

# SMART BOOKING WITHOUT LOOKING

## PROVIDING HOTEL RECOMMENDATIONS IN THE TRIPREBEL PORTAL

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### GOAL & REQUIREMENTS

#### Goal:

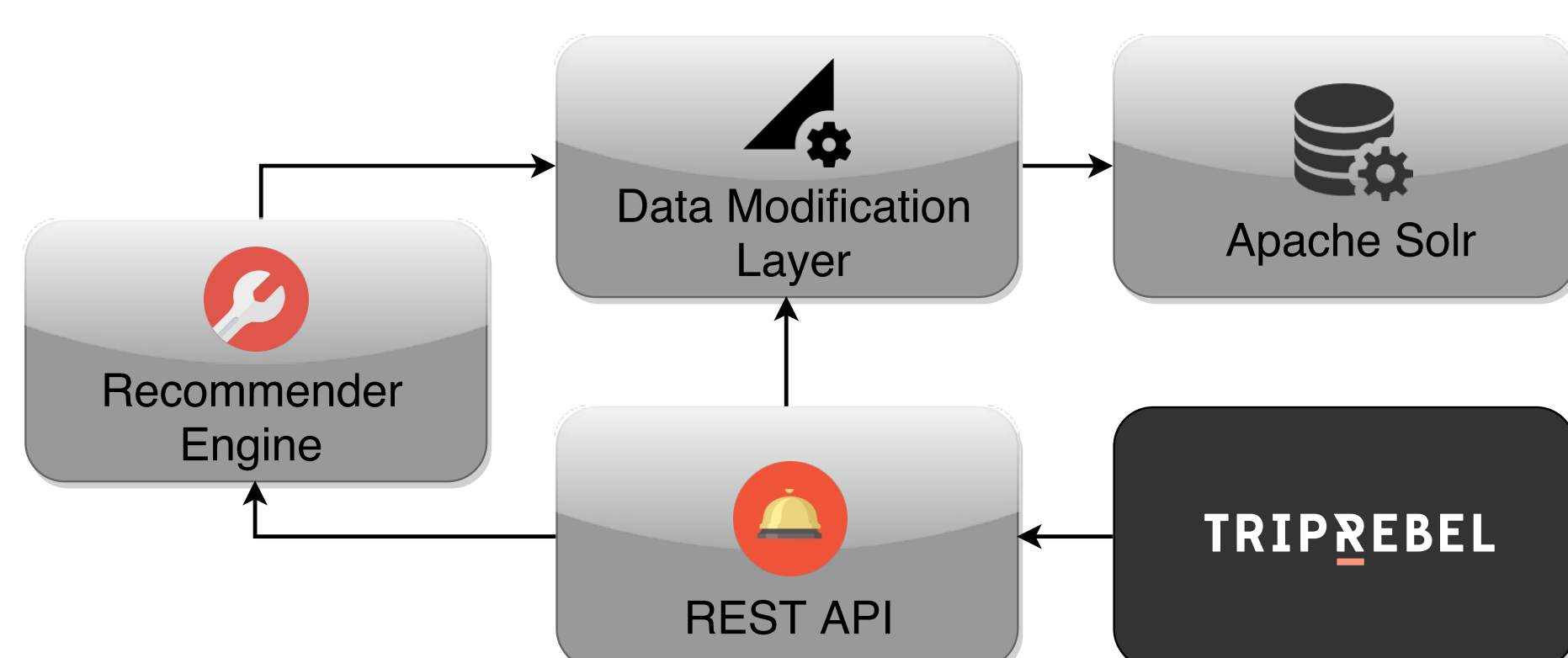
Provide a **scalable hotel recommender system** for TripRebel, a new online booking portal aiming to make hotel bookings easier and fairer.

