Prediction **ROOMSAGE**™

POWERED
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Design of automated systems
for client segmentation and personalized offers
Project description for ESGI144

RoomSage is a technological start-up aiming to build its core business on democratization of the online advertising world with the means of artificial intelligence. Its first focus is on the hospitality industry. More information can be found here: www.roomsage.com.

Nowadays hotel digital booking market is dominated by large players – Booking.com, Expedia etc., known as Online Travel Agents (OTA). Their market share in the US reached 39% in 2018 (52% among Millennials) and is forecasted to grow. For many hotels OTAs provide up to 75% of all reservations. In the 90's OTAs charged hotels 5-10% commission for every reservation done through OTA's website. Currently this figure is typically in the range 15-30%. Therefore, hoteliers search for solutions to attract direct bookings via their websites. Large hotel chains, like Hilton or Marriot, hired entire teams to design personalized offers, including package deals, preferred booking rates or various add-ons (discounts on massages, ski lessons, tourist trips, wine in the room etc.), to achieve this goal. But the vast majority of hoteliers can't afford it.

RoomSage aims to provide hoteliers (and other online advertisers) with automated solutions for ad campaign setup and management, including personalized ad campaigns.
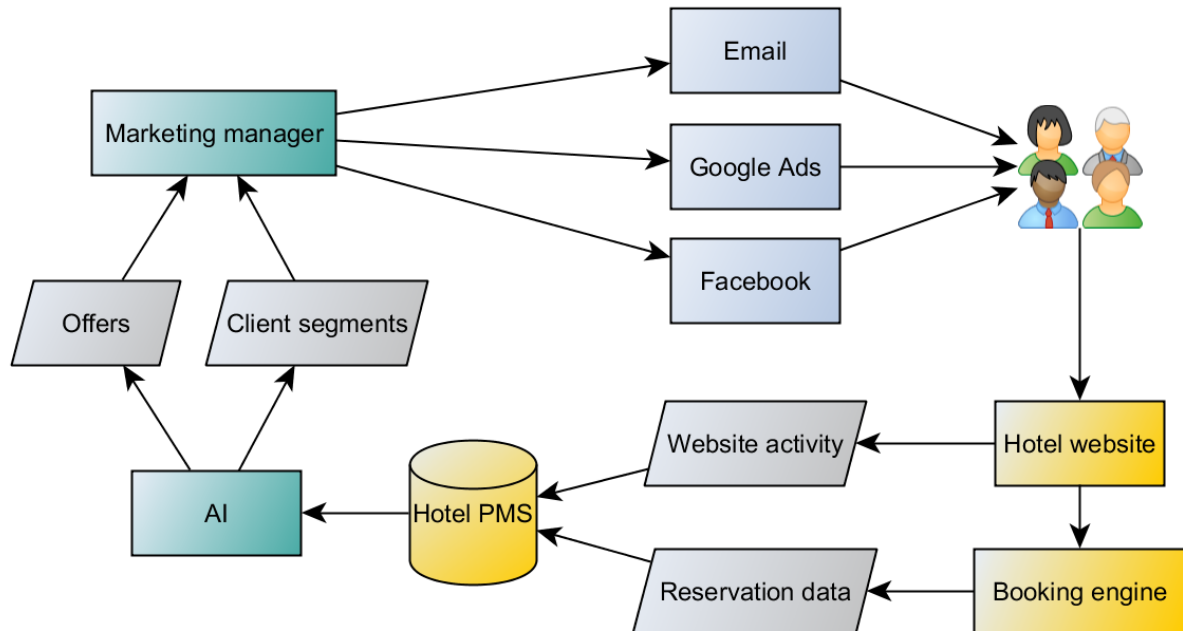
The problem

There are many channels which can be used for advertising – Google Ads, Facebook, Google Hotel Ads, Trivago, emails, some of which allow direct communication with a single person, while other only allow to advertise to groups of people. During the Study Group emphasis should be put on the case of groups.

To narrow down the problem one can think of generating direct booking with the use of Google Ads. A typical booking process through Google Ads looks as follows: the hotel creates an ad (potentially a personalized ad), a potential client searches for a hotel in Google, the ad is shown to the user, the user clicks on the ad and is redirected to the hotel's website, and there makes a reservation. As the advertiser pays per click, the proper measure of the ad/offer performance is the average value per click.

Therefore, the main problem to be solved can be stated as follows: design hotel clients segmentation techniques coupled with automated offer generation methods allowing to maximize the value per click from an ad campaign.

The following diagram illustrates the entire system.

Data availability

RoomSage will provide sample data for one hotel in Canada, situated in the largest ski resort in North America – Whistler. The data will contain:

- PMS data – data about all hotel reservations from the hotel's property management system.

- Booking engine data – how users interacted with the hotel's website (this data can be linked with the PMS data).

- Google Ads data – advertising platform data for hotel's campaigns as an example.

Mathematical questions

Key mathematical questions to be addressed during the study group might include:

1. How to choose the best hotel clients segmentation so that personalized offers for those segments would bring the best value per click?

2. Can segmentation and offer generation be done efficiently in a sequential manner?

3. How a feedback loop between offer generation and observed response to that offer should look like?

4. What is the proper design of a simulator on which proposed algorithms could be tested?