Predictive Analysis of Hospitality Industry to Global Economic Growth

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ABSTRACT
In this research study the researcher proposed predictive models on Hospitality Industries to Global Economic Growth. The researcher used the 20 features based on customer personal and professional data and their travel history around the world. The total customer's data 4888 are considered to develop this predictive model. The researcher used the supervised machine learning algorithms to classify the category of customers and Hospitality Industry to Global Economic Growth at world level. The researcher used the accuracy level of predictive model, recall and precision which are given such as Decision Tree Accuracy 0.855974%, Recall- 0.891156 , Precision 0.670330, Random Forest Accuracy0.891980%, Recall 1.000000, Precision 0.775076, Ada-Boost Classifier Accuracy 0.845336%, Recall 0.790244, Precision 0.685083, Gradient-Boost Classifier 0.900982%,Recall 1.000000, Precision 0.804805, XG-Boost Accuracy 0.892390%, Recall 1.000000, Precision 0.767647. The researcher found that as far as the model is concerned, 90% accuracy, 72% Recall, and 74% Precision was obtained, which was the best scores out of all the models that were evaluated. While this model may be sufficient to obtain better than chance results for an initial marketing program, it is recommended that to Visit Us collect data on Wellness Tourism package sales and customers as the product is being rolled out so that the model can be updated with current data get better predictions as soon as possible.

Keywords: Hospitality Industry, Tourism, Global Economic Growth, Predictive Models

1. INTRODUCTION

Travelers today are increasingly booking their holiday accommodation online. The rise in preference for online bookings has coincided with an increase in the power and persuasiveness of online peer review [1]. Customers consider peer reviews to be more independent and trustworthy and tend to rely on them more than information provided by business entities [5]. With the rapid growth of online communication platforms and the explosion of two-way information exchange about consumer products and services, online reviews, announcements, opinions and recommendations have become a source of real opportunities and challenges in the tourism and hospitality industry [6] . In other words, consumers find the content of online reviews more useful than recommendations from other online information sources [7]. Online reviews are particularly influential in the tourism and hospitality industry [8].

2. Background Of Research Study

The global hospitality industry, which includes hotels and other types of accommodation, as well as restaurants, bars, casinos, cruise ships, travel agencies, tour operators and similar organizations, accounted for roughly $4.5 trillion. The crisis particularly affected the above-average representation of small and medium-sized enterprises in sectors such as accommodation and food services (OECD, 2020). As of June 22, 2020, 513 companies in the restaurant segment filed for bankruptcy (WTTC, 2020c). Large firms also suffered from the decline (WTTC, 2020c). For example, Marriott International, which has 174,000 employees worldwide, has placed tens of thousands of employees on furlough, and Hilton Worldwide announced to creditors in March 2020 that it would take a precautionary $1.75 billion revolving credit facility to preserve cash and maintain flexibility (Nicola et al., 2020).

3. Problem Statement And Research Objectives

This research study is focused on "Predictive Analysis of Hospitality Industry to Global Economic Growth" and its significant research issues. The researcher covered the all the possibility of Hospitality Industry to Global Economic Growth worldwide and formulated the following research issues.

1. To study the global economic growth rate of hospitality Industries.

2. To study the different predictive model on hospitality industry to global economic Growth
3. To analyze the accuracy level of different predictive model on Hospitality Industry to Global Economic Growth.

4. RESEARCH DESIGN AND METHODOLOGY

In this research paper, researchers used Random Forest, Decision tree, XG-boost techniques to control for inconsistent data and provide a higher level of prediction model. Regarding predictive models for machine learning, the researchers used comparative studies of logistic regression and random forest, support vector algorithms, gradient boosting, XG-Boost and light gradient boosting technology to classify customers who are agitated and not agitated in the job market.

Input training set $\{ (xi,yi)\}^{n}_{i=1,}$ a different loss function L(y,F(x)), number of iterations M.

Algorithms:

Step-1: Initialize model with a constant value

$F_0(x)=\arg\min \sum_{k=1}^{n} L(yi, y)$ .....(1)

Step-2: For m=1 to M

1. Compute so called pseudo residuals

$$rim=\left[\frac{\partial L(yi, F(xi))}{\partial F(xi)}\right] \quad F(x)=F_{m-1}(x) \text{.....(2)}$$

for i=1,2,3,4,.....n.