#### 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



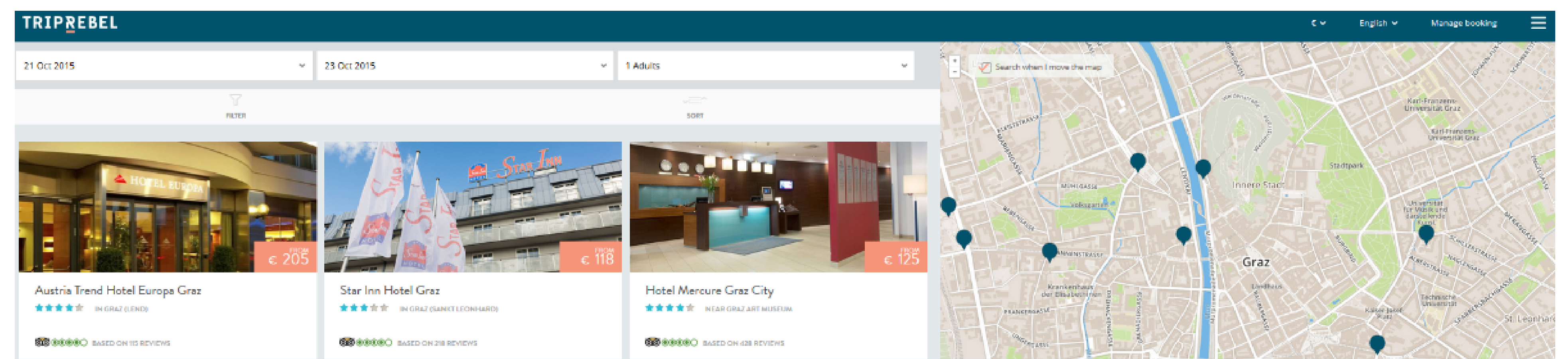
Core modules used in the hotel recommender for the TripRebel portal.

### REFERENCES & FRAMEWORK

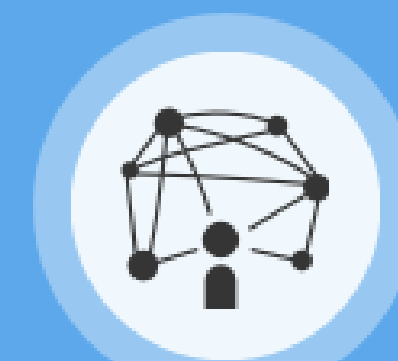
- [1] M. Traub, D. Kowald, E. Lacic, P. Schoen, G. Supp and E. Lex. Smart Booking Without Looking: Providing Hotel Recommendations in the TripRebel Portal. In *Proc. of i-KNOW '15*.
- [2] E. Lacic, D. Kowald, M. Traub and E. Lex. ScaR: Towards a Real-Time Recommender Framework Following the Microservices Architecture. In *Proc. of the Large Scale Recommender Systems (LSRS) Workshop at RecSys '15*.



