Sandbox DEMO

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The goals

The work packages

The goal of **WP3** (lead: Edinburgh) is to:

- develop and evaluate **automated techniques** for recovering from situations of trust breakdown

The goal of **WP4** (lead: Edinburgh) is to:

- develop a **concrete web software** from the computational methods of WP3.
The goals
One software, three functionalities

- **Sandbox component** for users to play with
- A component to capture experiences and opinions
- A mediation component for debating and negotiation

Web Software
The successful sandbox should have:

- Different variations of algorithms
- Different datasets where algorithms can be applied on
- Tools for performance measurements
We first have to answer the following questions:

- What are the purposes of the considered algorithm?
- What type of algorithms?
- What is the input and output?
- Should we provide explanations to the user?
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- What are the purposes of the considered algorithm? → **Hotel recommendation algorithms**
- What type of algorithms?
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  → **Hotel recommendation algorithms**

- What type of algorithms?  
  → **Machine learning algorithms**

- What is the input and output?

- Should we provide explanations to the user?
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  → **Hotel recommendation algorithms**

- What type of algorithms?
  → **Machine learning algorithms**

- What is the input and output?
  → **User data and the algorithm parameters**

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  → **Hotel recommendation algorithms**

- What type of algorithms?
  → **Machine learning algorithms**

- What is the input and output?
  → **User data and the algorithm parameters**

- Should we provide explanations to the user?
  → **Preview of the data used for training (?)**
Overview

1. Introduction
   - Context
   - The sandbox

2. First draft
   - Hotel recommendation
   - The input
   - The results
   - Explaining to the user

3. Data generation
   - Hotel data
   - User data
   - Rating data

4. The algorithm

5. Questions
We built a tool for recommending hotels to users w.r.t. their personal data.

Users are **anonymous** and we do not save anything.

We are only focusing on **hotels from Paris**.
The user’s input
Personal data & algorithm selection

- Users can input different kind of personal data (gender, age, ideal price, wheelchair user, etc.)

- Users have access to different versions of the algorithm
The user’s input
Personal data & algorithm selection

- Users can input different kind of personal data (gender, age, ideal price, wheelchair user, etc.)

- Users have access to different versions of the algorithm

- User will have access to different datasets (not yet implemented)
The user’s input
The input interface

Introduction
Context
The sandbox

First draft
Hotel recommendation
The input
The results
Explaining to the user

Data generation
Hotel data
User data
Rating data

The algorithm
Questions
The user’s input
The input interface

Questions to discuss:

- Are the input data suitable? Should we add more fields?
- Should we re-think the input (sliders, etc.)?
- Should we add more details about the different algorithm presets?
- Should we add the possibility for the user to have a history?
We provide several outputs to the user:

- An ordered list of 10 hotels with their details
- Some statistics on the recommended hotels
## The hotel recommendations

The list of recommended hotels

<table>
<thead>
<tr>
<th>#</th>
<th>Hotel Name</th>
<th>Address</th>
<th>City</th>
<th>Night</th>
<th>Price</th>
<th>Room Type</th>
<th>Wheelchair Accessible</th>
<th>Swimming Pool</th>
<th>Breakfast Available</th>
<th>Reviews</th>
<th>Michelin Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HOTEL PALAIS DE CHAULOT</td>
<td>35 AVENUE RAYMOND POINCARE, 16, TROCADERO - PARIS 75016</td>
<td>Paris</td>
<td>139.6</td>
<td></td>
<td>Double</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>HOTEL L’OISEAU BLEU</td>
<td>24 RUE AVIGNON- PARIS- FRANCE</td>
<td>Paris</td>
<td>81.8</td>
<td></td>
<td>Single</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>HOTEL PULLMAN PARIS NORTHERN PARIS</td>
<td>19 RUE DU COMMANDANT RENÉ MOUCHOTTE- PARIS- FRANCE</td>
<td>Paris</td>
<td>110.0</td>
<td></td>
<td>Twin</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HOTEL ATLANTIQUE</td>
<td>54 RUE FALGUERE- PARIS- FRANCE</td>
<td>Paris</td>
<td>88.9</td>
<td></td>
<td>Double</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>HOTEL RELAIS DU PRE</td>
<td>16 RUE PIERRE SEMARD- PARIS- FRANCE</td>
<td>Paris</td>
<td>120.6</td>
<td></td>
<td>Double</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>HOLIDAY INN PARIS SAINT GERMAIN DES PRES</td>
<td>PARIS- FRANCE 92- RUE DE VALGNARD- OL. SAINT GERMAIN - LUXEMBOURG- 75008 PARIS</td>
<td>Paris</td>
<td>220.7</td>
<td></td>
<td>Twin</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>LES JARDINS DE LA VILLA</td>
<td>PARIS- FRANCE 5 RUE REJOUR- 1ST PALAIS DES</td>
<td>Paris</td>
<td>142.6</td>
<td></td>
<td>Double</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
The hotel recommendations
Overview of the recommendation

- We provide the average price and review
- Compact visualisation the data of the recommended hotels
- **Future upgrades**: pie-charts and graphs?
In order to explain machine learning algorithms to basic users, we thought of two ideas:

- Explaining the algorithm in plain english
- Give the user a **glimpse** of the data used for learning.
Explaining the algorithm to the user
Showing similar users

Similar Users

Our database regroups more than 1000+ users.

