InterCriteria Analysis of rankings of Indian universities

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Abstract: The present paper discusses the application of InterCriteria Analysis over a dataset of rankings of the top performing Indian academic institutions in 2017. It serves as an illustrative example for application of the InterCriteria Analysis over weighted data. Comparison is made between the performance of the detected correlations between the different parameters before and after the application of the weight coefficients. All results are interpreted with the intuitionistic fuzzy triangle

Keywords: InterCriteria Analysis, Multicriteria decision making, Correlation, Consonance, Dissonance, University ratings.

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1   Introduction

InterCriteria Analysis, also known as InterCriteria Decision Making, is an approach that takes an index matrix containing evaluations of objects against a set of criteria as input and calculates the degrees of correlation between each pair of the criteria in the form of intuitionistic fuzzy pairs

[5]. The method introduced in 2014 by K. Atanassov, D. Mavrov and V. Atanassova [4] is based on the theory of the intuitionistic fuzzy sets [2] and the index matrices [1]. Under this approach, arrays of data obtained by the measurement of many objects against many criteria are processed until correlations are calculated for each pair of criteria in the form of intuitionistic fuzzy pairs of values in the [0, 1]-interval. The method can be successfully applied to problems, where measuring according to some of the criteria is slower or more expensive, which results in delaying or raising the cost of the overall process of decision making. When solving such problems it is necessary to adopt an approach for reasonable elimination of these criteria, in order to achieve economy and efficiency.

The idea of analyzing the rankings of universities has been explored in several works by Sotirova, Bureva and coauthors, both as general problem statement [16], and as an application to particular datasets for universities of Australia [17], Bulgaria [11, 12], Poland [KRAW], Slovakia [10], United Kingdom [15], employing the results from [3]. Here the InterCriteria Analysis is applied to data about the top performing Indian universities, and here we use the recent legs of ICA theoretical research, employing plotting of the intercriteria pairs onto the interpretational triangle [7, 9].

Hence, an attempt has been made to apply InterCriteria Analysis to discuss the parameters involved in the ratings of Universities in India. The purpose is to identify the best correlated indicators and groups of indicators in the Ranking System for the Indian Universities. By applying the approach over the extracted data, we find the parameters that have the highest dependencies. This approach can shed a light on the performance of these educational institutions and of the selected ranking parameters in the evaluation methodology.

2 Presentation of the input data

In the present research, we work with a dataset [13] containing the evaluations of 17 Indian universities (in ICA terminology: *objects*) according to 17 ranking parameters (*criteria*) for the Year 2017. In addition, we are given the weight coefficients assigned to each of the ranking parameters, which are distributed in five "broad heads" (groups), with 2 to 4 parameters in each group. The ranking parameters and weightages are presented in the following Table 1.

The methodology is developed on the basis of a set of metrics for ranking of academic institutions. Emphasis is placed on identifying data that the institution can easily provide or is easy to obtain from third party sources, and is easily verifiable in the interest of transparency. Some of the parameters' values are calculated according to formulas from primary data provided by the evaluated universities in prescribed formats (1A–1D, 2C, 2D, 3A–3E, 4A–4D, 5D), some are based on data from third party sources (2A, 2B) and some contain subjective evaluations collected from the general public through online surveys (5A–5C). The complete methodology of selecting data and assigning the parameters and their weightages is presented in details in [3]. Here we work with the available data for the universities as evaluated against 17 of the 21 parameters.

Due to data availability and attempt to be representative, we have opted to analyze here the 2017 Top 10 Institutes in Overall Ranking and Top 10 Universities, which (due to some intersection) gives a total number of 17 academic institutions:

U1:	Indian Institute of Science Bangalore	U10:	Banaras Hindu University, Varanasi
U2:	Indian Institute of Technology Madras	U11:	Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengalure
U3:	Indian Institute of Technology Bombay		
U4:	Indian Institute of Technology Kharagpur	U12:	Jadavpur University, Kolkata
U5:	Indian Institute of Technology Delhi	U13:	Anna University, Chennai
U6:	Jawaharlal Nehru University, Newdelhi	U14:	University of Hyderabad
U7:	Indian Institute of Technology Kanpur	U15:	University of Delhi
U8:	Indian Institute of Technology Guwahati	U16:	Amrita Vishwa Vidyapeetham, Coimbatore
U9:	Indian institute of Technology Roorkee	U17:	Savitribai Phule Pune University