### HOTEL RECOMMENDER APPROACHES



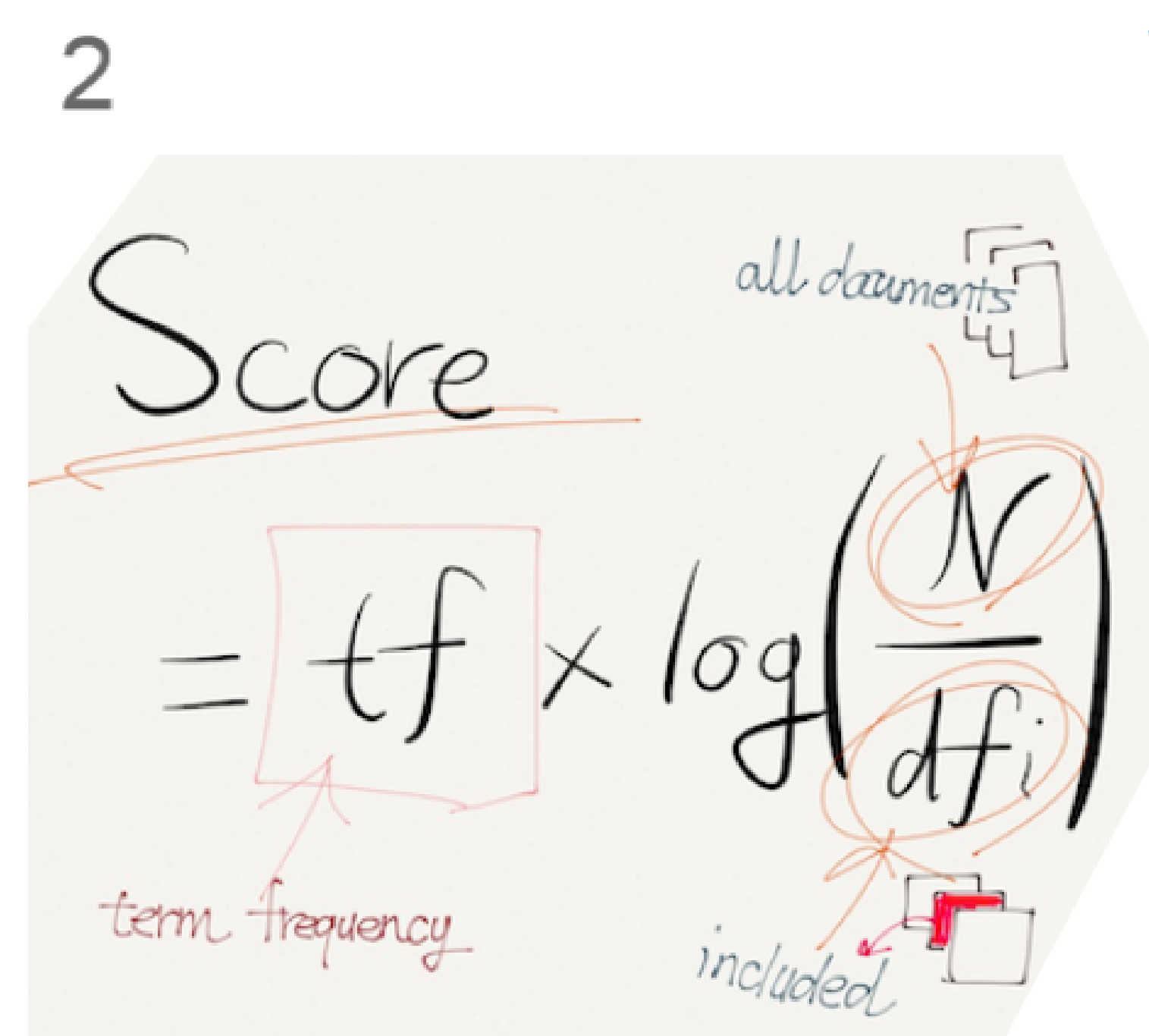
#### User-Based Collaborative Filtering (CF)



