

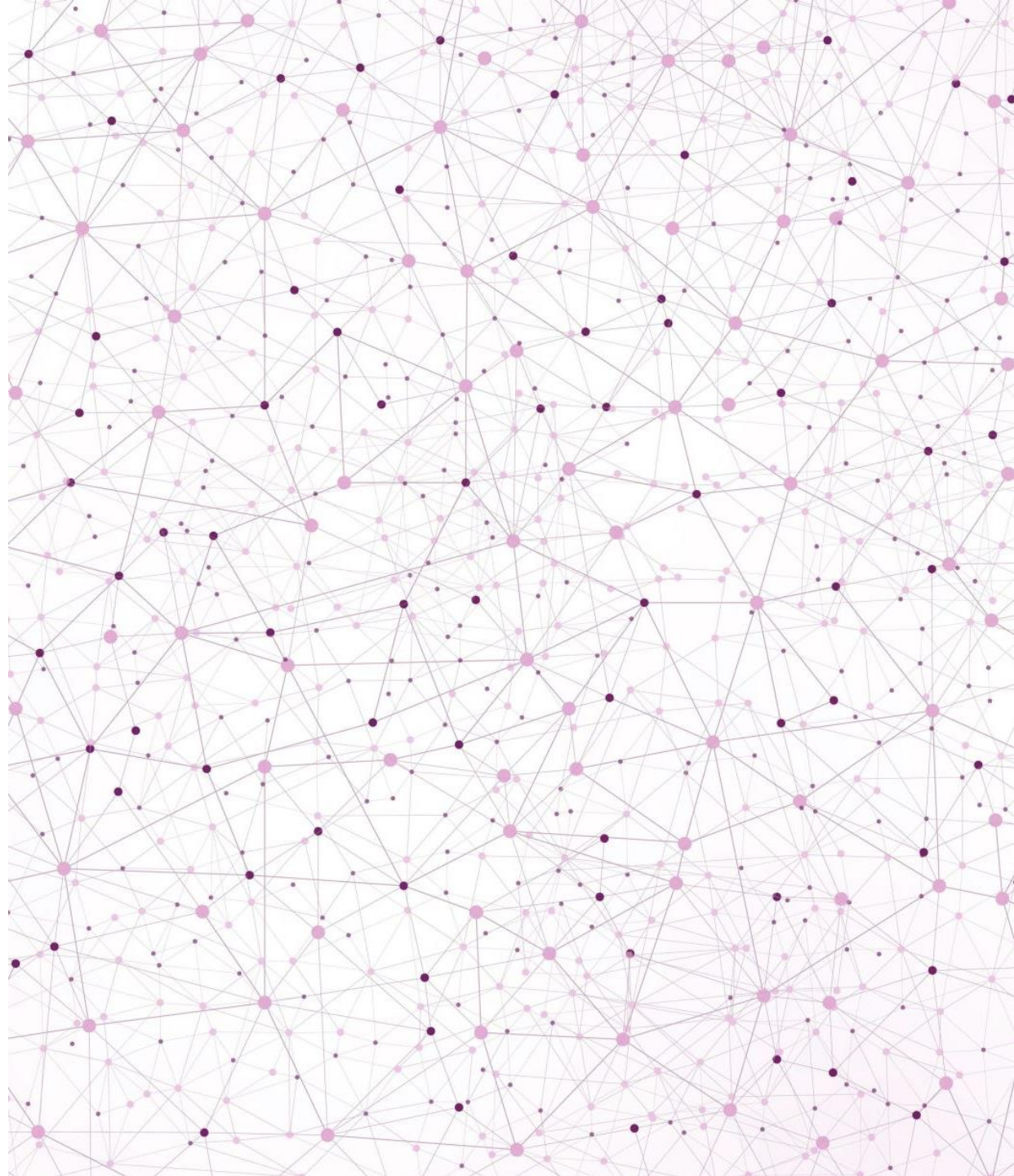
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# QS WORLD UNIVERSITY RANKINGS 2025

**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



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# 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

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# INTENDED USERS



Prospective graduate students  
comparing universities



University administrators and  
analysts benchmarking institutions

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# DATASET OVERVIEW

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

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# 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

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# 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
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# VISUAL ANALYTICS CYCLE



