

# BETTER RECOMMENDATIONS

## OF SOCIAL LEISURE ACTIVITIES THROUGH BETTER UNDERSTANDING OF PEOPLE'S CHOICES



Recommender systems help people plan their leisure time by crossing the opportunities a city offers with their personal interests and identifying activities of likely interest to them. In our research, we specifically aim to understand better the personal, contextual and social features that influence people's choices, so as to provide better recommendations.

### DOES THE PURPOSE OF AN ACTIVITY INFLUENCE PEOPLE'S CHOICES?

We collected ratings for restaurants and aperitif bars in Trento, Italy, restaurants and pubs in Asuncion, Paraguay, restaurants and clubs in Tomsk, Russia [1].

We asked 4 ratings for each place the user knew, according to different purposes:

- Bringing tourists
- Bringing friends
- Bringing the partner
- Price / quality ratio

Bringing tourists	$\tau = 0.52$	Bringing the partner
Bringing friends	$\tau = 0.29$	Price / quality ratio
Bringing tourists	$\tau = 0.07$	Price / quality ratio

### RESULTS

Bringing tourists and bringing the partner ranks are similar; bringing friends and price/quality ratio are similar and distant from the other two purposes.

The purpose does influence the choice of the place for a selected activity.

For each purpose, we made a ranking for each activity in each city and we measured the difference with Kendall  $\tau$ :

$$\text{Kendall } \tau = \frac{C - D}{C + D}$$

*C* = concordant couples  
*D* = discordant couples

The following table shows the comparison of our purpose-based ranks with TripAdvisor. It shows the top 10 restaurants in TripAdvisor and their position in our ranks (each rank contains the 23 restaurants that received at least 5 ratings).

	Trip Advisor	Bringing tourists	Bringing friends	Bringing the partner	Price / quality ratio
Le due spade	1 (3)	13	18	12	23
Duo tapas bar	2 (8)	3	14	3	15
Loto	3 (17)	1	4	1	17
Niky's	4 (19)	4	20	7	18
Oro stube	5 (25)	7	13	9	9
Welcome India	6 (26)	14	6	4	13
Rosa d'oro	7 (34)	8	1	6	7
Il cappello	8 (35)	6	21	5	16
Trattoria Piedicastello	9 (47)	9	8	19	8
Uva e menta	10 (55)	2	5	2	3
Da Andrea	-	16	7	15	1

Kendall $\tau$	Bringing tourists	Bringing friends	Bringing the partner	Price / quality ratio
Trip Advisor	0.431	0.020	0.478	- 0.186

### WHICH RECOMMENDATION ALGORITHM GIVES THE BEST RESULTS ON PURPOSE-BASED, THREE-VALUES RATINGS?

We collected ratings for the 50 more popular restaurants in the city center of Trento, Italy. We involved 114 people, all locals. For each purpose, the users were asked to say whether they like, are neutral or don't like the restaurants they already experienced. We collected 4706 ratings.

**user-based** collaborative filtering (Yule similarity, neighbors similarity threshold or 0.3); **cluster-based** collaborative filtering (complete-link hierarchical clustering, Yule similarity, 3 clusters); **slope one**; **SVD** (10 features, 30 iterations).

We used two non-personalized recommender algorithms: the **baseline**, an average-based recommender; **TripAdvisor-based** recommender, recommending the restaurants at the top of TripAdvisor's rank.