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



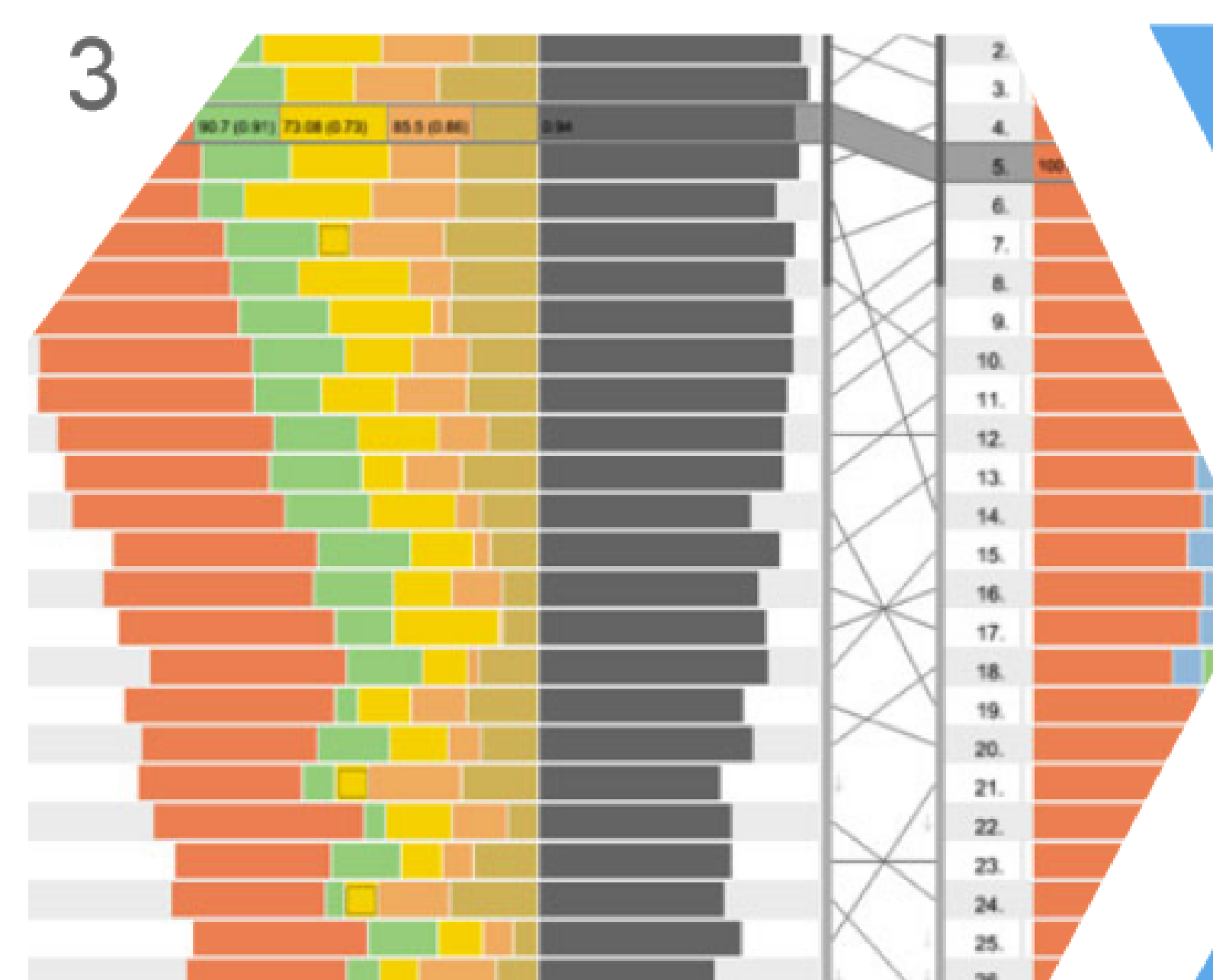
#### Content-Based Filtering (CBF)



