A Novel Approach for Utilising User Profiling Within the Automated Tourist Trip Design Problem

Liam Attard [0299300L]
Department of Artificial Intelligence
University of Malta
liam.attard.18@um.edu.mt

Abstract—**lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.**

Index Terms—**tourism,itinerary, user-profiling.**

I. INTRODUCTION

A. Problem Definition

Producing an itinerary before a trip can be a demanding task which requires a substantial amount of research. Many times people rely on travel books, individual travel blogs and online websites to form a holiday plan, but these are not always tailored according to the traveller's preferences and opinions [1].

This paper focuses on creating a system which helps tourists automate the process of travel planning. An adequate automated trip planner application would consist of two parts,

1) the retrieval of user preferences
2) the generation of a custom itinerary

Numerous systems are available and therefore building a working prototype is both possible and feasible [1]–[11]. Although these systems automate the process of producing the itinerary, they require a lot of end-user data and preferences to form a personalised itinerary. Can the user preference gathering be automated?

Given the amount of information a single user holds online, it is possible to automate and help the process of gathering personal preferences [12]. A deep learning model could be trained to classify a person's social media profile to determine what the user wants from a trip. This information alongside other parameters such as the user's budget and trip length could give out a very accurate personalised holiday plan.

B. Motivation

The immense amount of data generated by each user online [13] was the main motivation behind using this advantage in creating a unique system that benefits tourists by implementing something easy to use and does not bombard them with a lot of extra questions. Although planning itineraries can be a complex problem [9], if the users allows the system to gather preferences based on their social media profile, preferences can be collected automatically based on his posts.

C. Why the Problem is non-trivial

User Profiling based on social media has been an essential part of Personalized advertising. The advertisers can target their customers more accurately and earn more sales per viewer [14]. However, this paper aims in using such a technology to implement a different approach in automating the preference gathering.

D. Aims and Objectives

The aim of this project is to quickly generate a personalised itinerary by making use of preferences and parameters.

This system will aim to achieve the following Objectives:

1) Collect social media images to form a training and testing set which will be categoriesd by the activity. These can include images associated with events such as, nature, beach, sports, food, bars and clubs.
2) Design a model that classifies the images correctly.
3) Define a user profile based on the social media collection results and additional parameters.
4) Gather a list of places available and form scores for each activity based the user's parameters.
5) Generate quickly multiple itineraries each with different score levels.

II. BACKGROUND RESEARCH AND LITERATURE REVIEW

Several studies both on user profiling and on real-time automatic trip itinerary generation have been carried out throughout the years.

A. Automated Trip Systems

Sylejmani et al. [2] have defined the Tourist Trip Design Problem(TTDP) as part of the Orienteering Problem(OP). OP problems contain a number of nodes each containing a score and try to solve the path containing the maximal score constrained with parameters such as time and budget [15]. There are many solutions to this problem which will be discussed chronologically in the next section.

Dunstall et al. [9]

B. User Profiling for Travel Preferences

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