Table 1. Ranking parameters and weightages of Indian Universities [13]

No.	Broad head Ranking parameter	Broad head weightage	Parameter weightage in group (Marks)	Total parameter weightage
1	**Teaching, Learning & Resources (TLR)**			
1A	Student Strength including Doctoral Students (SS)	0.30	20	6.0
1B	Faculty-student ratio with emphasis on permanent faculty (FSR)		30	9.0
1C	Combined metric for Faculty with PhD (or equivalent) and Experience (FQE)		20	6.0
1D	Financial Resources and their Utilisation (FRU)		30	9.0
2	**Research and Professional Practice (RP)**			
2A	Combined metric for Publications (PU)	0.30	35	10.5
2B	Combined metric for Quality of Publications (QP)		40	12.0
2C	IPR and Patents: Published and Granted (IPR)		15	4.5
2D	Footprint of Projects, Professional Practice and Executive Development Programs (FPPP)		10	3.0
3	**Graduation Outcomes (GO)**			
3A	Combined metric for Placement, Higher Education and Entrepreneurship (GPHE)	0.20	40	8.0
3B	Metric for University Examinations (GUE)		15	3.0
3C	Median Salary (GMS)		20	4.0
3D	Metric for Graduating Students Admit ted Into Top Universities (GTOP)		15	3.0
3E	Metric for Number of Ph.D. Students Graduated (GPHD)		10	2.0
4	**Outreach and Inclusivity (OI)**			
4A	Percent Students from other states/countries (Region Diversity RD)	0.10	30	3.0

No.	Broad head / Ranking parameter	Broad head weightage	Parameter weightage in group (Marks)	Total parameter weightage
				Contd.
4B	Percentage of Women (WD)		25	2.5
4C	Economically and Socially Challenged Students (ESCS)		25	2.5
4D	Facilities for Physically Challenged Students (PCS)		20	2.0
5	**Perception (PR)**			
5A	Peer Perception: Employers and Research Investors (PREMP)	0.10	25	2.5
5B	Peer Perception: Academic Peers (PRACD)		25	2.5
5C	Public Perception (PRPUB)		25	2.5
5D	Competitiveness (PRCMP)		25	2.5

The input dataset for the ICA analysis, as extracted from [13] (pp. 32–41) is given in Table 2.

Table 2. Evaluation of the 17 top ranking Indian universities, against 17 ranking parameters

