

# Airline Passenger Satisfaction

**JYLES, ABREA**

**RODRIGUEZ, FATIMA**

**WHITE, HENRY**

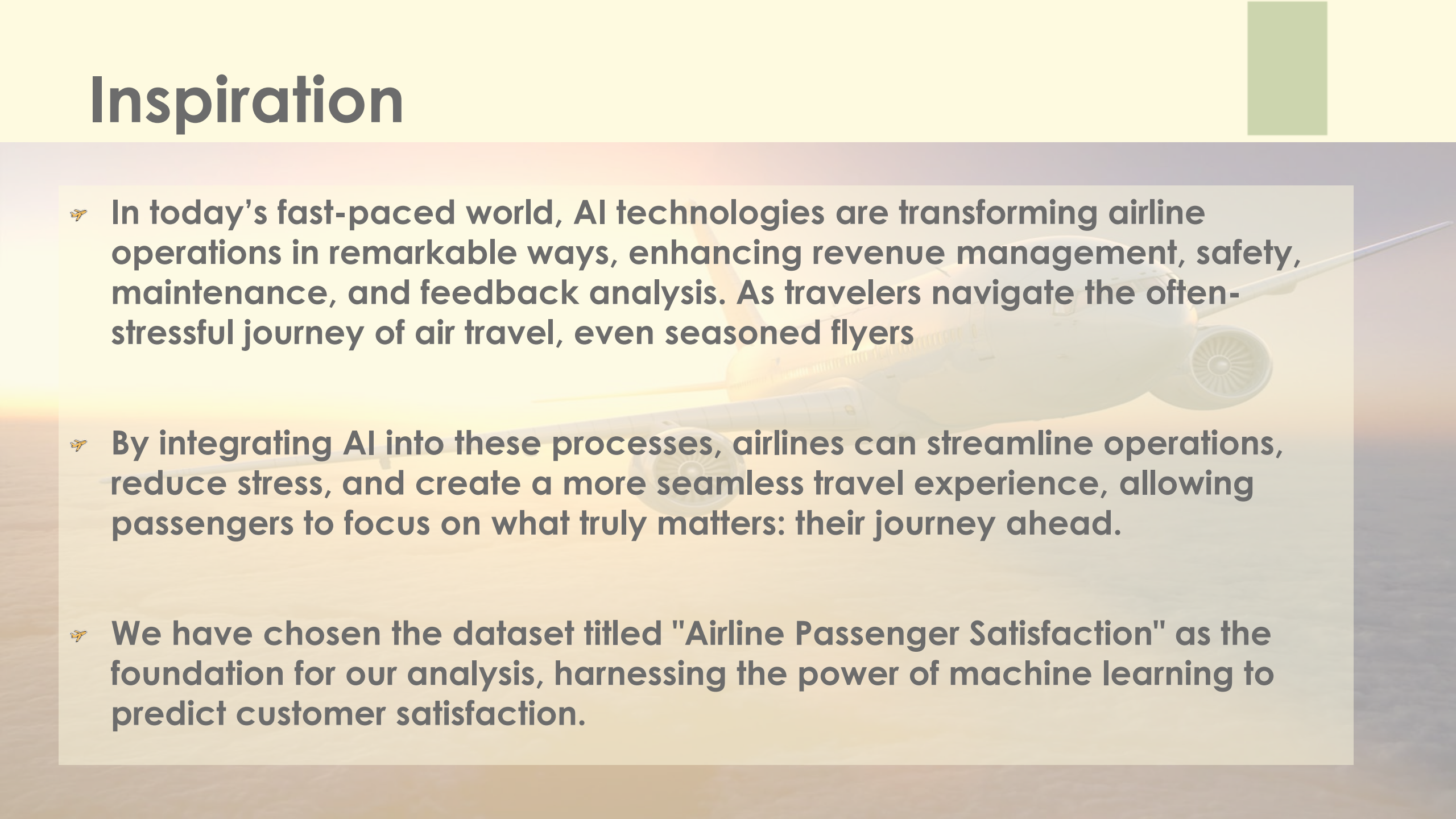


# Our Purpose

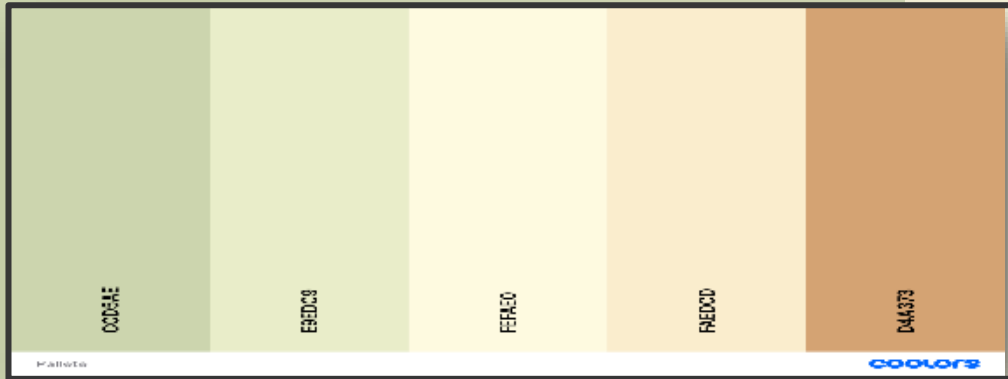
Is to analyze, solve, and visualize a problem using machine learning (ML) techniques and Tableau.