Data cleaning and standardization



PCA computation on performance indicators



Visual mapping into a 2D projection

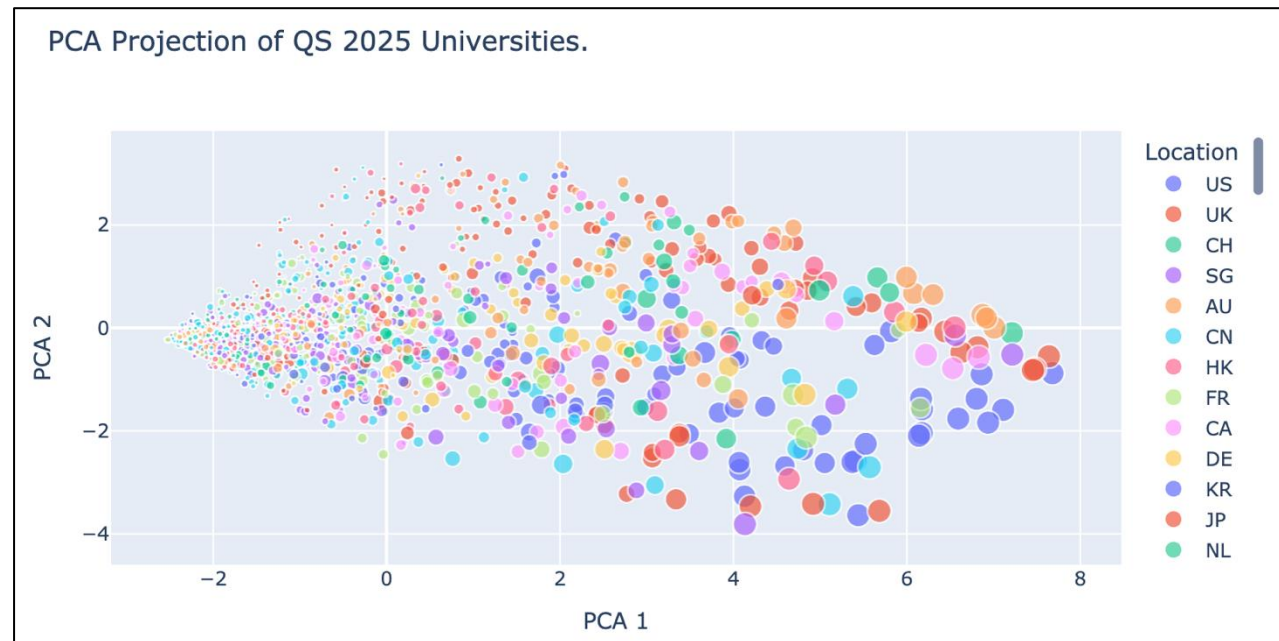


Coordinated visual exploration and analytics

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# PCA SCATTERPLOT



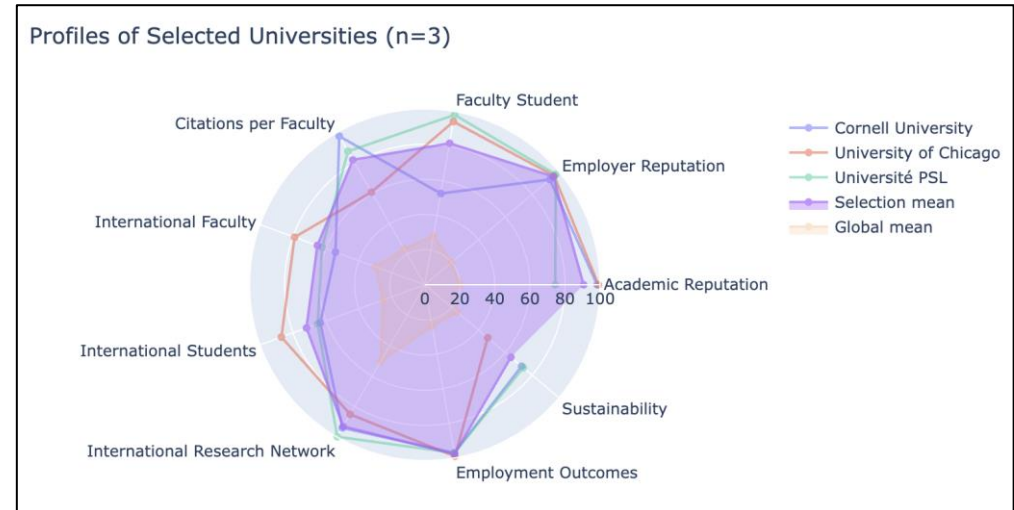
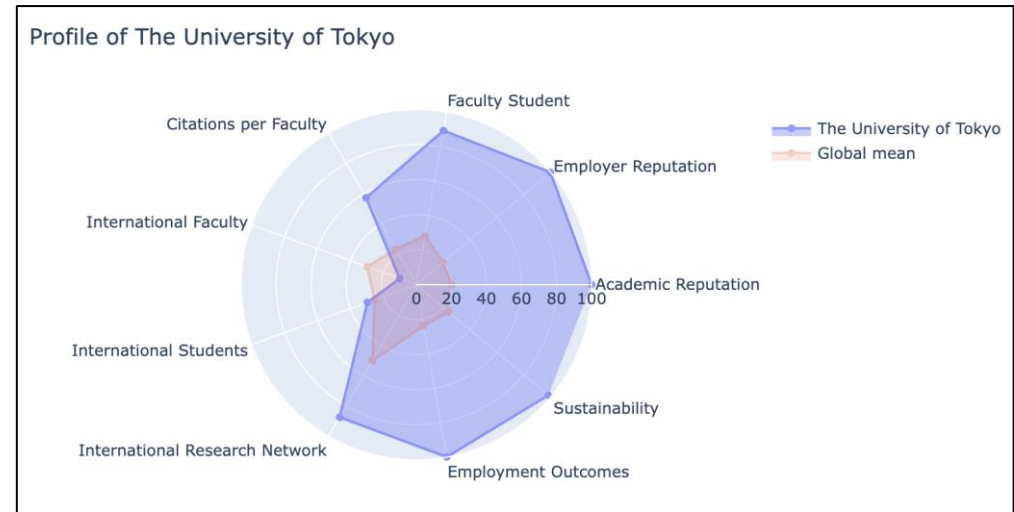
- Each point represents a university
  - Position encodes PCA components
  - Color encodes geographic location
  - Point size reflects academic reputation
  - Reveals clusters and outliers
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# RADAR CHART

