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Grading Using Website Contents of Universities

Dr. Sunita S. Padmannavar^[1], Dr. Milind J. Joshi^[2]

^[1]Asst. Professor, MCA Dept. GIT, Belgaum, Karnataka, India

^[2]Systems Analyst, Computer Center, Shivaji University,
Kolhapur (Maharashtra), INDIA 416004.

ABSTRACT

Grades are standardized measurements of varying levels of comprehension within a subject area. The quality of universities cannot be precisely measured by mere numbers. Therefore, any grading is controversial and no grading is absolutely objective. People should be cautious about any grading including our Academic Grading of World Universities. Our original purpose of doing the grading was to find out the gap between Indian universities and international universities, particularly in terms of contents or features present on university websites. It has been done for our academic interests without any outside support. There is no standardized system of grading in world.

Keywords— Internet, TCP/IP, Grade, GPA, World Wide Web, Voice over Internet Protocol

INTRODUCTION

The Internet is a global system of interconnected computer networks that use the standardized Internet Protocol Suite (TCP/IP). It is a *network of networks* that consists of millions of private and public, academic, business, and government networks of local to global scope that are linked by copper wires, fiber-optic cables, wireless connections, and other technologies. The Internet carries a vast array of information resources and services, most notably, the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail, in addition to popular services such as online chat, file transfer and file sharing, online gaming, and Voice over Internet Protocol (VoIP) person-to-person communication via voice and video.

The information present on university websites is very important. Prospective students use university websites to find what programs of studies are offered by a university. Current students may want to look up semester examination results online. Prospective faculty and staff may want to look up for jobs available at university. University websites primary goal is to provide information, especially to prospective students. However, it would not be surprising if university websites from various countries have certain differences.

Grades are standardized measurements of varying levels of comprehension within a subject area. Grades can be assigned in letters (for example, A, B, C, D, or E, or F, with A indicating excellent, C

indicating average and E/F indicating failing.), as a range (for example 4.0–1.0), as a number out of a possible total (for example out of 20 or 100), as descriptors (excellent, great, satisfactory, needs improvement), in percentages, or as a Grade Point Average (GPA). Many universities use a GPA (grade-point average) system in combination with letter grades. There are also many other systems in place. Grades can differ among universities - an A at one university may be a B+ at another. There is no standardized system of grading in world. Below Table 1 shows comparison of US and Indian GPA scale system.

Table 1: Comparison of US and Indian GPA scale system.

US 4.0 GPA scale system (Grade Point system)		Indian system (10 point system)	
4	Excellent	8-10	Excellent
3	Good	6-7	Good
2	Passing	3-5	Passing
1	Failure	1-2	Failure

The quality of universities cannot be precisely measured by mere numbers. Therefore, any grading is controversial and no grading is absolutely objective. People should be cautious about any grading including our Academic Grading of World Universities. Our original purpose of doing the grading was to find out the gap between Indian universities and international universities, particularly in terms of contents or features present on university websites. It has been done for our academic interests without any outside support. For this purpose we scanned 83 Indian and 63 international universities.

MATERIALS AND METHODS

Grading have always attracted the attention of many towards themselves. People have always liked to know for example what, who, which city or country have the highest or the lowest grading from different aspects, so that they can examine, compare and improve those aspects according to the result of grading. Meanwhile, with the increase of attention to universities and post-graduate institutions, university grading has gained larger importance. University grading not considering their problems is very important in attracting the attention of those who are after finding and choosing a suitable university for their further education. On the other hand, connection with websites has also drawn the attention of the web researchers to itself.

Increasing market-based orientation and international character of higher education institutions around the globe have led students, universities and governments to take a great interest in knowing the position that a particular center, university or other higher education entity has in comparison with other entities. With the massification of universities practically in every continent, the initiatives to obtain independent analysis of the quality of universities have increased rapidly in recent years across many nations¹.

RESEARCH QUESTION

In view of the foregoing discussion and considering the nature of present study, the researcher has laid down following research questions.

Grading is justifiable to university websites depending on their features. H_0

DATA PRESENTATION AND DATA ANALYSIS

The methodology used for this study is content analysis. Only universities which offered bachelors and/or masters degrees (or equivalent) were selected in order to preserve the integrity of the sample. A stratified random sampling procedure is used to draw the samples to be analyzed. 30% of the Indian university websites from each of the 4 types and 10% of the International University

websites are selected randomly for analysis. Table 2 below shows the details of number of websites taken as sample of Indian university websites and Table 3 shows the details of number of websites taken as sample of International university websites.