- ✈️ We will leverage a dataset consisting of evaluation surveys from passengers, which includes diverse demographic information and feedback on their experiences.
- ✈️ To uncover insights that can enhance passenger satisfaction and improve overall service quality based on the survey responses.
- ✈️ Through this project, we aim to apply ML algorithms to identify patterns and trends in the data

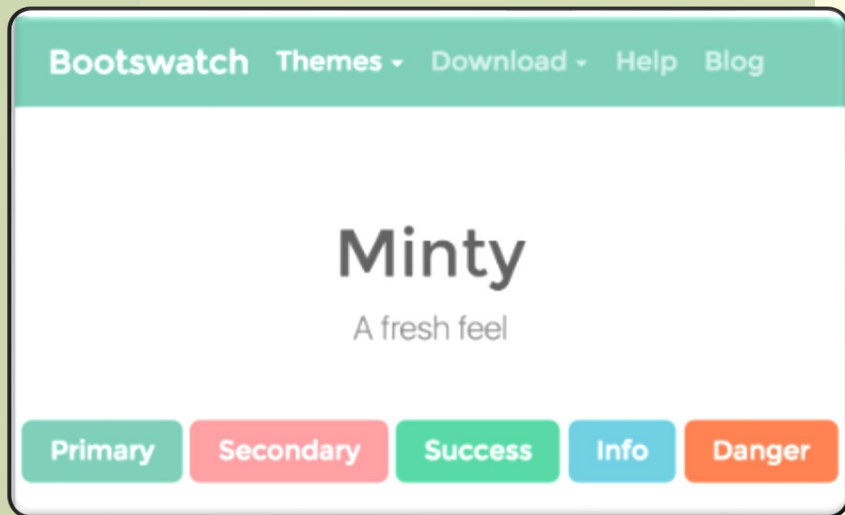
# Inspiration

- 
- ✈ In today's fast-paced world, AI technologies are transforming airline operations in remarkable ways, enhancing revenue management, safety, maintenance, and feedback analysis. As travelers navigate the often-stressful journey of air travel, even seasoned flyers
  - ✈ By integrating AI into these processes, airlines can streamline operations, reduce stress, and create a more seamless travel experience, allowing passengers to focus on what truly matters: their journey ahead.
  - ✈ We have chosen the dataset titled "Airline Passenger Satisfaction" as the foundation for our analysis, harnessing the power of machine learning to predict customer satisfaction.

# Design Concepts



For the presentation and dashboard, we selected a pallet containing light tones of green, yellow and brown



For the Web App, the theme selected was Minty



# Research Questions

- ✈️ Can we predict passenger satisfaction? What factors affect satisfaction the most?
- ✈️ Do passengers of different gender, ages, customer types, and types of travel report higher satisfaction levels?
- ✈️ Does the quality of inflight services (such as food and drink, inflight entertainment, and seat comfort) is positively correlated with overall passenger satisfaction?



# Time to Takeoff

WEBAPP





# Conclusions

**High Dissatisfaction Rate:** The analysis reveals a significant portion of passengers, **56.55%**, reported dissatisfaction with their airline experience. This indicates a critical need for airlines to address customer concerns, particularly in areas highlighted by the low overall service rating of under 3.5 out of 5.

The study identified several key features that significantly influence passenger satisfaction: inflight Wi-Fi service, online boarding, leg room service, and seat comfort. Airlines should prioritize enhancements in these areas to address the primary pain points of their customers.

The development of a prediction model utilizing XGB, achieving an impressive 98% accuracy, demonstrates the effectiveness of machine learning in understanding passenger satisfaction. This model can serve as a valuable tool for airlines to anticipate customer experiences based on specific inputs, enabling more personalized services and targeted interventions to improve satisfaction rates.

Although variables such as gender, customer type, age, type of travel, class, flight distance, and delays were considered, they showed no significant weight in predicting customer satisfaction. This suggests that satisfaction is more strongly driven by service quality and operational factors rather than demographic characteristics.



# Bias and limitations

Initially, XGBoost was chosen as the machine learning model due to its robustness and performance. However, we ultimately replaced it with Gradient Boost, because we faced deployment issues on Python Anywhere.

To enhance the efficiency of our analysis in Tableau, we created new columns based on existing data. This was done with the objective of visualizing better results and performing calculations that otherwise would not have been possible.

In our analysis, we treated null values as zero, which could significantly impact the overall satisfaction rate. This approach assumes that missing data corresponds to a lack of satisfaction, which may not be accurate.



# Future work

- ✈ Leveraging data analytics to understand passenger preferences and behaviors can help airlines offer more personalized services. Implementing loyalty programs that reward frequent flyers with tailored benefits, such as extra legroom or priority boarding, can enhance customer satisfaction.
- ✈ Investing in advanced digital solutions can significantly enhance passenger experience. This includes improving inflight wi-fi connectivity, streamlining online boarding processes, and offering user-friendly mobile apps that provide real-time updates and personalized travel information.
- ✈ By continuously refining their prediction models with real-time data (such as flight delays, customer feedback, and service usage patterns), airlines can proactively adjust staffing, resources, and service offerings.



# Works Cited

- ✈ Teejmahal20. Airline Passenger Satisfaction Dataset. Kaggle, <https://www.kaggle.com/datasets/teejmahal20/airline-passenger-satisfaction>.
- ← XGBoost. Python Package Introduction. [https://xgboost.readthedocs.io/en/stable/python/python\\_intro.html](https://xgboost.readthedocs.io/en/stable/python/python_intro.html).
- ✈ Scikit-learn. Scikit-learn: Machine Learning in Python. <https://scikit-learn.org/stable/>.
- ✈ PythonAnywhere. PythonAnywhere: Python in the Cloud. <https://www.pythonanywhere.com/>.
- ✈ Tableau Public. Tableau Public: Discover and Share Data Visualizations. <https://public.tableau.com/app/discover>.