Smart Booking Without Looking
Providing Hotel Recommendations in the TripRebel Portal

Matthias Traub, Dominik Kowald, Emanuel Lacic
Pepijn Schoen, Gernot Supp and Elisabeth Lex
{mtraub, dkowald, elacic}@know-center.at, {pepijn.schoen, gernot.supp}@triprebel.com and elisabeth.lex@tugraz.at

Goal & Requirements

Goal:

Provide a **scalable hotel recommender system** for **TripRebel**, a new online booking portal aiming to make hotel bookings easier and fairer.

Requirements:

Our recommender system should be able to **recommend similar hotel alternatives** based on different content attributes and location information, and further provide **personalized hotel recommendations** through exploiting implicit user-hotel interaction data. The main requirements are:

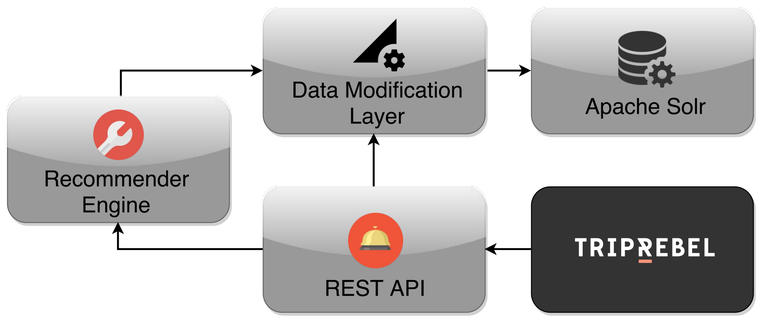
Req1 It should be possible to **filter** the recommended hotels (e.g., by hotel attributes, like city or hotel location).

Req2 It should be possible for the user to **combine** and **weight** the various recommendation approaches (e.g., Collaborative Filtering and Content-Based Filtering) in form of a **hybrid**.

Req3 Hotel data updates and new user-hotel interactions (i.e., implicit data) should **immediately** be taken into account for the **calculation of recommendations**.

Req4 Recommendations should be provided at **large-scale** and in **(near) real-time**.

System Architecture



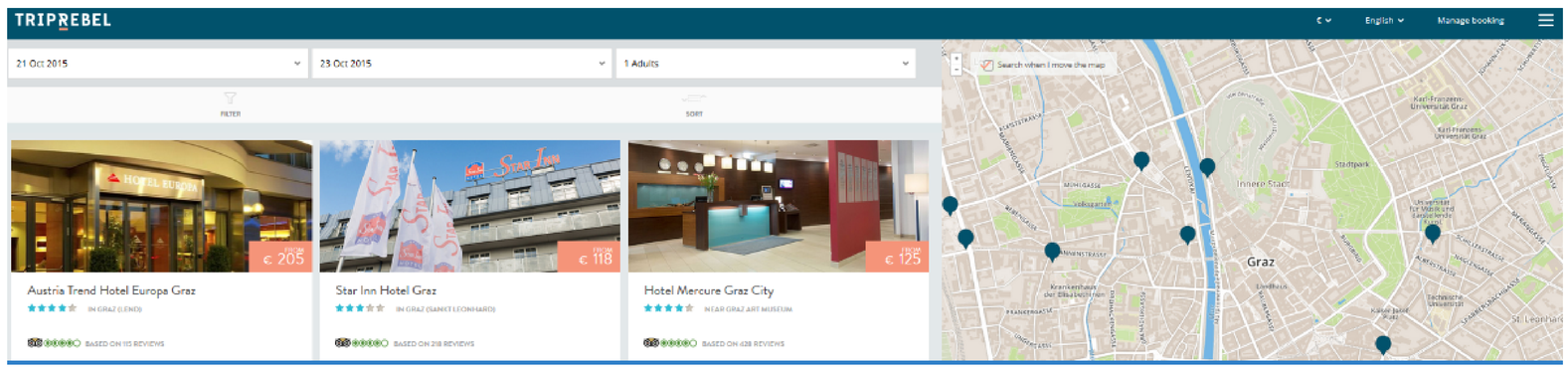
Core modules used in the hotel recommender for the TripRebel portal.

References & Framework

[1] M. Traub, D. Kowald, E. Lacic, P. Schoen, G. Supp and E. Lex. Smart Booking Without Looking: Providing Hotel Recommendations in the TripRebel Portal. In *Proc.* of i-KNOW ' 15.

