Home Sharing Website (HSW)

INDUSTRY	PRODUCT	RESULTS

INDUSTRY
Travel & Hotel Booking

WEBSITE
HOME SHARING WEBSITE (HSW)

PRODUCT
DEEP RECOMMENDATION

MACHINE LEARNING DASHBOARD

RESULTS
- Recommendations are **more accurate** and lead to **higher conversion**
- **Crossing Minds unique embedding** of the users and the items recommended allow HSW to leverage information from one domain to another and tackle the **cold start problem**.
- Integrating **group-recommendations** into HSW's platform with the purpose of differentiating them from their competition while simultaneously increasing their organic growth and revenue.
- All user and item data are **fully de-identified and secure**
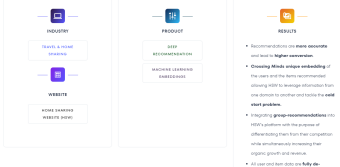
Crossing Minds and HSW settled on tackling these three challenges with the goal of increasing HSW's organic growth by: providing higher quality recommendations to their users based on taste-mapping, then leveraging cross-domain information to convert more of their users to their new product offerings and finally incorporate group-recommendations into their platform for the first time.

Goal

Providing higher-quality recommendations to users, converting new and current users onto new platforms, and incorporating group recommendations on the platform.

Challenges

Facing a constantly increasing number of competitors in the field, HSW is a modern and innovative business looking for ways to differentiate themselves further from their competition. HSW is looking to not only provide its users with a stay that is delightful and aligned with its users' taste but is also diversifying its product offerings by merging experiences in local activities and dining to provide new features for its users. By doing so, HSW hopes to increase its organic growth.

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- Providing higher-quality recommendations to their users based on taste-mapping.
- Leveraging cross-domain information to convert more of their users to their new product offerings.
- Incorporate group-recommendations into their platform for the first time.

HSW is the perfect example of how businesses are now migrating from Search Engine to Recommendation as the main algorithm to power their businesses. Indeed, no one ever specifically searches for housing on HSW: instead, one enters a set of filters (location, number of guests, pricing) and then receives a list of houses satisfying the filters, expecting the system to "know their habits" to fill missing filters. Unfortunately for HSW users, results are not personalized today so everyone sees the same results regardless of their historical transactions, creating frustration and churn. HSW's research engineers are trying, without much success, to provide more personalized results. The largest challenge they fight against is the **extreme sparsity** of their dataset, several orders of magnitude more than traditional entertainment datasets (given two random users, it is easy to find a movie they both watched, but very hard to find an HSW place they both booked). With such a dataset, traditional approaches and tools for recommendation are failing. On the other hand, Crossing Minds algorithm is built for extremely sparse data, and we were able to demonstrate significant improvement compared to HSW methods.

A challenge with HSW is not only to please the consumer by providing the most satisfying stay but also to increase the probability that the transaction or booking actually happens. HSW is a two-sided market, where on one side, travelers can book a place, and on the other side, hosts are renting a place. In this specific case, recommendations are presented such that the likelihood of the "demand" of the traveler to rent a place would actually be accepted by the host. However, this often-to-a-long and fastidious search process, simply because the housing presented to a consumer is not the one he might like most, but the one he has the most chances to book.

The second challenge of HSW is due to the diversification of their market. Since 2016, the apparition of Experiences and then of Restaurants lead the company to create three different Machine Learning team in order to tackle independently the recommendation for each of their domains. Additionally, one of the struggles of HSW was to initiate some existing travelers to those new domains. Supervisors who book one booking per month should be the first to enjoy the value add provided by "Experiences" and "Restaurant". The challenge here would be then to unify those three domains to provide **cross-domain recommendations** in order to build seamlessly the appropriate bridges between those domains.
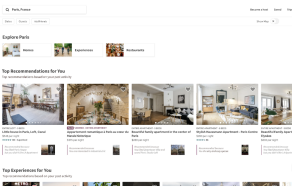
Group Recommendation

It's important to emphasize how unique **group recommendations** are. As mentioned by the Principal Data Engineer at HSW, "one rarely book a place for just one individual. We can clearly see that the number of occupants per booking is on average 1.7, and yet, there is no explicit grammar that the housing booked will please every occupant". Having the responsibility to find a location suitable for your family, friends, or your partner is always a daunting task. Every user who was invited to try HSW is 30 to 50% more active than the average user. Here we saw the opportunity to hit two birds with one stone. First group-recommendations will allow the increase in satisfaction of the users by offering a never before seen feature, this would also increase the number of referrals the users will send out from within the HSW platform. Instead of sharing the bookings with other travelers once the booking is done, it will be shared prior, increasing the incentive to invite people to create an account and enter some of their preferences.
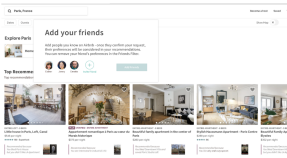
Work Process

In our user-facing application this, we confirmed that deep learning allows a significant breakthrough for recommendation accuracy when it comes to a cross-domain recommendation. Another point that has been demonstrated at Crossing Minds is that approaching the problematic of a recommender system with a domain-agnostic approach is considerably more insightful and powerful.
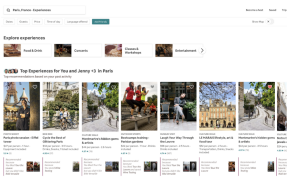
During our discussion with HSW, one important approach was to concretely visualize the implementation of the features required and their impact UX-wise quantitatively. Here are some of the UX interfaced this effect.
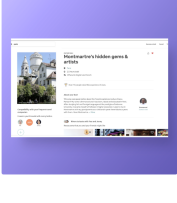

As you can see in the top left corner, the user as the option to "**Add Friends**"

The option to invite friends is the trigger to increase organic growth through referral. Once the friends selected, the screen is automatically updated such that the experiences and housing are now the best for both users simultaneously.

Another interesting feature that is proposed by our Crossing Minds API is the possibility to "explain" the recommendation, so users have a better understanding and therefore incentive to trust the suggested listings.

Finally, another feature that is provided by our API is the level of compatibility of housing with one or several users.

Why Crossing Minds

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