5. RESULT AND DISCUSSION

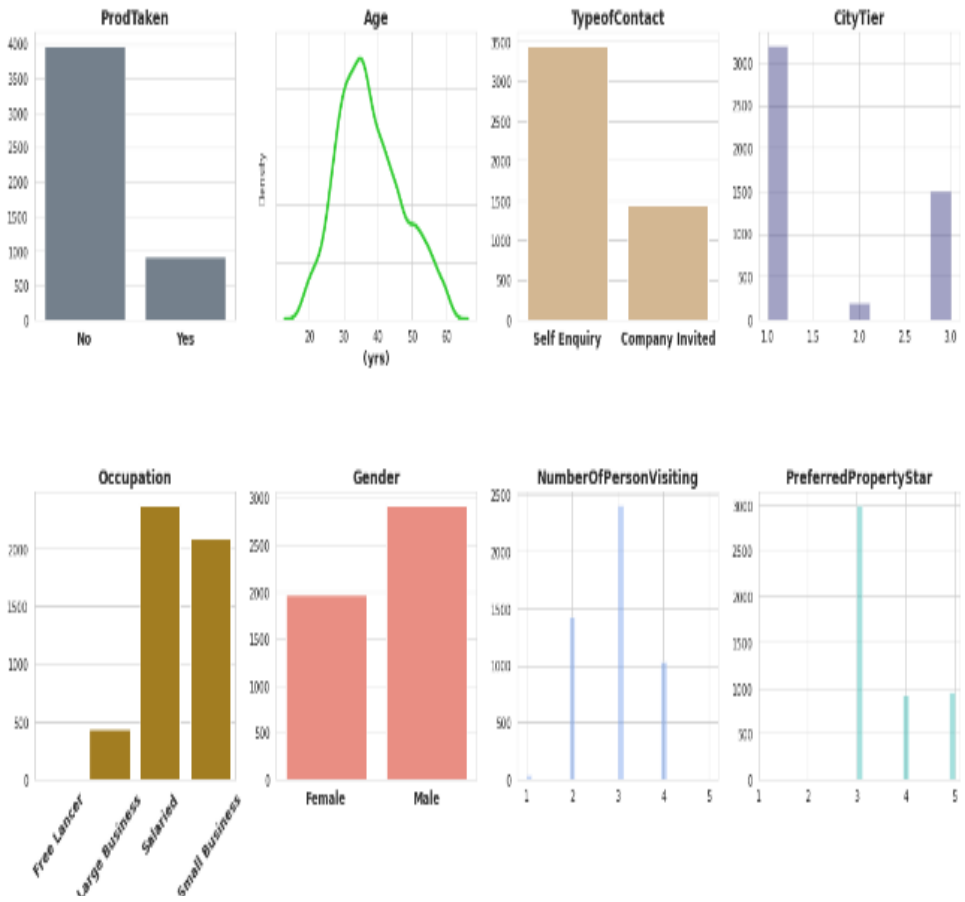

Fig.1.1: General Statistics of Customers

The data analysis report represents in detail about the customers such as age group who are more travelling , occupations, gender specification and others features which are using frequently by the customers (Fig.1.1).

