QS WORLD UNIVERSITY RANKINGS 2025

Visual Analytics 2025/2026

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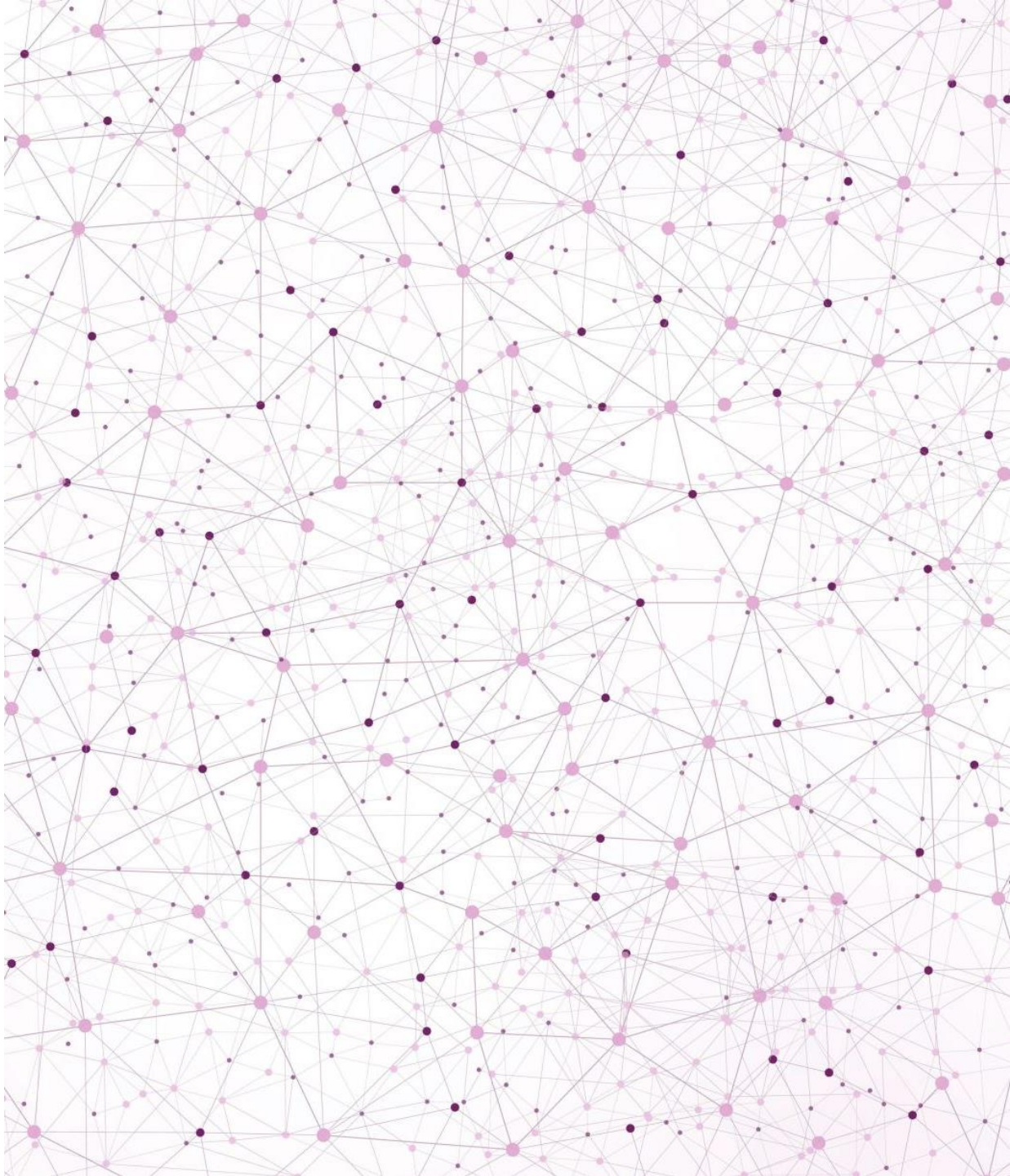


