

A Framework for Comparing Interactive Route Planning Apps in Tourism

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Context & Motivation

Tourist Itinerary Planning - is the problem of recommending travel itineraries to users. Given a destination and a duration the system would generate a sequence of locations to visit.

Existing work focuses mostly on two things

- Making the model more rich - weather, transportation information.
- Finding efficient heuristics for solving these models.

Problem Description

In order for the system to generate a personalized recommendation it has to elicit the user's preferences.

Typically these systems require explicit ratings for POIs or categories to understand the user needs.

We believe that the interactive presentation of recommendations can aid in preference elicitation process.

Research Question

What novel interactive techniques can be used in tourist itinerary planning systems ?

Exploratory Study

We adapted the 12 guidelines for recommender systems from Pu et al. 2011 into 7 interactivity criteria.

- C1 – Flexible Expression of Preferences
- C2 – Example-Based Preference Elicitation
- C3 – Preference Lookahead
- C4 – Conflict resolution
- C5 – Trade-off Transparency
- C6 – Result Presentation
- C7 – Explanations

POI and Tour level preferences

Tours are composite objects consisting of Points of Interest (POI) objects. We want to distinguish between tour and POI level attributes:

- Tour level attributes - budget, total transportation time.
- POI level attributes - categories of POIs, location.

Therefore for all 6 criteria we distinguish support for POI level (P) and tour level (T).

C1 – Flexible Expression of Preferences

- **POI-Level Preferences:** mandatory POIs and category preferences can be incrementally elicited instead of requiring all of them up-front.
- **Tour-Level Preferences:** up-front the system does not require any tour-related preferences apart from the destination itself.

C2 – Example-Based Preference Elicitation

- **POI-Level Preferences:** the system should suggest potential POIs to include in the tour.
- **Tour-Level Preferences:** the system should show *several* examples of pre-built tours.

C3 – Preference Lookahead

- **POI-Level Preferences:** consider showing the user POIs from categories the user did not consider to evaluate.
- **Tour-Level Preferences:** suggest a sequence of POIs that represents a partial tour, to which a user could add more POIs to complete it.

C4 – Conflict resolution

- **POI-Level Preferences:** when displaying/recommending a POI show how this POI matches and/or violates specific constraints.
- **Tour-Level Preferences:** in case the user has expressed preferences for an infeasible tour, still give him a tour suggestion with an explanation how this suggestion violates their preferences.

C5 – Trade-off Transparency

- **POI-Level Preferences:** show differences of POI level attributes.
- **Tour-Level Preferences:** show how different tours share the same POIs and which POIs are different between them.

- **POI-Level Preferences:** for mobile displays show only a few individual POIs, but for desktop clients show a large ranked list of POIs.
- **Tour-Level Preferences:** for mobile displays show only one tour at a time as a recommendation, but for desktop clients show several tour recommendations at the same time.

- **POI-Level Preferences:** explain how the POIs match preferences. Show POI scores and highlight mandatory POIs.
- **Tour-Level Preferences:** explain how the tour matches preferences.

Academic systems

We selected systems for evaluation from the Scopus database. We reviewed the top 200 papers ranked by citation and selected 7 systems for inclusion.

Commercial systems

In addition we selected top 5 commercial systems for review.

Results

Evaluation

	C1		C2		C3		C4		C5		C6		C7		Authors
	P	T	P	T	P	T	P	T	P	T	P	T	P	T	
CTP	-	-	+	-	-	+	-	-	-	-	-	-	-	-	Vansteenwegen et al. 2011
Intrigue	-	+	+	-	+	-	+	-	-	-	+	-	+	+	Ardissono et al. 2003
Tainan city	-	-	-	-	-	-	+	-	-	-	-	-	-	-	Lee, Chang, and Wang 2009
CT-Planner4	+	+	+	-	-	-	+	-	-	-	+	-	+	+	Kurata and Hara 2013
Here to there	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Ambite et al. 2002
Travel Ontology	-	-	-	-	-	-	-	-	-	-	-	-	-	+	Houda et al. 2010
Interactive Design	-	-	-	-	-	-	-	-	+	-	-	+	-	+	Rodríguez et al. 2012
Triphobo	+	+	+	+	-	-	-	-	-	-	+	-	-	-	https://www.triphobo.com
Inspirock	+	+	+	-	+	-	+	+	-	-	+	-	-	-	https://www.inspirock.com
RoutePerfect	+	+	+	+	-	-	+	+	-	-	+	-	-	+	https://www.routeperfect.com
Google Trips	+	+	+	+	-	-	-	-	-	-	+	+	-	-	https://get.google.com/trips
Sygyic Travel	+	+	+	+	+	-	-	+	-	-	+	-	-	-	https://travel.sygyic.com/

Evaluation

	C1		C2		C3		C4		C5		C6		C7		Authors
	P	T	P	T	P	T	P	T	P	T	P	T	P	T	
CTP	-	-	+	-	-	+	-	-	-	-	-	-	-	-	Vansteenwegen et al. 2011
Intrigue	-	+	+	-	+	-	+	-	-	-	+	-	+	+	Ardissono et al. 2003
Tainan city	-	-	-	-	-	-	+	-	-	-	-	-	-	-	Lee, Chang, and Wang 2009
CT-Planner4	+	+	+	-	-	-	+	-	-	-	+	-	+	+	Kurata and Hara 2013
Here to there	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Ambite et al. 2002
Travel Ontology	-	-	-	-	-	-	-	-	-	-	-	-	-	+	Houda et al. 2010
Interactive Design	-	-	-	-	-	-	-	-	+	-	-	+	-	+	Rodríguez et al. 2012
Triphobo	+	+	+	+	-	-	-	-	-	-	+	-	-	-	https://www.triphobo.com
Inspirock	+	+	+	-	+	-	+	+	-	-	+	-	-	-	https://www.inspirock.com
RoutePerfect	+	+	+	+	-	-	+	+	-	-	+	-	-	+	https://www.routeperfect.com
Google Trips	+	+	+	+	-	-	-	-	-	-	+	+	-	-	https://get.google.com/trips
Sygyic Travel	+	+	+	+	+	-	-	+	-	-	+	-	-	-	https://travel.sygyic.com/

Summary and Future Work

- We have introduced a framework for comparing interactivity support in route planning applications.
- We have evaluated most popular route planning applications.
- We have identified 2 potential future work directions.
 - Tour explanation in terms of the POI attributes
 - Trade-off analysis between different tours

Thank you!