Automatic User Profiling for Intelligent Tourist Trip Personalisation

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ABSTRACT

The objective of holiday activity planning is to maximise the traveller's enjoyment during such trips by selecting the right places to visit and things to do according to the person's preferences. This process involves preparing information from various data sources, which is often very time-consuming. This project presents a tourist itinerary recommendation algorithm that assists users by autonomously generating a personalised holiday plan according to the user's travel dates and constraints. Furthermore, the system automatically builds a travel interest profile from the user's social media presence, which is then used to recommend itineraries tailored to the user's interests. The system uses social media APIs from popular platforms such as Facebook and Instagram. With the user's permission, the system gathers information such as pages the user likes and pictures posted by the user.

A Convolution Neural Network is used to classify the user's pictures into their respective travel category, such as Beach, Clubbing, Nature, Museums or Shopping, which is then used to determine the user's predominant travel interest topics. A Resnet-18, Resnet-50 and Keras Sequential model are validated separately on a testing dataset to see which one works best. This computed travel profile of a user takes the form of a weight vector, which is then used to generate an automated itinerary that fits the user's preferences and travel constraints.

This weight vector is used to formulate a personalised objective function used by various meta-heuristic and evolutionary algorithms to optimise the plan. The algorithms consider hard constraints such as holiday dates, distances between places, and soft constraints (preferences), such as the interests and the user's preferred pace. This dissertation compares Particle Swarm Optimisation and Genetic Algorithms, and they are evaluated for both their plan quality and performance.

Since the results are highly personalised, the system was packaged into an application that allows users to connect with their social media accounts, build a personalised travel plan for a holiday in Malta, and ask the user to assess the plan's quality with respect to personal preferences and activity pace. The user is also asked to assess a more generic holiday itinerary without specification of the generated plan, in order to assess the effectiveness of the personalised holiday planning algorithm.

Categories and Subject Descriptors

H.4 [**Information Systems Applications**]: Miscellaneous; D.2.8 [**Software Engineering**]: Metrics—*complexity measures, performance measures*

General Terms

Theory

Keywords

ACM proceedings, LaTeX, text tagging

1. INTRODUCTION

2. THE *BODY* OF THE PAPER

2.1 Citations

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3. CONCLUSIONS

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4. ACKNOWLEDGMENTS

This section is optional; it is a location for you to acknowledge grants, funding, editing assistance and what have you. In the present case, for example, the authors would like to thank Gerald Murray of ACM for his help in codifying this *Author's Guide* and the **.cls** and **.tex** files that it describes.

5. REFERENCES

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APPENDIX

A. HEADINGS IN APPENDICES

The rules about hierarchical headings discussed above for the body of the article are different in the appendices. In the **appendix** environment, the command **section** is used to indicate the start of each Appendix, with alphabetic order designation (i.e. the first is A, the second B, etc.) and a title (if you include one). So, if you need hierarchical structure *within* an Appendix, start with **subsection** as the highest level. Here is an outline of the body of this document in Appendix-appropriate form:

A.1 Introduction

A.2 The Body of the Paper

A.2.1 Type Changes and Special Characters

A.2.2 Math Equations

Inline (In-text) Equations.

Display Equations.

A.2.3 Citations

A.2.4 Tables

A.2.5 Figures

A.2.6 Theorem-like Constructs

A Caveat for the TEX Expert

A.3 Conclusions

A.4 Acknowledgments

A.5 Additional Authors

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A.6 References

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