	TLR				RP				GO		OI				PR		
	SS	FSR	FQE	FRU	PU	QP	IPR	FPPP	GUE	GPHD	RD	WD	ESCS	PCS	PREMP	PRACD	PRPUB
U01	11.00	30.00	18.03	24.07	35.00	40.00	9.20	3.39	60.00	27.97	21.46	13.68	16.34	10.00	22.83	50.00	10.50
U02	17.00	19.09	13.37	20.03	24.77	31.59	9.11	7.13	60.00	24.02	21.25	13.00	25.00	17.50	21.91	37.08	9.63
U03	17.00	19.79	13.44	14.45	25.95	35.61	11.35	5.24	45.84	24.23	20.42	12.88	25.00	7.50	25.00	45.37	13.07
U04	16.14	15.91	11.17	11.85	24.86	35.87	4.86	4.87	58.37	26.74	18.91	11.13	22.81	20.00	20.59	36.00	8.13
U05	14.67	15.92	11.16	13.70	25.38	33.11	6.02	3.97	46.04	19.88	21.95	12.82	21.42	12.50	23.22	37.36	8.95
U06	13.40	21.72	13.74	13.24	13.04	19.22	0.64	1.06	60.00	38.71	22.49	24.91	25.00	10.00	11.69	33.10	2.48
U07	15.04	17.81	12.42	14.80	22.69	29.27	7.15	3.02	39.20	19.14	18.97	7.93	23.11	10.00	14.72	40.41	8.49
U08	12.62	22.40	14.98	15.53	20.19	25.81	0.19	1.28	60.00	18.28	21.96	12.32	25.00	20.00	7.41	17.83	3.56
U09	15.32	14.90	10.45	11.58	21.86	30.36	0.53	3.85	60.00	23.38	23.70	11.51	25.00	12.50	10.45	17.83	4.11
U10	19.00	12.06	7.26	9.54	15.44	30.51	0.31	3.71	60.00	34.36	6.83	16.15	25.00	15.00	12.80	27.60	3.61
U11	2.00	30.00	17.24	29.04	25.83	20.07	4.89	1.14	60.00	8.79	22.82	20.52	1.60	2.50	0.00	6.28	0.64
U12	18.05	14.58	9.61	6.40	20.63	29.91	1.62	2.20	58.40	33.02	4.14	17.57	14.16	17.50	5.47	21.95	1.39
U13	15.99	14.60	8.33	7.33	22.18	28.01	2.42	1.97	60.00	19.31	2.00	23.01	25.00	10.00	13.80	15.82	14.32
U14	11.16	21.90	14.42	9.83	18.37	22.71	0.60	1.09	57.54	21.25	12.03	21.10	25.00	20.00	3.09	23.09	0.88
U15	17.11	10.65	6.80	8.91	17.48	33.47	2.30	3.37	42.06	40.00	5.20	20.08	13.32	20.00	3.09	25.72	1.95
U16	15.50	24.93	10.65	11.82	9.17	17.62	7.59	5.11	60.00	5.77	12.97	24.20	25.00	20.00	7.41	8.64	10.08
U17	14.12	16.16	10.04	16.08	13.56	18.14	0.44	2.90	60.00	25.13	4.23	23.03	25.00	20.00	0.00	7.49	3.71

Marks	20	30	20	30	35	40	15	10	60	40	30	25	25	20	25	50	25
Weight	0.30				0.3				0.2		0.1				0.1		

For each of the evaluated 17 universities, the aggregated evaluation per broad head is given in Table 3, where the weightages of the broad heads are as given in both Table 1 and 2.

Table 3. Aggregated parameters and weightages for the top 17 Indian universities [13]

	TLR (0.30)	RP (0.30)	GO (0.20)	OI (0.10)	PR (0.10)
U01	83.11	87.59	87.97	61.48	83.33
U02	69.49	72.60	84.02	76.75	68.7
U03	64.68	78.14	70.07	65.80	83.44
U04	55.07	70.46	85.11	72.85	64.72
U05	55.45	68.48	65.92	68.69	69.53
U06	62.11	33.96	98.71	82.40	47.27
U07	60.07	62.14	58.34	60.01	63.62
U08	65.53	47.46	78.28	79.28	28.79
U09	52.24	56.60	83.38	72.70	32.38
U10	47.85	49.96	94.36	62.97	44.01
U11	78.28	51.93	68.97	47.44	6.92
U12	48.64	54.09	91.42	53.37	28.81
U13	46.25	54.58	79.31	60.01	43.94
U14	57.30	42.77	78.79	78.13	27.06
U15	43.48	56.61	82.06	58.6	30.76
U16	62.90	39.49	65.77	82.17	26.12
U17	56.39	35.03	85.13	72.26	11.20

3   Results of application of ICA

From the application of ICA on the aggregated data, we obtain the following output, giving the pairwise correlations between the different broad heads of parameters on the basis of the Top 17 academic institutions: Table 4(a), (b), Figure 1.