Works on various types of metadata tied to items or users



Utilize built-in TF-IDF ranking equation to find similar hotels



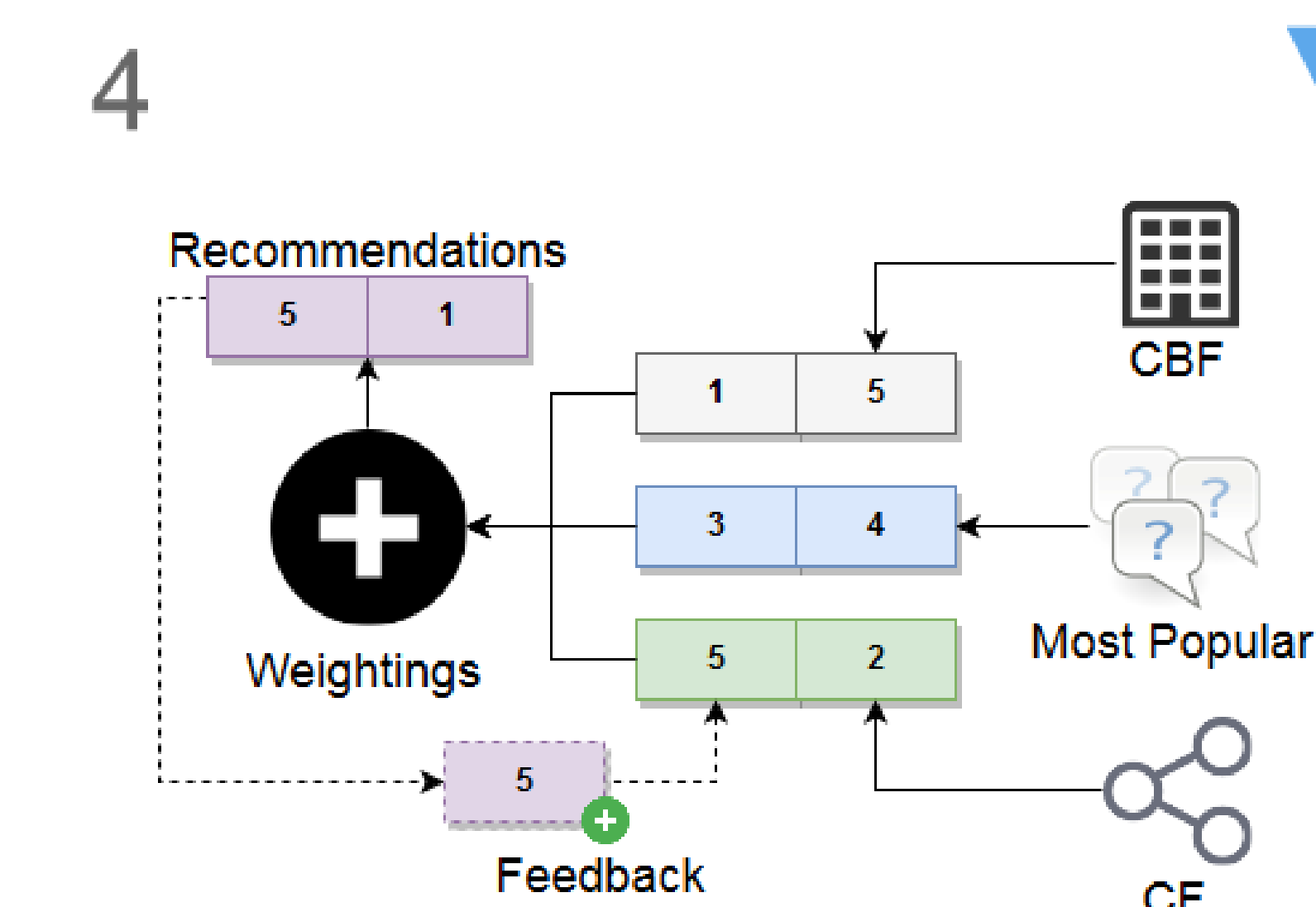
#### Most Popular



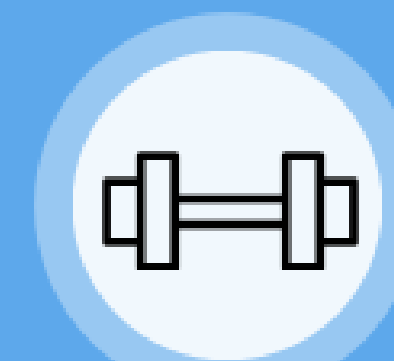
Ranks hotels based on different user interactions e.g., Booking, Liking, ...



Combination of all user interaction possibilities and scaling factors



#### Hybrid Recommender



Dynamic weightings 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.