RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

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Department of Computer Science and Engineering

Flight Fare Prediction Using Machine Learning Techniques

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Problem Statement and Motivation

Problem Statement:

Accurately predicting flight fares is a complex challenge due to multiple influencing factors such as brand, time, aircraft specs, and demand variability

Motivation:

With rising airline usage, customers and airlines alike can benefit from an accurate, intelligent pricing system for better decision-making and competitive advantage.

Existing System

- Traditional systems rely on linear regression or hedonic pricing models.
- Limited ability to handle non-linearity and high-cardinality categorical data.
- Prone to overfitting and poor generalization

Objectives

- Predict flight fare resale prices using machine learning.
- Improve accuracy and generalization using ensemble models.
- Identify key features influencing price.
- Deploy a scalable, real-world model.

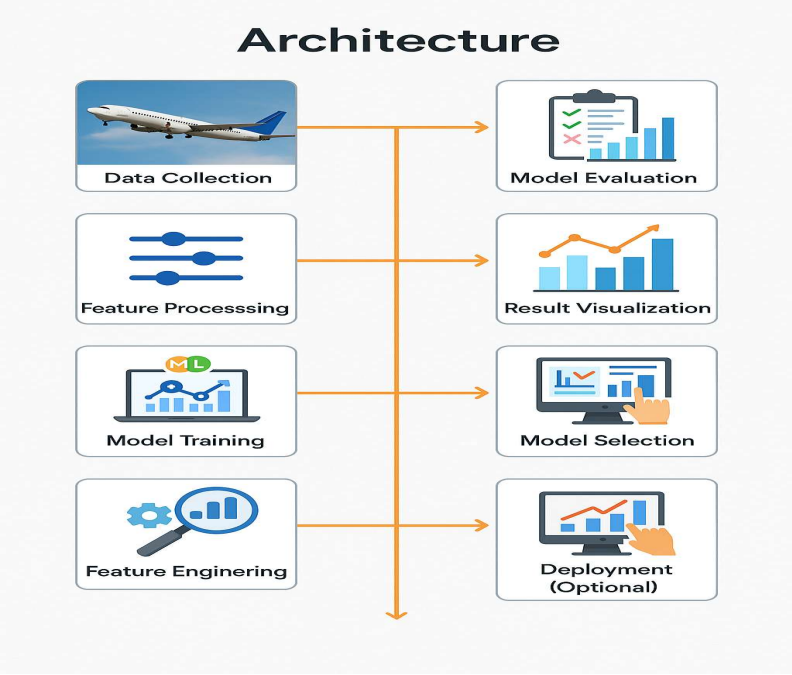
Abstract

This project uses historical flight fare data to build a machine learning-based predictive model. A variety of algorithms are employed—including ensemble methods like XGBoost—to capture complex relationships in pricing. Results show that these models outperform traditional methods in terms of accuracy and robustness.

Proposed System

- Use a cleaned and preprocessed dataset of historical flight fares.
- Apply multiple ML algorithms including regression and ensemble methods.
- Evaluate model performance with metrics like MAE, MSE, and R^2 Score.
- Select and visualize the best-performing model

System Architecture



List of Modules

- Data Collection and Preprocessing
- Feature Engineering
- Model Training (ML Algorithms)
- Performance Evaluation
- Result Visualization
- Deployment Readiness (Optional)

Functional Description for each modules with DFD and Activity Diagram

- **Data Collection:** Fetch historical flight fare data.
- **Preprocessing:** Handle missing values, encode categoricals, scale numericals
.
- **Modeling:** Train models (e.g., Linear, RF, XGBoost).
- **Evaluation:** MAE, MSE, R^2 Score.
- Include a basic **DFD and activity diagram** showing flow

Implementation & Results of Module

Conclusion:

XGBoost outperformed other models, effectively predicting flight fares by learning complex patterns. Feature engineering and tuning enhanced model accuracy.

Future Work:

- Add real-time API for dynamic fare prediction.
- Use deep learning for image/text-based ticket data.
- Apply explainable AI for transparency.
- Explore time series modeling

Conclusion & Future Work

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References

Saini, R., & Tiwari, A. (2021)
Flight Fare Prediction System Using Random Forest and XGBoost.
Journal of Emerging Technologies and Innovative Research (JETIR), 8(4), 101–107.

Rajesh, A., & Arun, V. (2020)
Airfare Price Prediction Using Supervised Learning Techniques.
International Journal of Scientific & Technology Research, 9(1), 282–285.

Kumar, V., & Goel, D. (2019)
Flight Ticket Price Prediction Using Machine Learning.
International Journal of Computer Sciences and Engineering, 7(6), 622–628.

Thank You