μ	TLR	RP	GO	OI	PR
TLR	1	0.551471	0.426471	0.602941	0.544118
RP	0.551471	1	0.463235	0.389706	0.816176
GO	0.426471	0.463235	1	0.492647	0.558824
OI	0.602941	0.389706	0.492647	1	0.514706
PR	0.544118	0.816176	0.558824	0.514706	1

v	TLR	RP	GO	OI	PR
TLR	0	0.448529	0.573529	0.389706	0.455882
RP	0.448529	0	0.536765	0.602941	0.183824
GO	0.573529	0.536765	0	0.5	0.441176
OI	0.389706	0.602941	0.5	0	0.477941
PR	0.455882	0.183824	0.441176	0.477941	0

Table 4. ICA analysis of the groups (broad heads) of parameters, based on the data for the top 17 Indian universities in 2017.
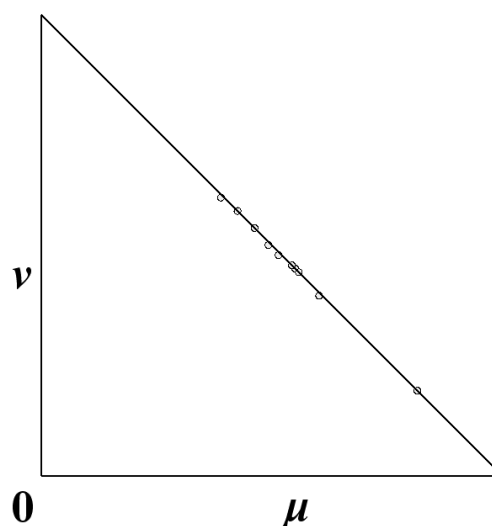
Figure 1. Results from Table 4 (left), plotted as points onto the intuitionistic fuzzy triangle

The results show that the strongest detected correlation is between the *Perception* (PR) and *Research and Professional Practice* (RP), as given by the pair ⟨0.816176, 0.183824⟩ and the lowest one is between *Research and Professional Practice* (RP) and *Outreach and Inclusivity* (OI), as given by the pair ⟨0.389706, 0.602941⟩. All the rest intercriteria pairs exhibit high dissonance with practically zero uncertainty, which means that the evaluated group of academic institutions exhibit a whole spectrum of different performances.

We continue with the analysis of the detailed data of all analyzed institutions against all ranking parameters, given in Table 2. The output is given in Table 5 (a) and (b) and Figure 4.

Table 5. Results from the application of ICA over the input data from Table 2.

μ	SS	FSR	FQE	FRU	PU	QP	IPR	FPPP	GUE	GPHD	RD	WD	ESCS	PCS	PREMP	PRACD	PRPUB
SS	1.000	0.191	0.221	0.279	0.441	0.618	0.515	0.691	0.250	0.654	0.316	0.456	0.368	0.471	0.574	0.551	0.581
FSR	0.191	1.000	0.897	0.765	0.588	0.382	0.632	0.463	0.426	0.301	0.684	0.544	0.368	0.338	0.500	0.485	0.537
FQE	0.221	0.897	1.000	0.772	0.662	0.485	0.618	0.478	0.368	0.375	0.750	0.463	0.338	0.309	0.551	0.574	0.507
FRU	0.279	0.765	0.772	1.000	0.654	0.493	0.625	0.544	0.390	0.397	0.743	0.456	0.301	0.309	0.559	0.581	0.574
PU	0.441	0.588	0.662	0.654	1.000	0.765	0.735	0.610	0.257	0.449	0.618	0.301	0.184	0.213	0.743	0.654	0.625
QP	0.618	0.382	0.485	0.493	0.765	1.000	0.632	0.728	0.213	0.684	0.515	0.272	0.213	0.375	0.750	0.772	0.625
IPR	0.515	0.632	0.618	0.625	0.735	0.632	1.000	0.699	0.235	0.434	0.544	0.449	0.250	0.265	0.713	0.699	0.728
FPPP	0.691	0.463	0.478	0.544	0.610	0.728	0.699	1.000	0.294	0.500	0.537	0.338	0.375	0.449	0.699	0.632	0.750
GUE	0.250	0.426	0.368	0.390	0.257	0.213	0.235	0.294	1.000	0.309	0.397	0.456	0.581	0.301	0.287	0.169	0.346
GPHD	0.654	0.301	0.375	0.397	0.449	0.684	0.434	0.500	0.309	1.000	0.404	0.559	0.272	0.456	0.515	0.618	0.426
RD	0.316	0.684	0.750	0.743	0.618	0.515	0.544	0.537	0.397	0.404	1.000	0.375	0.324	0.287	0.581	0.581	0.478
WD	0.456	0.544	0.463	0.456	0.301	0.272	0.449	0.338	0.456	0.559	0.375	1.000	0.360	0.456	0.309	0.316	0.426
ESCS	0.368	0.368	0.338	0.301	0.184	0.213	0.250	0.375	0.581	0.272	0.324	0.360	1.000	0.375	0.353	0.294	0.419
PCS	0.471	0.338	0.309	0.309	0.213	0.375	0.265	0.449	0.301	0.456	0.287	0.456	0.375	1.000	0.265	0.294	0.316
PREMP	0.574	0.500	0.551	0.559	0.743	0.750	0.713	0.699	0.287	0.515	0.581	0.309	0.353	0.265	1.000	0.794	0.787
PRACD	0.551	0.485	0.574	0.581	0.654	0.772	0.699	0.632	0.169	0.618	0.581	0.316	0.294	0.294	0.794	1.000	0.662
PRPUB	0.581	0.537	0.507	0.574	0.625	0.625	0.728	0.750	0.346	0.426	0.478	0.426	0.419	0.316	0.787	0.662	1.000