The users below have been carefully picked to match the data in your profile. You can have view and access the ratings that these users have previously made on a selection of hotels. The first person on the list is the user that is the most similar to you.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Target Price</th>
<th>Is Married</th>
<th>Wheelchair User</th>
<th>Have Kids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papilio Santon</td>
<td>18</td>
<td>M</td>
<td>196.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marah Fugione</td>
<td>20</td>
<td>M</td>
<td>197.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimitry Canweedine</td>
<td>22</td>
<td>M</td>
<td>196.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yorgos Hindisberg</td>
<td>26</td>
<td>M</td>
<td>202.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beunegard Casaldi</td>
<td>31</td>
<td>M</td>
<td>197.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Explaining the algorithm to the user

Ratings from similar users

User Profile

- Firstname: Pepito
- Lastname: Sento
- Age: 18
- Gender: Male
- Ideal price for a night: 196.1
- Wheelchair User: 
- Is married: 
- Have kids: 

User History

Ratings from this user.

<table>
<thead>
<tr>
<th>Hotel Name</th>
<th>Price Per Night</th>
<th>Room Type</th>
<th>Breakfast Available</th>
<th>Swimming Pool</th>
<th>Michelin</th>
<th>Disable Access</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE PAVILLON DU LAC</td>
<td>177.8</td>
<td>Twin</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>3</td>
</tr>
<tr>
<td>HOTEL NOTRE DAME SAINT MICHEL</td>
<td>81.8</td>
<td>Single</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>3</td>
</tr>
<tr>
<td>HOTEL DE NESLE</td>
<td>155.8</td>
<td>Double</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>4</td>
</tr>
<tr>
<td>BED AND BREAKFAST IN PARIS - ACOVE &amp; AGAPES</td>
<td>152.2</td>
<td>Double</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>6</td>
</tr>
<tr>
<td>B &amp; B LES ROSIERS</td>
<td>103.0</td>
<td>Single</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>1</td>
</tr>
<tr>
<td>PARIS SWEET 36</td>
<td>97.7</td>
<td>Twin</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>2</td>
</tr>
<tr>
<td>CLFT</td>
<td>184.8</td>
<td>Double</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>5</td>
</tr>
<tr>
<td>GARDEN ELYSEE</td>
<td>66.9</td>
<td>Single</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>3</td>
</tr>
</tbody>
</table>
Questions to be discussed:

- Is this an efficient way of explaining algorithms to the users?

- What are the other way of explaining recommender algorithms to the users?

- Should we explain or let the user experiment?
This algorithm uses three datasets:

1. A set of hotels
2. A set of users
3. A set of ratings from users to hotels

Most of the data used was generated!
We used the hotel dataset from the **Tour-pedia** website

- Same source as the hotel data from the fake booking website
- A set of 1766 handpicked hotels
- Real data (name, address, reviews, etc.)

We generated the **missing data**:

- Room price per night
- Wheelchair accessible
- Swimming pool, etc.
Fake users
Mockaroo: a realistic data generator

We created a set of 1000 users using the Mockaroo generator:

- First name, last name, gender and age

We added the missing fields:

- Annual salary and ideal price
- Marital status, children
- Wheelchair user, etc.
We produced rating using a two-steps process:

1. We assigned some hotels to the users
2. The user rated the hotels using the following criteria:
   - An intrinsic preference from the user
   - The price of the hotel room w.r.t. ideal price range
   - The probability to like the room w.r.t. gender and age
   - The probability to like swimming pools w.r.t. age and gender
   - The probability to like Michelin restaurants
   - The probability to want wheelchair accessible hotels
Questions

Questions to be discussed:

- Do we continue with this generated dataset or should we switch to realistic datasets?

- Should we revise the way users rate hotels?
The recommender algorithm

The algorithm is based on two components:

- A hybrid recommender system
- A similarity measure between users
The recommender algorithm

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Hybrid Recommender System

Users
Hotels
Ratings

Similarity

Recommendation

User 1
User 2

User
Questions?