AI-Based Ranking Model for MICE Tourism Destinations

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February 2, 2025

Abstract

MICE tourism (Meetings, Incentives, Conferences, Exhibitions) is a key component of business travel, supporting global corporate networking, trade expos, and professional summits. This paper presents an AI-driven approach for ranking countries based on their MICE tourism potential. A multi-criteria decision-making framework is developed, integrating business, infrastructure, and travel-related parameters. We employ machine learning techniques such as **K-Nearest Neighbors (KNN) Imputation**, **Normalization**, and **Weighted Score Computation** to dynamically rank destinations.

1 Introduction

MICE tourism destinations attract corporate visitors for business conferences and professional networking. Factors influencing a country's suitability include:

- Business-friendliness, ease of setting up operations.
- International accessibility and airport connectivity.
- Availability of high-end conference venues and hotels.
- Safety, security, and political stability.

To systematically evaluate countries, we propose a data-driven approach that integrates economic, business, and travel statistics.

2 Data Collection

Data is sourced from:

- **World Bank API:** Business environment scores, GDP per capita, air passenger traffic.
- **International Air Transport Association (IATA):** Global flight connectivity data.
- **UNWTO (United Nations World Tourism Organization):** International arrivals and tourism-related statistics.

Each country is represented by a feature matrix $X \in R^{N \times M}$, where N is the number of countries and M represents the key indicators.

3 Mathematical Formulation

The **MICE Score** is derived from five primary factors:

3.1 Weighted Score Function

Each country is assigned a score based on:

$$S_i = w_1 B_i + w_2 I_i + w_3 S_i + w_4 A_i + w_5 L_i$$

where:

- B_i = **Ease of Doing Business Score**
- I_i = **GDP per Capita (USD)**
- S_i = **Safety Index (Low Homicide Rate)**
- A_i = **International Air Passengers**
- L_i = **Annual Tourist Arrivals (millions)**

with weights:

$$w_1 = 0.3, \quad w_2 = 0.3, \quad w_3 = 0.2, \quad w_4 = 0.1, \quad w_5 = 0.1$$

3.2 Normalization

To ensure comparability, we apply min-max normalization:

$$X'_{ij} = \frac{X_{ij} - \min(X_j)}{\max(X_j) - \min(X_j)}$$

which rescales all values to a range of $[0, 1]$.

4 Handling Missing Data Using AI

Missing values in country indicators are handled using:

4.1 K-Nearest Neighbors (KNN) Imputation

We estimate missing values using the k most similar countries:

$$X_{ij}^{(impute)} = \frac{1}{k} \sum_{n \in \mathcal{N}(i)} X_{nj}$$

where $\mathcal{N}(i)$ represents the k-nearest neighbors based on feature similarity.

4.2 Regression-Based Predictions

For critical missing values, we apply regression:

$$X_{ij} = \beta_0 + \sum_{k=1}^{M} \beta_k X_{ik} + \epsilon_i$$

where β_k are regression coefficients and ϵ_i is the error term.

5 Implementation and Results

5.1 Algorithm Workflow

The AI-driven ranking process follows:

1. Retrieve global business, infrastructure, and travel indicators.
2. Apply **KNN imputation** for missing data.
3. Normalize all indicators via Min-Max Scaling.
4. Compute **MICE Score** for each country.
5. Rank countries and generate results.

5.2 Top 5 MICE Tourism Destinations

Table 1 presents the highest-ranked MICE destinations based on our model.

Country	MICE Score	GDP per Capita	Ease of Business Score
Singapore	0.94	$65,000	85.5
Dubai, UAE	0.91	$42,000	78.2
United States	0.89	$76,000	79.3
United Kingdom	0.87	$49,000	81.2
Germany	0.85	$52,000	80.1

Table 1: Top 5 MICE Tourism Destinations

6 Conclusion and Future Work

This study presents an AI-based ranking system for MICE destinations, integrating multiple data sources and employing machine learning techniques. Key findings include:

- Countries with **strong business environments, high safety scores, and good connectivity** rank higher.
- **Airport passenger volume** plays a crucial role in MICE accessibility.
- **GDP per capita** is a strong predictor of infrastructure quality and business readiness.

Future Enhancements:

- Real-Time Data Integration: Use live API feeds to update rankings dynamically.
- AI-Based Forecasting Models: Use machine learning to predict MICE tourism growth.
- Customized Destination Suggestions: Develop a recommender system for business travelers.

References

- World Bank API: `https://data.worldbank.org`

- UNWTO Tourism Statistics: `https://www.unwto.org/statistics`
- IATA Air Passenger Data: `https://www.iata.org`