| ν	SS	FSR	FQE	FRU	PU	QP	IPR	FPPP	GUE	GPHD	RD	WD	ESCS	PCS	PREMP	PRACD	PRPUB
SS	0.000	0.794	0.772	0.713	0.551	0.375	0.478	0.301	0.412	0.338	0.676	0.537	0.309	0.353	0.397	0.434	0.412
FSR	0.794	0.000	0.096	0.228	0.404	0.610	0.360	0.529	0.250	0.691	0.309	0.449	0.294	0.485	0.471	0.500	0.456
FQE	0.772	0.096	0.000	0.228	0.338	0.515	0.382	0.522	0.301	0.625	0.250	0.537	0.331	0.522	0.426	0.419	0.493
FRU	0.713	0.228	0.228	0.000	0.346	0.507	0.375	0.456	0.279	0.603	0.257	0.544	0.368	0.522	0.419	0.412	0.426
PU	0.551	0.404	0.338	0.346	0.000	0.235	0.265	0.390	0.412	0.551	0.382	0.699	0.485	0.618	0.235	0.338	0.375
QP	0.375	0.610	0.515	0.507	0.235	0.000	0.368	0.272	0.456	0.316	0.485	0.728	0.456	0.456	0.228	0.221	0.375
IPR	0.478	0.360	0.382	0.375	0.265	0.368	0.000	0.301	0.434	0.566	0.456	0.551	0.419	0.566	0.265	0.294	0.272
FPPP	0.301	0.529	0.522	0.456	0.390	0.272	0.301	0.000	0.375	0.500	0.463	0.662	0.294	0.382	0.279	0.360	0.250
GUE	0.412	0.250	0.301	0.279	0.412	0.456	0.434	0.375	0.000	0.360	0.272	0.213	0.169	0.287	0.390	0.507	0.324
GPHD	0.338	0.691	0.625	0.603	0.551	0.316	0.566	0.500	0.360	0.000	0.596	0.441	0.397	0.375	0.463	0.375	0.574
RD	0.676	0.309	0.250	0.257	0.382	0.485	0.456	0.463	0.272	0.596	0.000	0.625	0.346	0.544	0.397	0.412	0.522
WD	0.537	0.449	0.537	0.544	0.699	0.728	0.551	0.662	0.213	0.441	0.625	0.000	0.309	0.375	0.669	0.676	0.574
ESCS	0.309	0.294	0.331	0.368	0.485	0.456	0.419	0.294	0.169	0.397	0.346	0.309	0.000	0.228	0.309	0.382	0.250
PCS	0.353	0.485	0.522	0.522	0.618	0.456	0.566	0.382	0.287	0.375	0.544	0.375	0.228	0.000	0.574	0.529	0.515
PREMP	0.397	0.471	0.426	0.419	0.235	0.228	0.265	0.279	0.390	0.463	0.397	0.669	0.309	0.574	0.000	0.176	0.191
PRACD	0.434	0.500	0.419	0.412	0.338	0.221	0.294	0.360	0.507	0.375	0.412	0.676	0.382	0.529	0.176	0.000	0.331
PRPUB	0.412	0.456	0.493	0.426	0.375	0.375	0.272	0.250	0.324	0.574	0.522	0.574	0.250	0.515	0.191	0.331	0.000
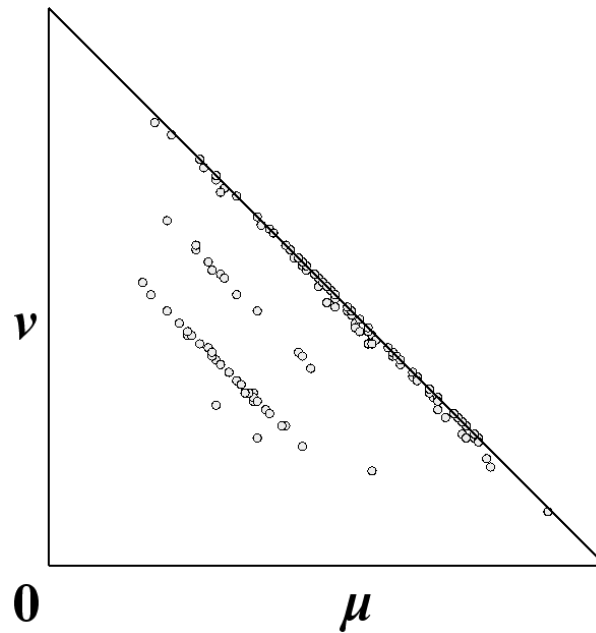
Figure 2. Results from the application of ICA (Table 5)
plotted onto the intuitionistic fuzzy interpretational triangle

