Classification of Turkish Universities by quantity and titles of Academic Staff

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Introduction

- Academic staff employment shows the academic characteristics of universities.
- A new dataset extracted from Yök Akademik website using Web Scraping has been formed.
- Universities are clustered based on the ratios of academic staff.

Data Retrieval

- The data used in this study were retrieved from the YÖK Academic platform website [5].
- Data is retrieved through the use of Web Scraping technique.

Web Scraping

- A technique for extracting data from a Web environment in a structured form.
- Each scraping is different from the other because each source stores the data in a different format.
- The data stored in the source site should be structured, else the scraping becomes a very hard task.
- Selenium Web Driver Tool
  - In-memory browser support to extract data from dynamic web-pages.
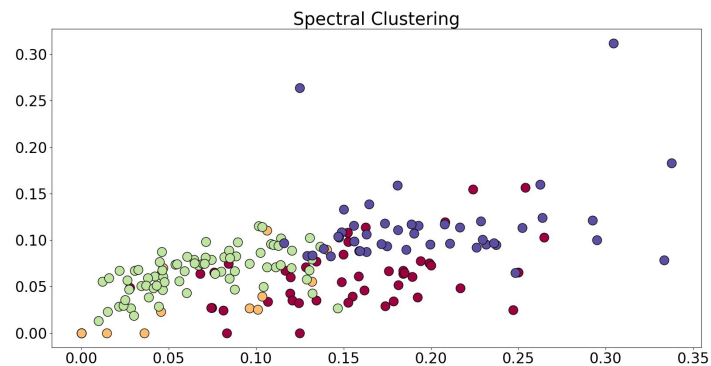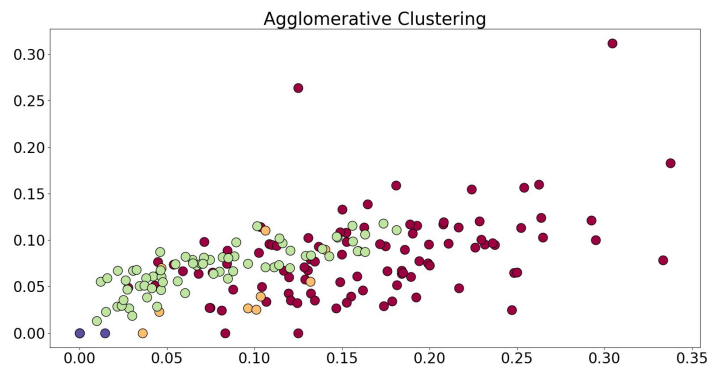 - Easy binding with many languages.

Data Processing

- The data retrieved through Web scraping is plain HTML, it need some preprocessing to form a structured data.
- Universities has 5 fields representing different academic employments all converted to integer type.
  - Professor
  - Associate Professor
  - Lecturer
  - Research Assistant
  - Assistant Professor

Unvan(lar) ⌄
☐ PROFESÖR (10)
☐ DOÇENT (12)
☐ ÖĞRETİM GÖREVLİSİ (50)
☐ ARAŞTIRMA GÖREVLİSİ (93)
☐ DOKTOR ÖĞRETİM ÜYESİ (54)

Data Mining

- The data is unlabelled. Clustering is needed.
- Many clustering solutions exist, such as hierarchical clustering, partition-based clustering, density-based clustering etc.
- Among tested algorithms, Agglomerative Clustering and Spectral Clustering algorithms are found to yield the most precise clusters.

Results

Results

- Turkish Universities are clustered in four distinct clusters.
  - State universities and private universities with balanced staff percentages.
  - Private universities with the higher percentage of instructors.
  - State universities and private universities employing mostly research assistants.
  - Vocational schools which employ almost only instructors.

Results

Cluster 0: State universities and private universities with balanced staff percentages

UNIVERSITY NAME	PROF	ASSOC PROF	INSTRUCTOR	RES ASST	ASST PROF	CLUSTER
ABANT IZZET BAYSAL UNIV.	0.108	0.096	0.213	0.306	0.277	0
IZMIR YUKSEK TEKNOLOJI ENST.	0.149	0.109	0.233	0.380	0.129	0
ULUDAG UNIV.	0.208	0.117	0.213	0.336	0.126	0
BOGAZICI UNIV.	0.189	0.117	0.226	0.305	0.164	0
ISTINYE UNIV.	0.184	0.067	0.174	0.100	0.475	0

Results

Cluster 1: Private universities with the higher percentage of instructors

UNIVERSITY NAME	PROF	ASSOC PROF	INSTRUCTOR	RES ASST	ASST PROF	CLUSTER
KAPADOKYA UNIV.	0.036	0	0.691	0.072	0.201	1
ISTANBUL AYVANSARAY UNIV.	0.101	0.025	0.667	0.071	0.136	1
IZMIR EKONOMI UNIV.	0.106	0.11	0.431	0.152	0.201	1
IHSAN DOGRAMACI BILKENT UNIV.	0.141	0.09	0.537	0.011	0.222	1
TURK HAVA KURUMU UNIV.	0.047	0.07	0.491	0.14	0.251	1

Results

Cluster 2: State and private universities employing mostly research assistants

UNIVERSITY NAME	PROF	ASSOC PROF	INSTRUCTOR	RES ASST	ASST PROF	CLUSTER
MUNZUR UNIV.	0.016	0.059	0.259	0.350	0.316	2
MUS ALPARSLAN UNIV.	0.025	0.036	0.29	0.399	0.25	2
ARDAHAN UNIV.	0.046	0.046	0.282	0.325	0.3	2
NIGDE OMER HALISDEMIR UNIV.	0.089	0.098	0.245	0.258	0.31	2
YALOVA UNIV.	0.07	0.075	0.296	0.342	0.217	2

Results

Cluster 3: Vocational schools which employ almost only instructors

UNIV. ID	PROF	ASSOC PROF	INSTRUCTOR	RES ASST	ASST PROF	CLUSTER
IZMIR KAVRAM M.Y.O	0	0	1	0	0	3
ISTANBUL SISLI M.Y.O	0	0	0.921	0	0.079	3
ATASEHIR ADIGUZEL M.Y.O	0.014	0	0.942	0	0.043	3
FARUK SARAC TASARIM M.Y.O	0	0	1	0	0	3

Conclusions

- A new dataset containing the number of employed academicians in Turkish Universities has been created.
- The data is extracted from YÖK Akademik Webpage.
- Universities with different approaches to the employment of academic staff are successfully clustered in to 4 clusters.
- State universities employ more balanced number of academic staff, compared to private universities.
- Private schools tend to employ mostly instructors, number of professors or research assistants are low.
- Faculty or department level analyzes are open for research.

Thank you