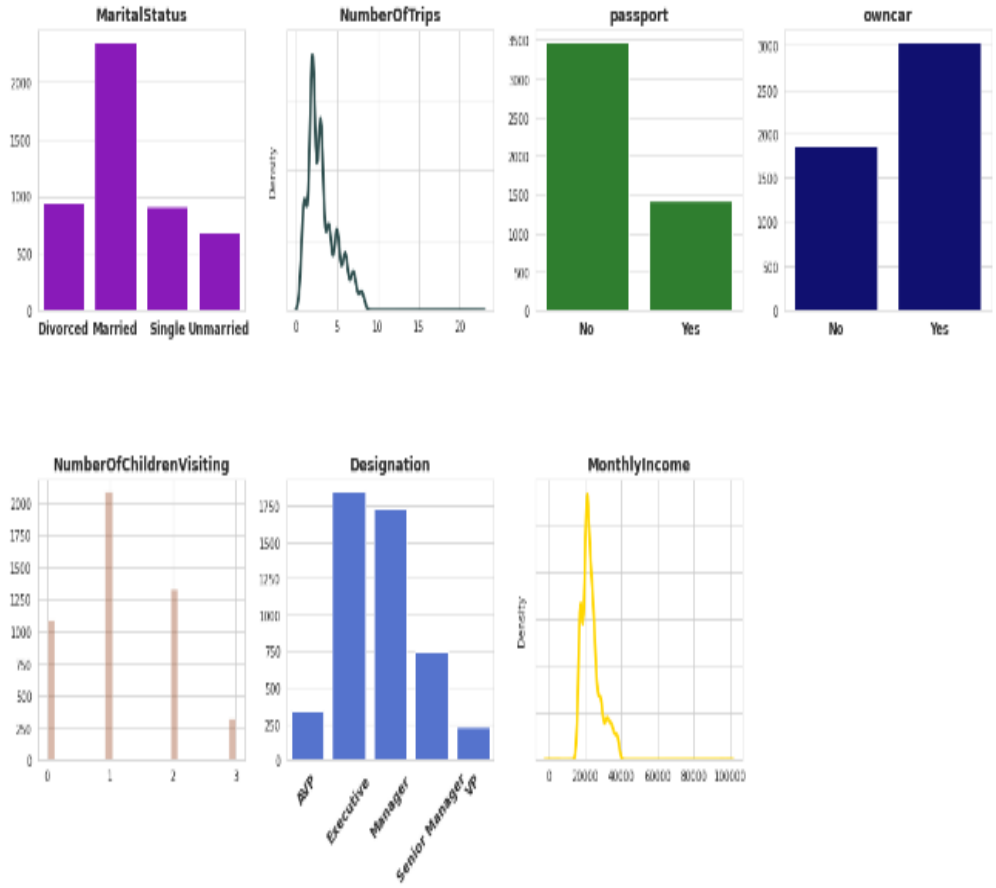

Fig.1.2. Personal Statistics of Customers

This data statistics represents the family background and current marital status of customers, number of children, number of trips, designations, monthly income, own car or taking rental during the trips, passport belongings, , these all factors playing the significant role in hospitality industries with respect to economic growth at global level (Fig.1.2).

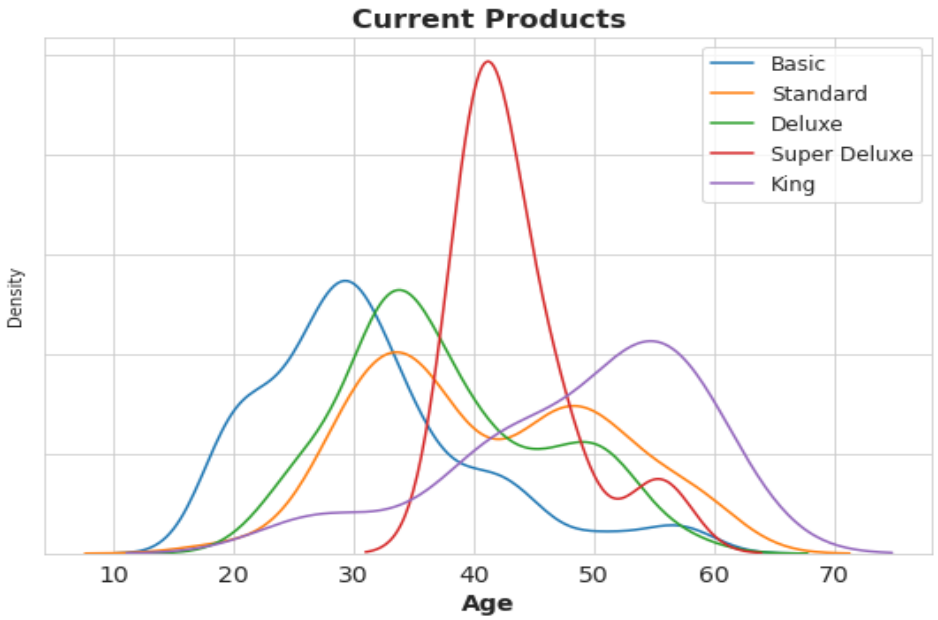

Fig.1.3. Statistics of Customer Age and Their Hotel Booking

This data statistical analysis report represents the customer age and categories of hospitality booking standards, during the researcher study the researcher found that age in between 30 to 40 years usually booked the super deluxe level of hospitality (Fig.1.3). Basic package: popular with customers in their 20s, 30s, and 40s, Standard and Deluxe packages: skewed towards customers in their 30s and 40s, Super Deluxe package: popular with customers in their 40s and 50s, King package: popular with customers in their 40s and 50s.