The figure shows the resultant intuitionistic fuzzy set, visibly clustered in several subsets that are worth analyzing on their own. It is also worth discussing the broad heads of parameters on the level of intercriteria pairs between the parameters in each head.

For the first broad head *Teaching, Learning & Resources* (TLR) comprising of the four criteria *Student Strength including Doctoral Students* (SS), *Faculty-student ratio with emphasis on permanent faculty* (FSR), *Combined metric for Faculty with PhD (or equivalent) and Experience* (FQE) and *Financial Resources and their Utilisation* (FRU) we note the strong bonds within the set of parameters FSR, FQE and FRU. The most obviously correlated parameters here, FSR and FQE, exhibit the strongest consonance of ⟨0.897, 0.096⟩ and FRU correlates with both of them with almost equal extent. The students' strength (SS) does not correlate with these three criteria in the broad head TLR at all.

In the second broad head, *Research and Professional Practice* (RP) the four parameters in the group – *Combined metric for Publications* (PU), *Combined metric for Quality of Publications* (QP), *IPR and Patents: Published and Granted* (IPR), *Footprint of Projects, Professional Practice and Executive Development Programs* (FPPP) – exhibit relatively strong consonances.

Equally strong bonds are there between the three parameters in the broad head *Perception* (PR): *Peer Perception: Employers and Research Investors* (PREMP), *Peer Perception: Academic Peers* (PRACD) and *Public Perception* (PRPUB). These three parameters are particularly notable since according to the methodology of collecting the input data, these are subjective evaluations (perceptions) collected from the public through online surveys.

The third broad head, *Graduation Outcomes* (GO) consisting of the two parameters *Metric for University Examinations* (GUE) and *Metric for Number of Ph.D. Students Graduated* (GPHD) exhibit only one intercriteria pair ⟨0.309, 0.360⟩, i.e. dissonance, with all the three measures, of membership, non-membership and uncertainty being almost equal.