MOTIVATION

- Global university rankings summarize complex performance into a single rank
- Traditional tables do not express unrelying multidimensional structure
- Users cannot easily understand why universities differ or cluster
- QS rankings aggregate multiple heterogeneous indicators

GOALS

01

Design an interactive visual analytics system for QS 2025 rankings

02

Support exploration beyond ordinal rank comparison

03

Reveal similarity patterns and clusters

04

Combine dimensionality reduction with coordinated visualizations

INTENDED USERS

Prospective students comparing universities

University administrators and analysts benchmarking institutions

DATASET OVERVIEW

- QS World University Rankings 2025 (https://www.kaggle.com/datasets/darrylljk/worlds-best-universities-qs-rankings-2025)
- 1,503 universities worldwide
- Combination of ranking and performance indicators
- Angelini-Santucci index = 13,000

DATASET STRUCTURE

Performance Indicators:

Academic Reputation
Employer Reputation
Faculty-Student ratio
Citations per Faculty
Employment Outcomes
Sustainability

Internalization Indicators:

International Faculty
International Students
International Research Network

Contextual Attributes:

Institution Name, Location
QS Overall Score, 2025 Rank

ANALYTICAL TASKS

T1: Explore similarity and clustering of universities

T2: Compare individual institutions

T3: Analyze selected groups of universities

T4: Identify distinguishing performance features

T5: Quantify similarity and deviation using distance metrics

DIMENSIONALITY REDUCTION

- University data is high-dimensional (9 indicators)
- Direct visualization is not feasible
- Principal Component Analysis (PCA) is used
- PCA captures dominant variance structure
- Enables 2D overview of similarity relationships

