2023 Master internship at University of Algarve

TITLE

Applications of machine learning in the hospitality industry for maximizing revenue

LAB & PEOPLE

- Name of the hosting lab: Research Center for Tourism, Sustainability and Well-being
  General activities of the lab: Research
  Website: www.cinturs.pt
  Number of staff / PhD: 48
- Supervisor name and contact: Luis Nobre Pereira, Lmper@ualg.pt

TOPIC OF THE INTERSHIP

- Scientific context of the internship

Demand forecasting is one of the key components of a successful revenue management (RM) tool in the hospitality industry because it is a building block of hotel's strategic decisions, as their accuracy determines the efficacy of pricing and rooms inventory optimization decisions. Several scholars have explored different forecasting methods for tourism and hotel demand, but research on hotel demand forecasting is not as abundant as those in tourism demand forecasting and research on demand forecasting method in the midst of uncertainty is rare. Furthermore, a few revenue management solutions (RMS) in the market claim that machine learning has been applied to their system, but the forecasting models of most RMS are still mainly based on combined forecasting models which use historical booking records and advanced booking data (e.g., pickup methods based on trailing periods). Although there has been more and more literature using machine learning to make predictions, lack of interpretability in predictive models has been raised as one of the key concerns and undermine trust in those models. Therefore, this project aims to propose a hotel demand forecasting method using an interpretable machine learning approach so that we can understand how it arrived at a specific estimation.

Keywords: Hotel demand forecasting; dynamic pricing; optimize revenue; machine learning; deep learning; clustering; booking curves; cancelation.

Bibliography

Huang, L., Zheng, W., 2021. Novel deep learning approach for forecasting daily hotel demand with agglomeration effect. *International Journal of Hospitality Management* 98, 103038.

Kaya, K., Yilmaz, Y., Yaslan, Y., Oguducu, S.G., Cingi, F., 2022. Demand forecasting model using hotel clustering findings for hospitality industry. *Information Processing and Management 59*(1), 102816.

Lee, M., 2018. Modeling and forecasting hotel room demand based on advance booking information. *Tourism Management* 66, 62-71.

Pereira, L.N., Cerqueira, V., 2022. Forecasting hotel demand for revenue management using machine learning regression method. *Current Issues in Tourism*, 25(17), 2733-2750.

Sánchez, E.C., Sánchez-Medina, A.J., Pellejero, M., 2021. Identifying critical hotel cancellations using artificial intelligence. *Tourism Management Perspectives*, 35, 100718.

Viverit, L., Heo, C.Y., Pereira, L.N. e Tiana, G. (2023). Application of Machine Learning to Cluster Hotel Booking Curves for Hotel Demand Forecasting. *International Journal of Hospitality Management*, 111, 103455.

- Tasks and duties entrusted to the student: Literature review, data analysis, discuss results, write scientific papers.

- Skills to be acquired or developed: Forecast hotel demand, dynamic pricing and revenue optimization.

PROFILE OF THE DESIRED STUDENT

- Minimum level of study required: Master
- Field(s) of study: Hospitality management – revenue management
- Scientific skills: Statistics, Data science, Machine learning
- Language skills required: English

THE INTERNSHIP ASSIGNMENT:

Desired duration of the internship (in months): *3 months (minimum)*
Desired Starting date of the mission: *September 2022, or January 2023, or April 2023*
Indicative weekly schedule: *35h / week*
Remuneration: *Not available.*
Erasmus grant: *Application should be made by the student at the sending institution*

Internship agreement: *an internship agreement will be signed.*

To SEA-EU students:
If you're interested please send your CV and letter of motivation to the scientist in charge, Lmper@ualg.pt .