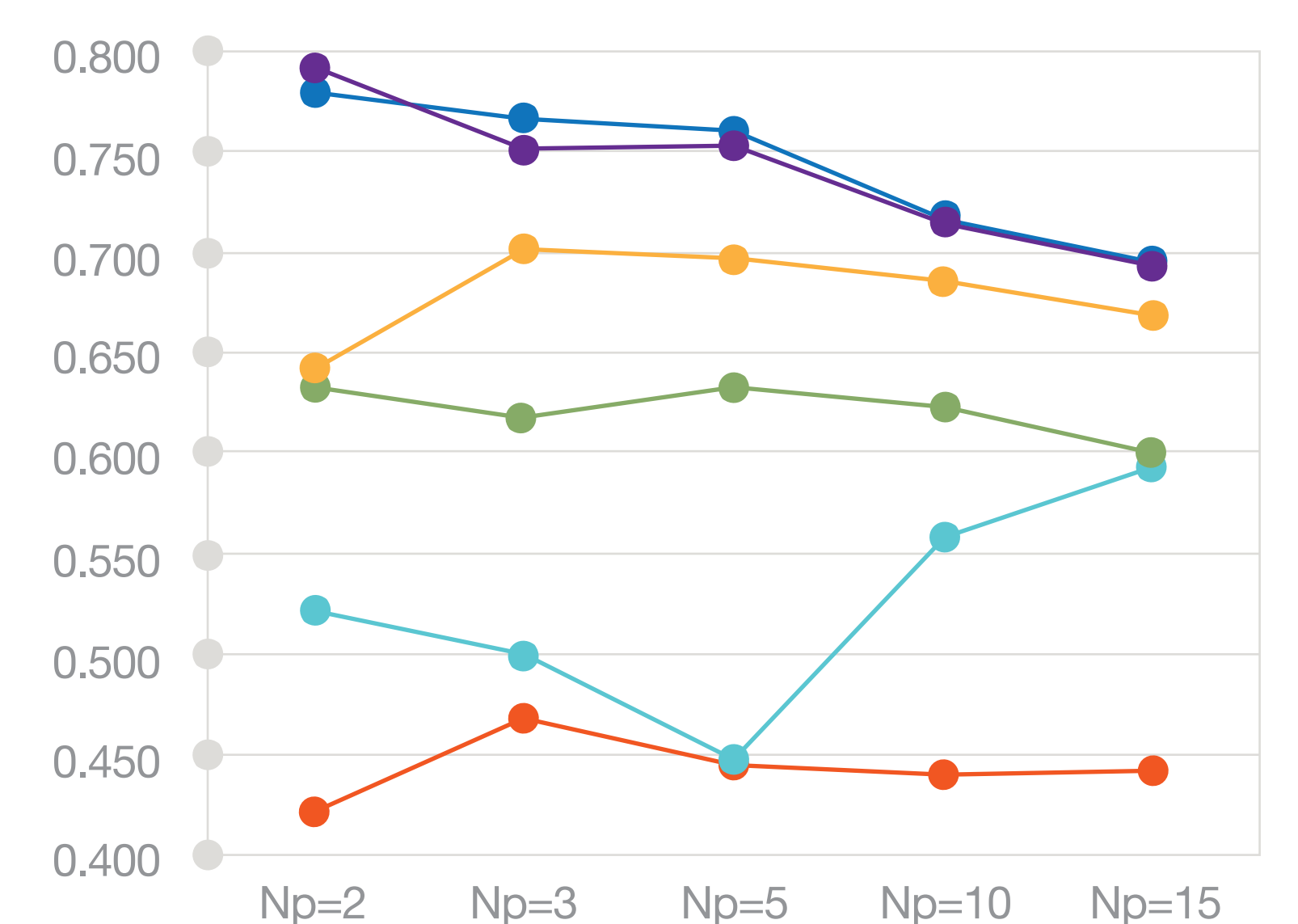
The algorithms have been tested by computing their precision on recommendations lists of different size (i.e.,  $N_p$  = number of places).

$$\text{Precision}(u, g, n) = \frac{\| \text{Good}(u, g, n) \|}{\| \text{Good}(u, g, n) \| + \| \text{Bad}(u, g, n) \|}$$

We tested 4 personalized recommender algorithms, with parameters tuned on our dataset:

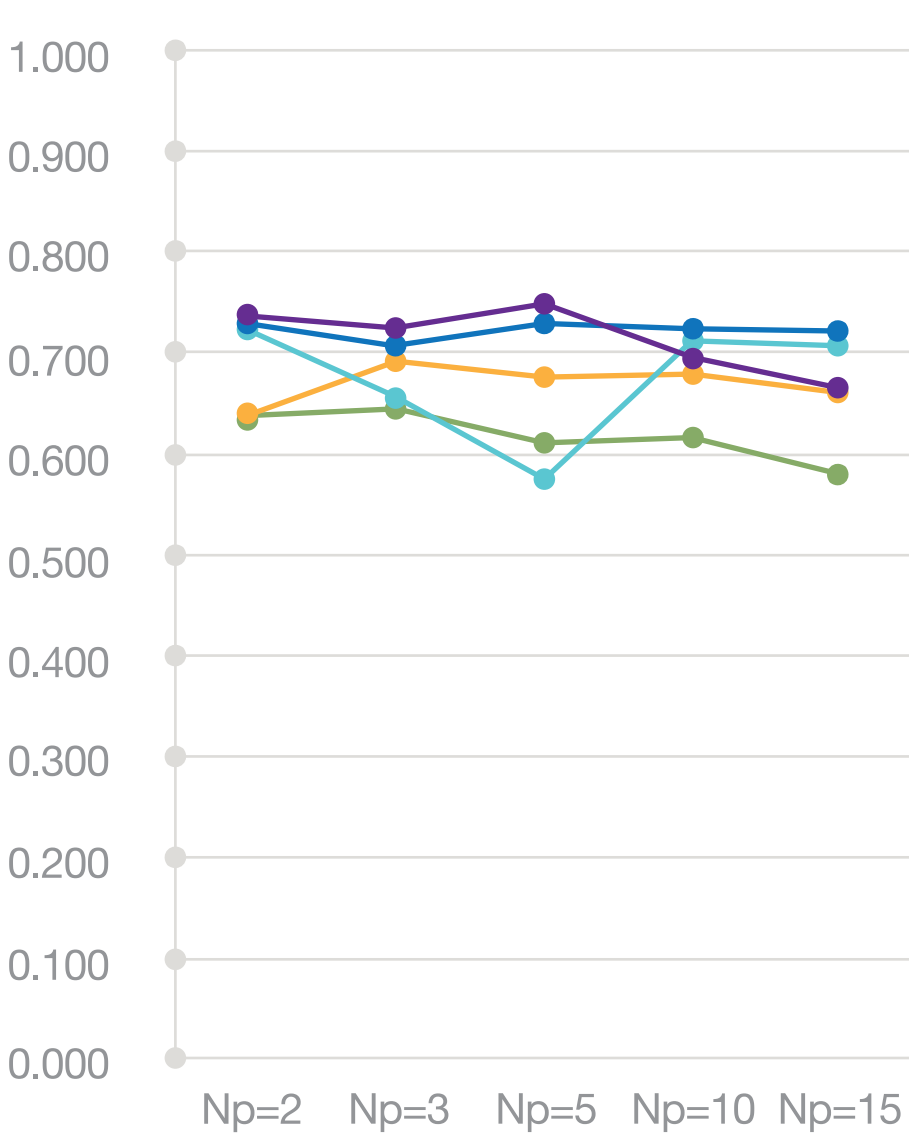
### Average precision

- user-based
- cluster-based
- SVD
- slope one
- TripAdvisor
- baseline

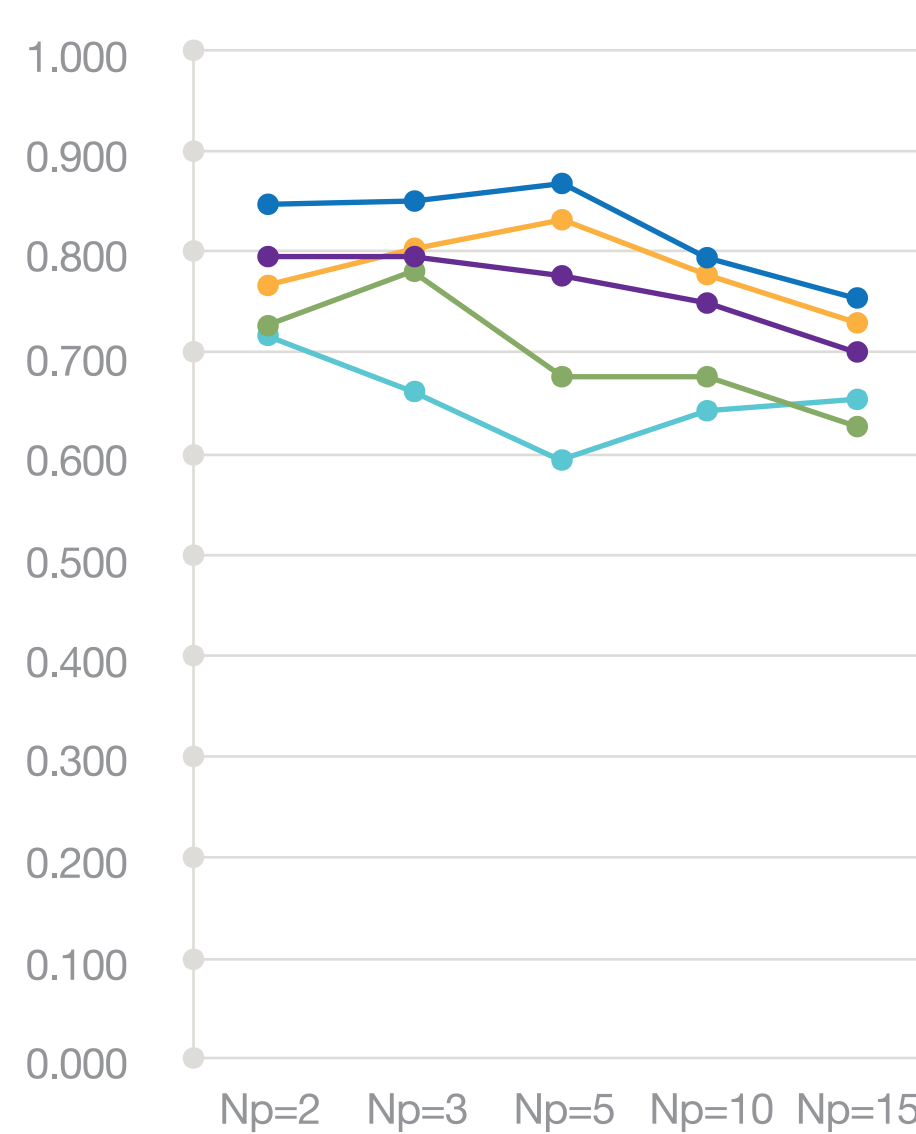


### Precision by purpose

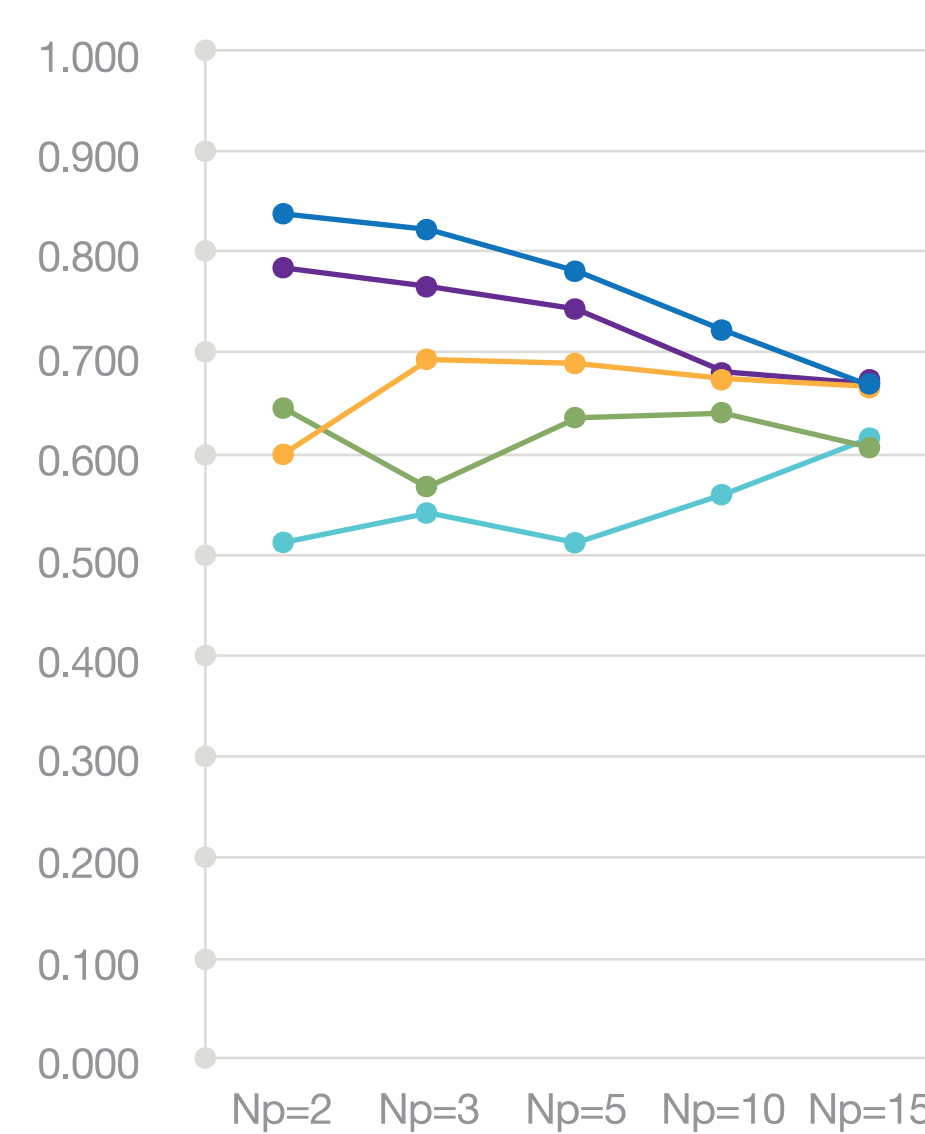
#### Bringing tourists



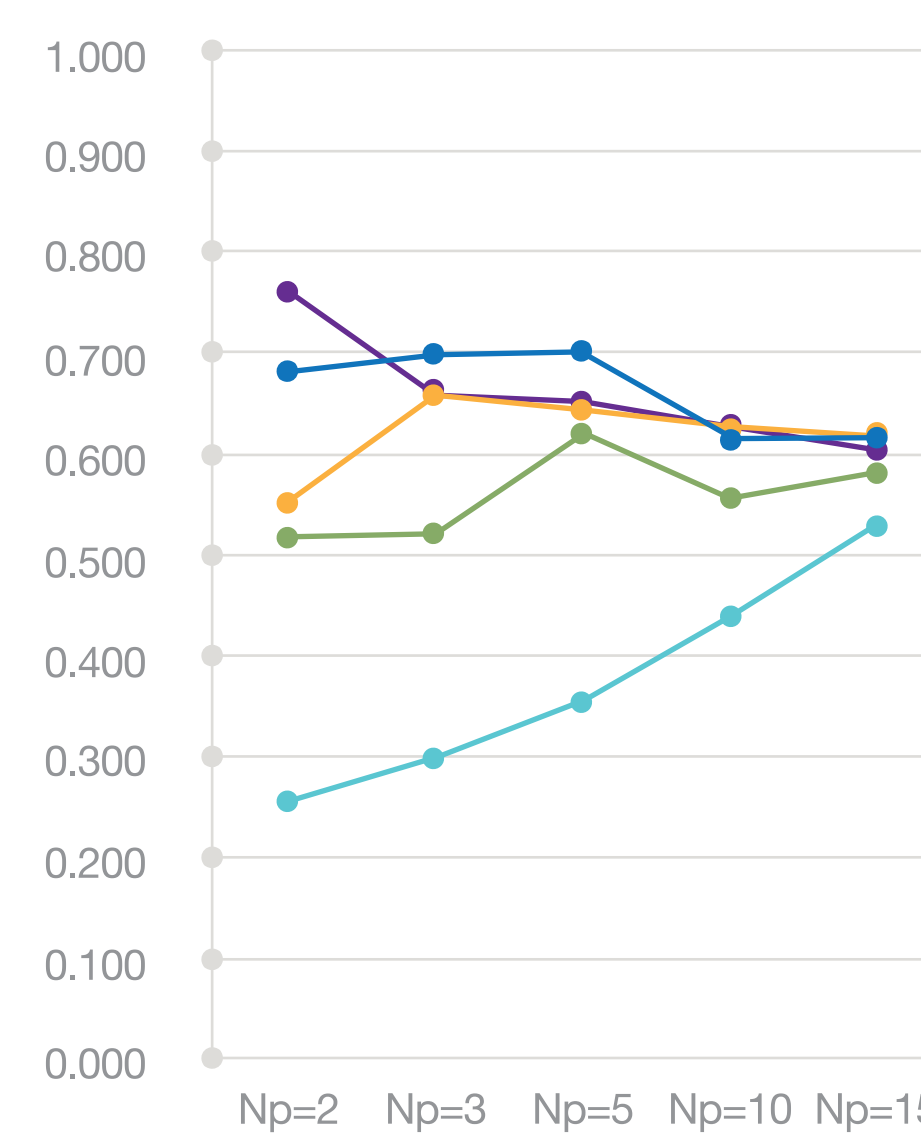
#### Bringing the partner



#### Bringing friends



#### Price / quality ratio



### RESULTS

With a more focused data collection we can immediately improve recommendation quality.

Locals and TripAdvisor send tourists to similar restaurants.

There is space for new services that take locals' opinions into consideration and that cater for purpose-specific recommendations.

### CONCLUSION

In this paper, we analyzed how recommender algorithm are better applied in the specific context of social leisure activities. By collecting data from locals, the most knowledgeable people about the offerings of the city, and

taking in consideration the different purposes for performing such activities, we can easily improve the quality of recommendations with respect to generic and non-personalized recommendation systems, such as TripAdvisor.