VISUAL ANALYTICS CYCLE

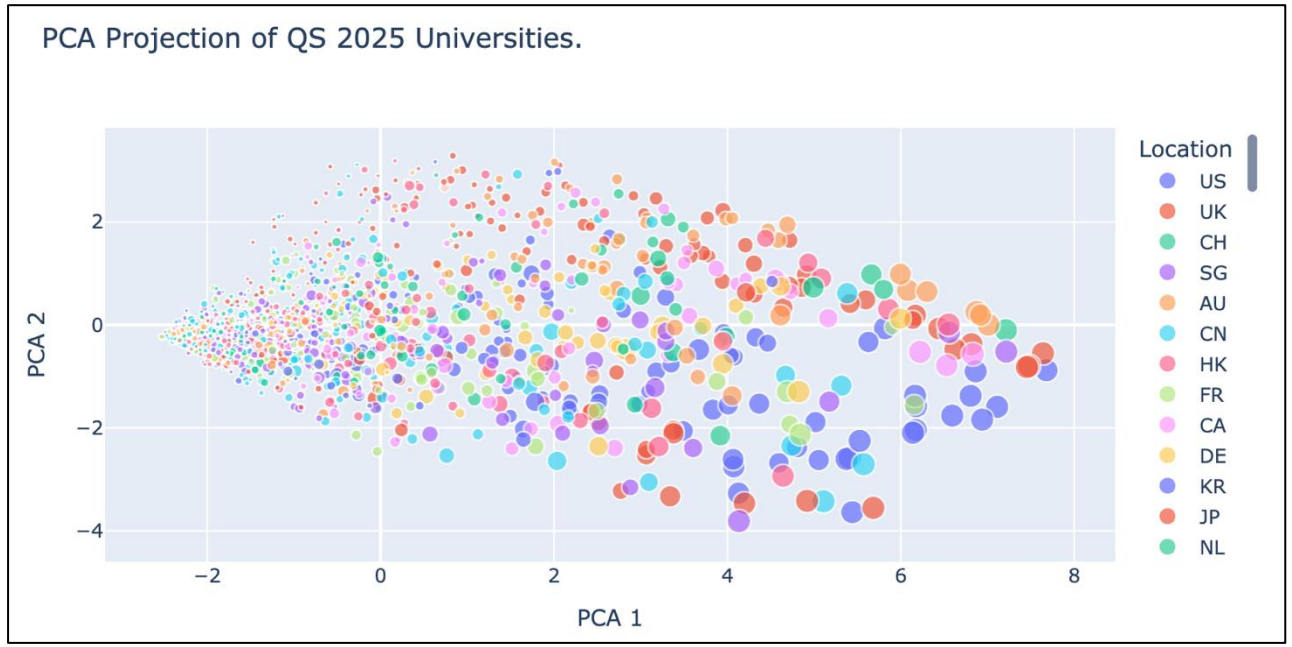
Data cleaning and standardization

PCA computation on performance indicators

Visual mapping into a 2D projection

Coordinated and bidirectional visual exploration and analytics

PCA SCATTERPLOT



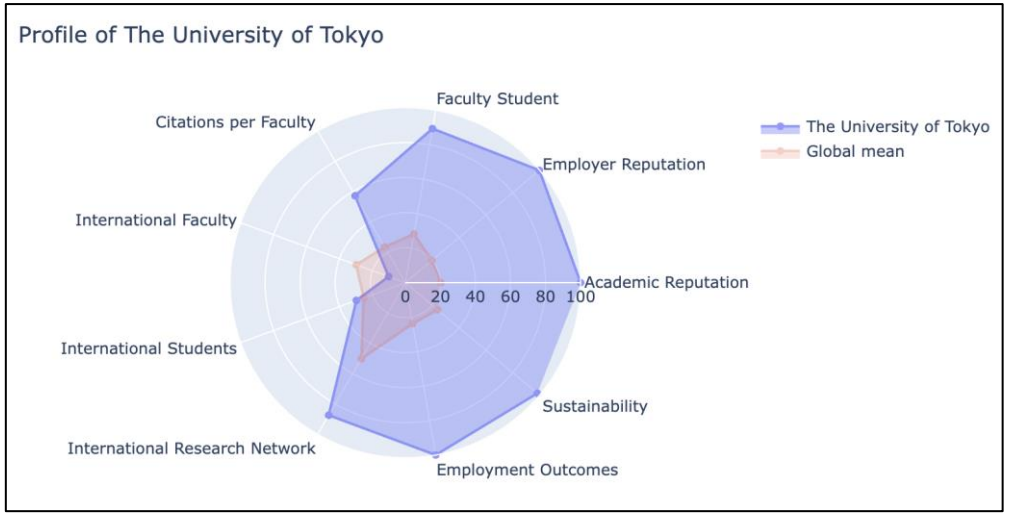
- Each point represents a university
- Position encodes PCA components
- Color encodes geographic location
- Point size reflects academic reputation
- Reveals clusters and outliers