[2] E. Lacic, D. Kowald, M. Traub and E. Lex. ScaR: Towards a Real-Time Recommender Framework Following the Microservices Architecture. In the Large Scale Recommender Systems (LSRS) Workshop at RecSys '15.

Hotel Recommender Approaches



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User-Based Collaborative Filtering (CF)

- Implementation of CF with a user-based nearest neighbor algorithm
- Considers the user's context i.e., the current hotel being viewed on the portal

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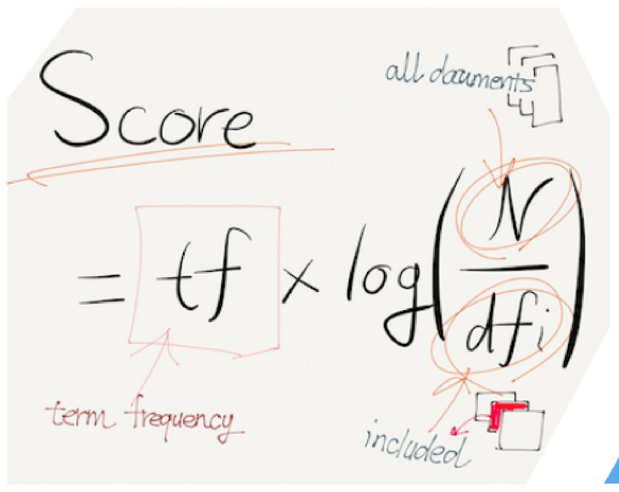

Content-Based Filtering (CBF)

- Works on various types of metadata tied to items or users
- Utilize built-in TF-IDF ranking equation to find similar hotels

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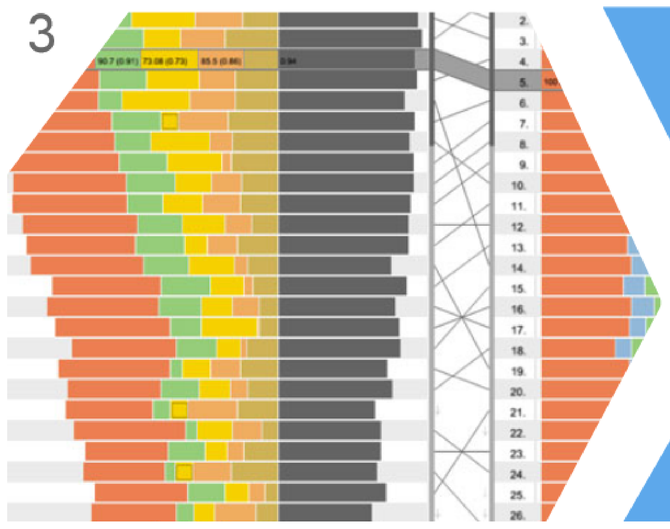

Most Popular

- Ranks hotels based on different user interactions e.g., Booking, Liking, ...
- Combination of all user interaction possibilities and scaling factors

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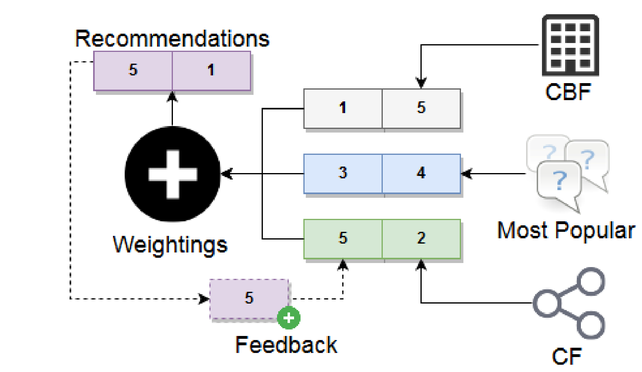

Hybrid Recommender

- Dynamic weigthings for each recommender approach
- Future work will include automatic recommender feedback integration

Preliminary Online Evaluation

Approach	Number of Recommendations	User Interactions related to Recommendations	Liked	Booked	Conversion Rate	Duration (min)			
						<1	1-2	2-3	>3
$CF_{u,h}$	582	130	57	25	4.29%	17	31	13	69
CF_u	401	39	15	10	2.49%	5	16	8	10
Both	983	169	72	35	3.56%	22	47	21	79

Current **online** evaluation on **user acceptance** of the two Collaborative Filtering approaches. The CF_u approach uses the **whole user history**, whereas the $CF_{u,h}$ considers the **user context** in form of the hotel that is currently looked at.