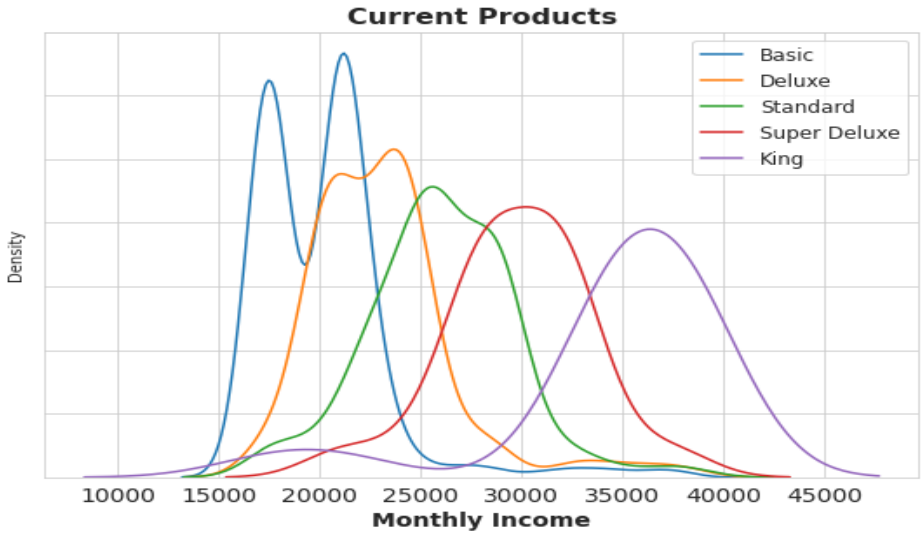

Fig.1.4. Statistics of Customers Monthly Income and Their Hotel Booking

Observations

The above data analysis report represents the monthly income of customers and their hospitality booking such as Basic Package: Popular with customers with income range between 15k and 25k, Deluxe Package: Popular with customers with income range between 20k and 30k, Standard Package: Popular with customers with income range between 20k and 35k, Super Deluxe Package: Popular with income range between 25k and 35k, King: Popular with customers with income range between 30k and 45k(Fig.1.4).

Predictive Analysis

S. No	Predictive Models	Accuracy	Recall	Precision
1	Decision Tree	0.855974	0.891156	0.670330
2	Random Forest	0.891980	1.000000	0.775076
3	Ada-Boost Classifier	0.845336	0.790244	0.685083
4	Gradient-Boost Classifier	0.900982	1.000000	0.804805
5	XG-Boost	0.892390	1.000000	0.767647

The above data analysis report represents the predictive analysis of hospitality data and their frequent booking of hotels and trips. There are number of features which playing a significant role in economic growth such as customer age factors, monthly income, number of children, designations, passports, and many others. The researcher used the accuracy level of predictive model, recall and precision which are given such as Decision Tree Accuracy 0.855974%, Recall- 0.891156 , Precision 0.670330, Random Forest Accuracy0.891980%, Recall 1.000000, Precision 0.775076, Ada-Boost Classifier Accuracy 0.845336%, Recall 0.790244, Precision 0.685083, Gradient-Boost Classifier 0.900982%,Recall 1.000000, Precision 0.804805, XG-Boost Accuracy 0.892390%, Recall 1.000000, Precision 0.767647. The researcher found that As far as the model is concerned, 90% accuracy, 72% Recall, and 74% Precision was obtained, which was the best scores out of all the models that were evaluated.

SUMMARY OF MODEL PERFORMANCES

Finally the researcher concluded that research issues on "Hospitality Industry to Global Economic Growth" has a significant impact with respect to economic growth in the real world. The researcher used 4888 customers data with 20 features which are covered the all possible features of customers who are travelling and staying in hotels. The researcher used the different machine learning algorithms and models, the results analysis are showing that except the decision tree and the Ada-boost classifier appear to be slightly overpowered. Ada-boost should not be seriously considered due to its repeated reviews. For the remaining models, the occurrence of over fitting may indicate that the sample weights are compensated by the nature of the algorithms' error correction process. The stacking model is definitely the best performing model here and the predictions from this model will be used up to the exploratory analysis of the predicted subset. As for the model, it achieved 90% Accuracy, 72% recall and 74% Precision, which was the best score of all the models evaluated. While this model may be sufficient to obtain better than chance results for an initial marketing program, it is recommended that Visit Us collect data on Wellness Tourism package sales and customers as the product is being rolled out so that the model can be updated with current data which would get better predictions as soon as possible.

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