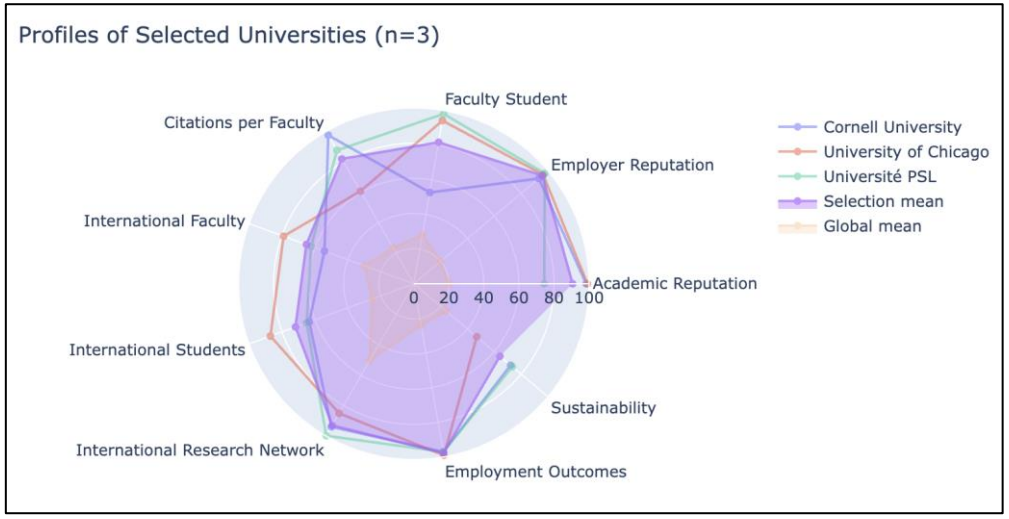
RADAR CHART

- Displays multivariate performance profiles
- Supports comparison across all indicators
- Supports direct interaction with individual profiles

Shows:

- Individual university profiles
- Selection mean
- Global mean





BAR CHART

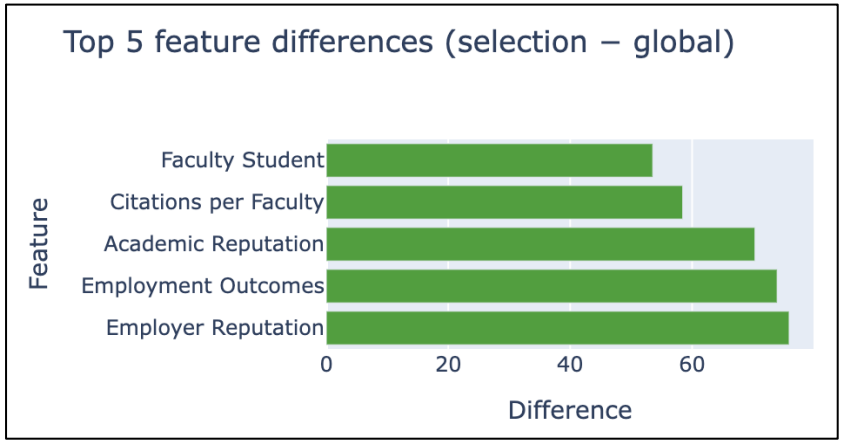
- Highlights feature differences explicitly

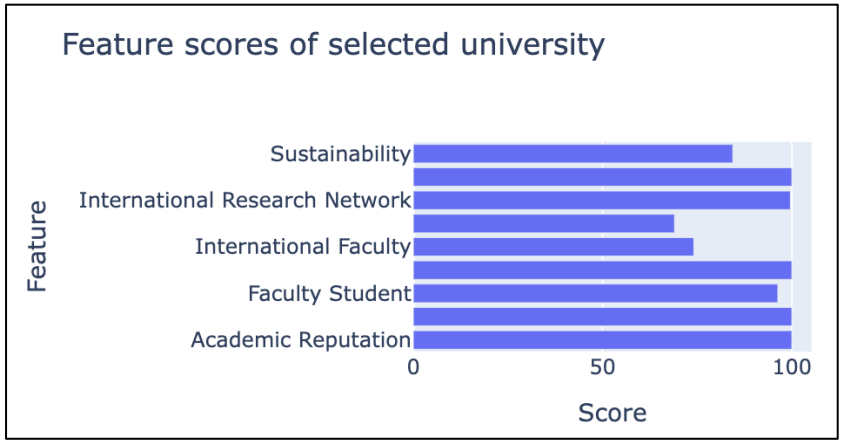
For groups:

- Most distinguishing indicators vs global mean

For single institutions:

- Absolute indicator values





DISCOVERED INSIGHTS

- PCA reveals a global structure aligned with academic strength
- High-performing universities cluster consistently
- Similar overall scores can hide very different profiles
- Performance similarity is not geographic

CONCLUSION

- Visual analytics enables deeper understanding of ranking data
- PCA + coordinated views support profile-based reasoning
- System reveals patterns hidden in ranking tables

LIVE DEMO

THANK YOU FOR YOUR ATTENTION!