Similar is the situation with the parameters in the fourth broad head *Outreach and Inclusivity* (OI), which consists of *Percent Students from other states/countries* (Region Diversity RD), *Percentage of Women* (WD), *Economically and Socially Challenged Students* (ESCS) and *Facilities for Physically Challenged Students* (PCS), where all the pairs are from dissonance to weak negative consonance.

We will now analyze the intercriteria pairs independently, both within and across the so formed broad heads. We have three visibly well-formed clusters of points and several isolated points. The analysis shows that the middle cluster of points is fully formed by the intercriteria pairs, where one of the criteria is parameter *Facilities for Physically Challenged Students* (PCS), as illustrated on Figure 3. The cluster closest to the uncertainty (point (0, 0) of the IF triangle, see Figure 4) is formed by the criteria *Metric for University Examinations* (GUE) and *Economically and Socially Challenged Students* (ESCS).
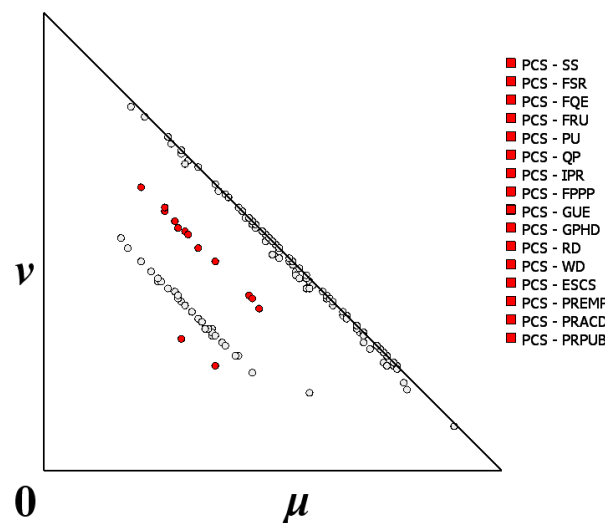
Figure 4. Selection of the intercriteria pairs with parameter PCS.

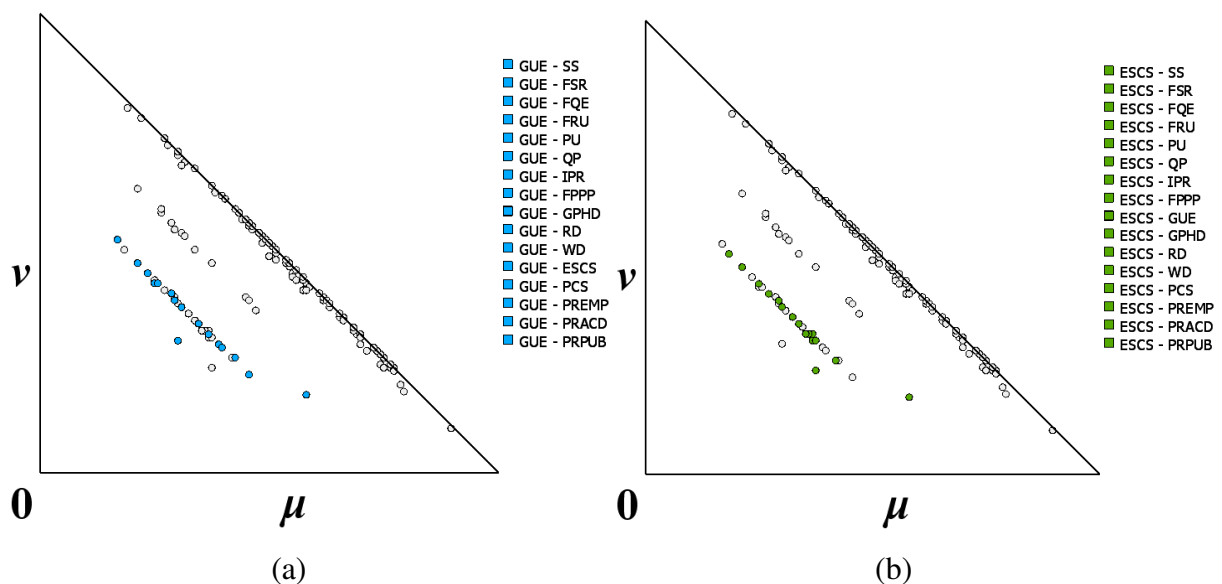(a)   (b)

Figure 5. Selection of the intercriteria pairs with parameter GUE (a) and ESCS (b).

