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**Assessment Cover Page**

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| *Module Name:* ***Strategic Thinking (HDip in Data Analytics - Feb 2024 - HCI cohort)*** |  |
| *Assignment Title:* ***CA 1 – Capstone Project Proposal*** |  |
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**Declaration**

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I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution.

Abstract

This work proposes a new ranking algorithm for hotel revenue management, called **HotelRank** that considers three main factors relevant in this industry: online performance, room demand forecast and booking cancellation predictions. Those factors will be computed choosing the most accurate machine learning and deep learning techniques applicable to a dataset that contains two years bookings from ten Italian luxury hotels.

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# Introduction

Revenue management involves employing information systems and pricing strategies to effectively assign appropriate capacity to customers, ensuring it aligns with the optimal price and timing. In the hospitality sector, particularly within the rooms division, revenue management focuses on providing the suitable room to the appropriate guest, at the right price, and through the most fitting distribution channel. (Ivanov, 2014)

Hotel revenue management stands out as a critical factor in maintaining profitability. Among the various factors contributing to effective hotel revenue management, some correlated factors stand out prominently:

* Forecasting of hotel room demand.
* Prediction of booking cancellations.
* Online hotel reputation.

### Forecasting of hotel room demand.

Forecasting hotel room demand involves predicting the anticipated demand for rooms on any given day throughout the year. Accurate forecasts enable hotels and revenue managers to adjust prices dynamically, thus maximizing revenue potential. However, forecasting hotel room demand is a complex task, influenced by a multitude of factors that vary widely across different regions and contexts. Variables such as location, cultural events, weather, seasonal patterns, and more significantly impact optimal hotel revenue management strategies (Apostolos, 2021). For example, a rock concert or a global exposition can increase the booking demand or a storm in the area can trigger an increment of cancellations.

### Prediction of booking cancellations.

Booking cancellations (Nuno Antonio, 2019) are an issue for the hotel revenue manager because they make harder to predict the number of booked rooms. A common pattern to address this issue is trying to achieve the overbooking by lowering the price but when overbooking is real, it is a problem because it hurts hotel reputation and revenue. People might find themselves without a room. So, from revenue manager perspective having a way to predict cancellation in advance is crucial in his decision-making process.

### Online hotel reputation.

Using the framework developed in , we define online hotel reputation. Online reputation is *“the result of what clients, former clients, future clients, employees, etc. say, write and communicate to another anywhere in the internet social media based on their perceptions and experience in any moment of their relationship, direct or indirect, with the brand”* (Diana-Jens & Rodríguez Ruibal, 2015). The same study performed in the four main Spanish cities (Barcelona, Madrid, Valencia, Sevilla) states that room price increases whenever the hotel is positioned in the top positions in TripAdvisor Index. As demonstrated in a Chinese study on ten luxury hotels (Wang, et al., 2023), Negative online reviews also can have a strong impact in room booking rate that up to nine months to recover.

During the years many machines learning (Nuno, et al., 2017) and deep learning techniques (Zhang, et al., 2019) has been deployed to minimize the negative impact of the above-described factors and maximize revenue.

Our focus will be to create a hotel ranking algorithm called **HotelRank** that considers all three factors (demand forecasting, cancellations and online reputation) in a weighted manner using machine learning and deep learning techniques. This research project will be executed in strict collaboration with **Blastness Spa**.

**Blastness Spa** is the #1 provider in Italy for luxury hotels with a portfolio of over nine hundred hotels. The project will deliver a set of data science models and a data engineering platform in Azure that it is able to ingest, analyse and train models online, providing real-market value to the project itself. We're employing a CRISP-DM approach for the model tuning and creation, while adopting Scrumban (Alliance, 2017) for the deployment part to ensure agility and adaptability.

# Chapter 1

## Chapter 1.1

### Chapter 1.1.1.

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[NOTE: For the table of contents to function properly, you must use the correct headings for all your chapters and subchapters.

**Heading 1:** This is the main heading and should be employed for the primary title or chapter. For example: CHAPTER 1.

**Heading 2:** Use Heading 2 as a subheading. For instance: Chapter 1.1.

**Heading 3:** Heading 3 provides a more detailed breakdown, such as Chapter 1.1.1.

By adhering to this hierarchical structure, you ensure an organized and effective document outline, enhancing readability and navigation. However, you are not forced to use all 3 headings, usually heading 1 and 2 are sufficient.

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# References