- Displays multivariate performance profiles
- Supports comparison across all indicators

Shows:

- Individual university profiles
- Selection mean
- Global mean



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# BAR CHART

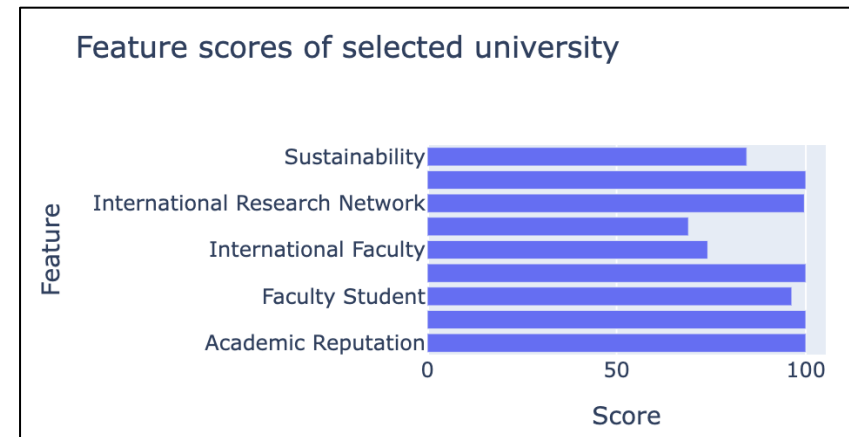
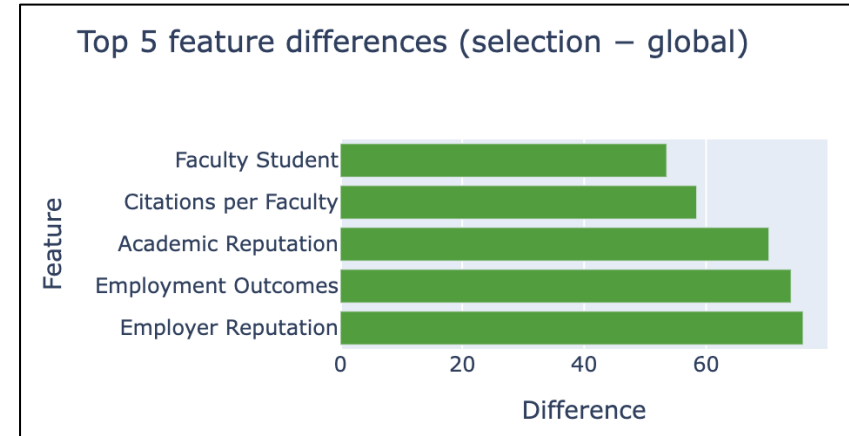
- Highlights feature differences explicitly

For groups:

- Most distinguishing indicators vs global mean

For single institutions:

- Absolute indicator values



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# 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

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# 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!**

