simplistic user interface.
(4) Intripid is useful for anyone planning a road trip.
(5) Intripid will reduce time spent trip planning, reduce gas costs, and provide the user with enjoyment. User studies measure the success of Intripid. People familiar with the area will give feedback on the efficiency and accuracy of routes.
(6) No risks are present. Payoffs include an easily monetizable product and technical skills gained.
(7) No costs exist besides time.
(8) Intripid will be completed in seven weeks.
(9) The midterm check for success is accurately planning a route that integrates API metadata. The final checks for success are customizing user profiles and creating a comprehensive user interface.

2 SURVEY

2.1 Trip Optimization

Johnson et al.'s approach calculates three routes which optimize simplicity, safety, and beauty [8]. In particular, the beauty route selects routes near scenic areas rather than highways. We will apply this to Intripid by analyzing the popularity of nearby geotagged photos using the Flickr API. Johnson et al.'s algorithm does not provide an interactive UI, which we will include in Intripid.

Quercia et al.'s scenic routing algorithm selects the path with the highest beauty rating based on Flickr metadata in London and Boston [11]. Participants from the two cities confirmed the validity of the algorithm's output. This will benefit Intripid since we are unable to do in depth user studies. We will also improve upon this approach by generalizing it to all cities in the United States.

Bao et al. proposes a shortest path algorithm where optimal route minimizes total distance and maximizes the popularity score of attractions [3]. This article is useful since it highlights the effectiveness of the greedy strategy for selecting popular attractions. We will improve upon this approach by weighting attractions based on the ratings and reviews from Yelp.

2.2 Gas Mileage

Allstate Insurance has patented a server for vehicles that optimizes gas mileage by suggesting specific refuel locations along a given route while taking into account user preferences [9]. This server will be helpful to Intripid by highlighting some crucial variables used. It can be improved upon by relying less on data and more forecasting for gas prices.

Eveland expands on Allstate's patent by generalizing the intermediate stops such as gas stations, restaurants, and hotels, while forecasting gas prices [5]. Intripid will implement a similar forecasting procedure, improving upon the generic intermediate stops by accommodating user-inputs.

Halbey et al. focus on the use of electric vehicles for long distance trips and the absence of a recharging schedule optimizer [6]. The article shows that the network for long-distance electric vehicle travel is too limited to have a reliable model. Intripid has the opportunity to develop a recharging schedule but will be cautious as most of the limitations are due to non-available resources.

2.3 Low-Cost Vacationing

Crompton found seven main motivations for a pleasurable vacation [4]. This paper is useful as Intripid can use these motivations to build recommendations that will improve vacations. The shortcoming of this paper is lack of quantitative data, which Intripid could generate by finding travelers' most common destinations and activities.

Francken and van Raaij discuss the effects of the decision of vacation location and activities on overall satisfaction, finding that 68% of travel preferences align with Intripid's goals [12]. Furthermore, they found that people still want to travel in tough economic times, meaning there is a market for Intripid. A shortcoming is that this paper was published 30 years ago. While the data may be dated but we will use its core ideas to improve Intripid.

Pan and Fesenmaier researched how people plan and find information related to a vacation online [10]. This information is useful in planning the design of Intripid in determining what information should be made available for travelers. A shortcoming is that their research focuses solely on activities in a predetermined destination, whereas Intripid is additionally concerned with building a comprehensive itinerary.

2.4 Site Recommendations

Cyberguide is a multi-functional mobile tour guide that utilizes several emerging technologies [1]. This article is helpful providing potential useful features such as visual and verbal interfaces. The shortcomings are in its limited availability, basic UI, and inability to effectively store data.

Intrigue is a web application that recommends tourist sites based on their travel preferences [2]. The most helpful aspect of this article is its support of a numeric calculation for rating a tourist attraction. This service gives recommendations based upon one location, where we will give recommendations based upon all locations on a planned route.

Huan presents a way to calculate best attractions for a potential tourist based upon a user's travel history [7]. This article will make the attraction recommendation more robust by recording where travelers go on their trips. However, the user interface is outdated, which we will improve upon with a modern UI.

3 PLAN OF ACTIVITIES

All team members contributed a similar amount of effort. Sarah worked on building the routing algorithm. She will test this on local routes, ensuring validity before expanding to the entire United States. This will take three weeks. Erik collected datasets for gas prices, campgrounds, and official scenic byways. He will integrate these into a SQLite database that will link to our UI, taking one week. Nick has created a basic web interface which will become the interactive UI. This will take Nick five weeks. Will has gathered API keys for Google Maps, Yelp, and Flickr. He will work with Sarah

for four weeks to integrate appropriate requests into the routing algorithm.

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