Visual Analysis of Travel Route Recommendation

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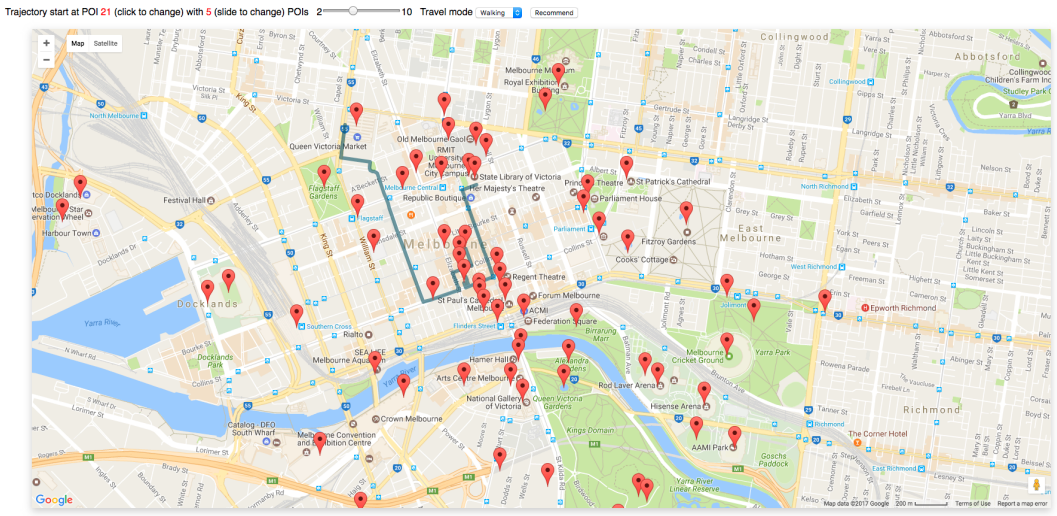

Figure 1: Travel route recommendation visualisation system. Given a starting POI and a number of POI to be visited, the system suggests a set of routes from a history of previous tourists.

ABSTRACT

We propose a novel travel route visualisation tool.

CCS CONCEPTS

• **Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; • **Networks** → Network reliability;

KEYWORDS

ACM proceedings, LaTeX, text tagging

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1 INTRODUCTION

Sequence ranking has emerged as an important tool for solving diverse problems such as travel route and music playlist recommendations. Unlike the classical ranking algorithm where each item considers independently, the sequence ranking algorithm requires modelling a structure between items and suggests a set of items as a whole. For example, let us consider recommending a trajectory of points of interest (POI) in a city to a visitor. If the classical ranking algorithm learns a user's preference for each individual location while ignores the distances between them, the algorithm may create a long trajectory, which should be shorter in optimal routeing. Several sequence ranking algorithms are proposed to solve the problem and achieve relative success to compare with the classical algorithms. An important challenge remaining is how to visualise the recommended sequences so that a user can understand why the sequences are suggested.

In this paper, we tackle the problem of sequence visualisation, especially, in the context of a travel route recommendation. We first formulate the sequence ranking algorithm as a structured recommendation problem, and then we develop a novel visualisation engine that efficiently distinguishes differences between suggested routes as well as a variation of POIs within a suggested route.

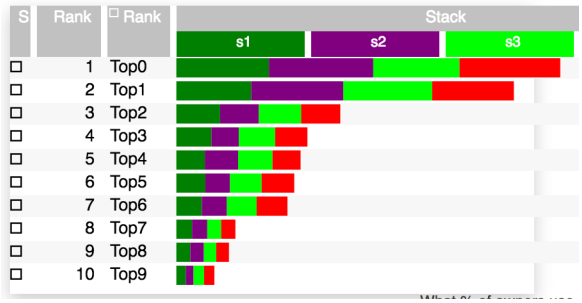

Figure 2: Visualisation of feature score for each trajectory.

2 STRUCTURED RECOMMENDATION

We first cast the sequence recommendation as a structured prediction problem, which allows us to leverage the well-studied literature of structured SVMs (SSVM) [3, 6]. There are two obstacles to prevent us applying the SSVM directly for the sequence recommendation problem; first, there would be multiple possible routes among a set of POIs, second, a naive application of SSVM would generate repeating sequence in the prediction time. To eliminate possible loop in a prediction time, we apply serial list Viterbi [4, 5] algorithm. We finally trained our model on the trajectory data extracted from Flickr photos [1].

From a visualisation perspective, an important advantage of the SSVM is the explicit representation of feature score in its final decision process. Especially, in our case, we can disassemble the final score of a route into feature scores of each POI and each transition between two adjacency POIs. We hand-crafted POI features such as the category, popularity, average spending time of previous tourists, etc, and also crafted transition features such as the distance between two POIs, .

3 VISUALISATION

The Figure 1 Break total score into individual feature score, represent using stacked bar graph.

Comparison between two POIs in a single trajectory. Further comparison of POIs within a single trajectory, we use radar chart to show the score of each feature.

We further provide a tool to analyse an internal variation between multiple POIs in a single route. Figure 3 shows the feature scores of two POIs in a single route via a radar plot.

Stacked bar plot [2]

4 CONCLUSION

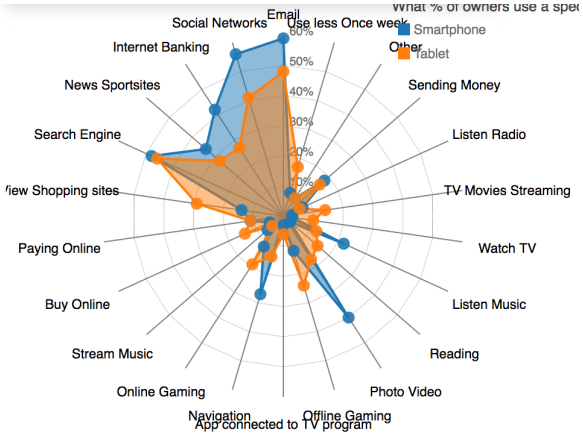

Figure 3: Visualisation of feature score for each POI within a single route.

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