If analyzed in a pairwise manner, between the 17 parameters there exist 136 intercriteria pairs, and the strongest detected correlations is between parameters *Faculty-student ratio with*

emphasis on permanent faculty (FSR) and *Combined metric for Faculty with PhD (or equivalent) and Experience* (FQE) — ⟨0.897, 0.096⟩, which is both the point closest to the Truth (1, 0), and the point with the highest μ/ν ratio (see [8]). From the rest, the top approx. 10% pairs (15) range from the above mentioned pair ⟨0.897, 0.096⟩ down to two pairs with equal values ⟨0.728, 0.272⟩ standing for the correlations between *Combined metric for Quality of Publications* (QP) and *Footprint of Projects, Professional Practice and Executive Development Programs* (FPPP), and between *IPR and Patents: Published and Granted* (IPR) and *Public Perception* (PRPUB). The rest of the top correlating pairs is given in Table 6, where the columns stay for, respectively, the pair of criteria, the membership and the non-membership values μ and ν of the intercriteria pair, the distance d from Truth per [7] and the additionally informative ratio μ/ν per [8].

Table 6. Top 10% (15) and Bottom 10% (14) correlating intercriteria pairs.

C1	C2	μ	ν	d	μ/ν
FSR	FQE	0.897	0.096	0.141	9.385
PREMP	PRACD	0.7941	0.1765	0.2712	4.5
PREMP	PRPUB	0.7868	0.1912	0.2864	4.1154
QP	PRACD	0.7721	0.2206	0.3172	3.5
FQE	FRU	0.7721	0.2279	0.3224	3.3871
FSR	FRU	0.765	0.228	0.328	3.355
PU	QP	0.7647	0.2353	0.3328	3.25
QP	PREMP	0.75	0.2279	0.3383	3.2903
PU	PREMP	0.7426	0.2353	0.3487	3.1563
FQE	RD	0.75	0.25	0.3536	3
FPPP	PRPUB	0.75	0.25	0.3536	3
FRU	RD	0.7426	0.2574	0.364	2.8857
PU	IPR	0.7353	0.2647	0.3744	2.7778
QP	FPPP	0.7279	0.2721	0.3847	2.6757
IPR	PRPUB	0.7279	0.2721	0.3847	2.6757
...					
PCS	PREMP	0.2647	0.5735	0.9325	0.4615
FPPP	WD	0.3382	0.6618	0.9359	0.5111
PU	ESCS	0.1838	0.4853	0.9496	0.3788
WD	PRACD	0.3162	0.6765	0.9619	0.4674
SS	RD	0.316	0.677	0.962	0.467
WD	PREMP	0.3088	0.6691	0.962	0.4615
GUE	PRACD	0.1691	0.5074	0.9735	0.3333
FSR	GPHD	0.3015	0.6912	0.9827	0.4362
PU	WD	0.3015	0.6985	0.9879	0.4316
PU	PCS	0.2132	0.6176	1.0002	0.3452
SS	FRU	0.279	0.713	1.014	0.392
QP	WD	0.2721	0.7279	1.0295	0.3737
SS	FQE	0.221	0.772	1.097	0.286
SS	FSR	0.191	0.794	1.134	0.241

4   Conclusions

The present paper is dedicated to application of the recently proposed method of Intercriteria Analysis that aims to detect dependencies between criteria on the basis of the evaluations of objects against them. After successful application of the method over datasets with rankings of academic institutions and universities in Australia, Bulgaria, Slovakia and United Kingdom, in this current leg of research we have applied the method over a dataset about the best performing universities in India in 2017, as excerpted from the National Institutional Ranking Framework Methodology for Ranking of Academic Institutions in India. Findings about the top correlating among the 17 parameters, and among the groups of criteria have been presented and discussed.

Acknowledgements

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