**AGH UNIVERITY OF SCIENCE AND TECHNOLOGY**
**FACULTY OF APPLIED MATHEMATICS**

# The Selection of a Model for Airlines Customer Satisfaction

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**Abstract**

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# Contents

# 1 Introduction

## 1.1 Introduction

# 2 The Data

```
## Rows: 129,880
## Columns: 23
## $ satisfaction                          <chr> "satisfied", "satisfied", "sati...
## $ Gender                                <chr> "Female", "Male", "Female", "Fe...
## $ `Customer Type`                       <chr> "Loyal Customer", "Loyal Custom...
## $ Age                                   <dbl> 65, 47, 15, 60, 70, 30, 66, 10,...
## $ `Type of Travel`                      <chr> "Personal Travel", "Personal Tr...
## $ Class                                 <chr> "Eco", "Business", "Eco", "Eco"...
## $ `Flight Distance`                     <dbl> 265, 2464, 2138, 623, 354, 1894...
## $ `Seat comfort`                        <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ `Departure/Arrival time convenient`   <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ `Food and drink`                      <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ `Gate location`                       <dbl> 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3...
## $ `Inflight wifi service`               <dbl> 2, 0, 2, 3, 4, 2, 2, 2, 5, 2, 3...
## $ `Inflight entertainment`              <dbl> 4, 2, 0, 4, 3, 0, 5, 0, 3, 0, 3...
## $ `Online support`                      <dbl> 2, 2, 2, 3, 4, 2, 5, 2, 5, 2, 3...
## $ `Ease of Online booking`              <dbl> 3, 3, 2, 1, 2, 2, 5, 2, 4, 2, 3...
## $ `On-board service`                    <dbl> 3, 4, 3, 1, 2, 5, 5, 3, 4, 2, 3...
## $ `Leg room service`                    <dbl> 0, 4, 3, 0, 0, 4, 0, 3, 0, 4, 0...
## $ `Baggage handling`                    <dbl> 3, 4, 4, 1, 2, 5, 5, 4, 1, 5, 1...
## $ `Checkin service`                     <dbl> 5, 2, 4, 4, 4, 5, 5, 5, 5, 3, 2...
## $ Cleanliness                           <dbl> 3, 3, 4, 1, 2, 4, 5, 4, 4, 4, 3...
## $ `Online boarding`                     <dbl> 2, 2, 2, 3, 5, 2, 3, 2, 4, 2, 5...
## $ `Departure Delay in Minutes`          <dbl> 0, 310, 0, 0, 0, 0, 17, 0, 0, 3...
## $ `Arrival Delay in Minutes`            <dbl> 0, 305, 0, 0, 0, 0, 15, 0, 0, 2...
```

The data is downloaded from www.kaggle.com and delivered by an airline organization. The dataset consists of the details of customers who have already flown with them. The feedback of the customers on various context and their flight data has been consolidated. The main purpose of this dataset is to predict whether a future customer would be satisfied with their service given the details of the other parameters values. Also the airlines need to

know on which aspect of the services offered by them have to be emphasized more to generate more satisfied customers. The data consists of 129880 rows and 23 columns.\ Below we list all column names with explanations of the variables' meaning: * Satisfaction: Airline satisfaction level (satisfactied or dissatisfied) Gender: Gender of the passengers (male or female) Customer type: The customer type (loyal customer or disloyal customer) Age: the actual age of passengers (in years) Type of travel: Purpose of the flight of the passengers (personal travel or business travel) Class: Travel class in the plane of the passengers (business, eco or eco plus) Flight distance: The flight distance of this journey Seat comfort: Satisfaction level of seat comfort (0:Not Applicable;1-5) Departure/arrival: Satisfaction level of departure/arrival time convenient (0:Not Applicable;1-5) Food and drink: Satisfaction level of food and drink (0:Not Applicable;1-5) Gate location: Satisfaction level of gate location (0:Not Applicable;1-5) Inflight WiFi service: Satisfaction level of the inflight wifi service (0:Not Applicable;1-5) Inflight entertainment: Satisfaction level of inflight entertainment (0:Not Applicable;1-5) Online support: Satisfaction level of online support (0:Not Applicable;1-5) Ease of online booking: Satisfaction level of online booking (0:Not Applicable;1-5) On-board services: Satisfaction level of on-board service (0:Not Applicable;1-5) Leg room service: Satisfaction level of leg room service (0:Not Applicable;1-5) Baggage handling: Satisfaction level of baggage handling (0:Not Applicable;1-5) Checkin service: Satisfaction level of check-in service (0:Not Applicable;1-5) Cleanliness: Satisfaction level of cleanliness (0:Not Applicable;1-5) Online boarding: Satisfaction level of online boarding (0:Not Applicable;1-5) Departure delay in minutes: Minutes delayed when departure (0:Not Applicable;1-5) Arrival delay in minutes: Minutes delayed when arrival (0:Not Applicable;1-5)

## 2.1 The Data Quality

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# 3 Data Wrangling

## 3.1 Categorical Variables

### 3.1.1 The information Value

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## 3.2 The Continous Variables

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### 3.2.1 Decide which Continuous Variable to Use

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## 3.3 Data Binning

### 3.3.1 The Categorical Variables

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fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

### 3.3.2 The Continuous variables

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# 4 The Logisic Regresssion

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# 5 The performance of the Model

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# 6 Validation of the Model

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### 6.1 Monte Carlo Cross Validation

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## 7 The Challenger Models

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### 7.1 Neural Network

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### 7.2 Another logistic regression: logistic 2

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# 8 Conclusion

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# 9 Bibliography