Table 2: Number of sample websites (National Universities)

Type of university	Total No.	Universities selected for the study (30%)
Central universities	39	13
Open universities	10	3
Deemed universities	130	39
State universities	95	29
Total	274	83

Table 3: Number of sample websites (International Universities)

Name of Country	No of universities	Universities selected for the study (10%)
Australia	39	4
Belgium	16	2
Canada	69	7
China	90	9
Hong Kong	8	1
Ireland	8	1
Japan	90	9
Seoul, South Korea	34	4
New Zealand	8	1
Singapore	12	1
Sweden	14	2
UK	121	12
USA	94	10
Total	615	63

A university website has two kinds of audience's internal users and external users. Internal users of university websites could be current students, faculty and staff working in university while external users could be prospective students, prospective faculty and staff, business people, alumni and so on. Some of the content / features to be analyzed not present on or not linked from the home page. Although it is the design consideration whether to include link to something on the home page, so it is decided to use entire website contents / features as the unit of analysis for this study.

Value 0 is assigned for absent and 1 is assigned for present for every content/feature.

FINDING OF THE STUDY

Pursuant to research question mentioned here in above, it is found that some contents are common in both types. Below Table 4 shows the Classification of universities according to contents used in websites and gradation allocated. Here we have divided the universities according to the contents used in websites in 4 grades as **A**(40-52), **B**(27-39), **C**(14-26), **D**(0-13).

Table 4: Classification of universities according to contents used in websites and gradation allocated

Sr. No.	Name Of University	Category	No Of Contents	Grade
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1	Flinders University [FLINDERS]	International	49	A
2	Victoria University [VU]	International	48	A
3	Swinburne University of Technology [SWINBURNE]	International	47	A
4	University of South Australia [UniSA]	International	45	A
5	Shivaji University	National	43	A
6	University of York	International	40	A
7	University of St Andrews	International	40	A
8	University of Dublin	International	40	A
9	University of Liverpool	International	39	B
10	University of Oxford	International	39	B
11	The English and Foreign Languages University	National	39	B
12	School of Psychology	International	38	B
13	University of Liverpool	International	38	B
14	University of Central Lancashire	International	37	B
15	Narsee Monjee Institute of Management Studies	National	37	B
16	Indian Institute of Foreign Trade	National	37	B
17	Madras University	National	37	B
18	University College Falmouth	International	36	B
19	University of Warwick	International	36	B
20	Dr Harisingh Gour Vishwavidyalaya	National	36	B
21	Indian Institute of Information Technology	National	36	B
22	Victoria University of Wellington	International	35	B
23	National University of Singapore	International	35	B
24	University of Brighton	International	35	B
25	Swansea University	International	35	B
26	Indian Institute of Science	National	35	B
27	Goa University	National	35	B
28	Jammu University	National	35	B
29	Lucknow University	National	35	B
30	University of New Hampshire	International	34	B
31	University of Gujarat	National	34	B
32	SYMBIOSIS International University	National	34	B
33	Sathyabama Institute of Science and Technology	National	34	B
34	Hemchandracharya North Gujarat University	National	34	B
35	Annamalai University	National	34	B
36	Choudhary Charan Singh University	National	34	B
37	Lingnan University	International	33	B
38	Nagoya University	International	33	B
39	University of Stirling	International	33	B
40	Quinnipiac University	International	33	B
41	University of Idaho	International	33	B
42	University of Allahabad	National	33	B
43	Dr.D.Y.Patil Vidyapeeth	National	33	B
44	Amrita Vishwa Vidyapeetham	National	33	B
45	North Maharashtra University	National	33	B
46	Kyushu University	International	32	B
47	Sung Kyun Kwan University	International	32	B

48	Örebro University	International	32	B
49	University of Sunderland	International	32	B
50	Union University	International	32	B
51	Tezpur University	National	32	B
52	Bharati Vidyapeeth	National	32	B
53	Mody Institute of Technology and Science	National	32	B
54	Sri Ramchandra Medical College and Research Institute	National	32	B
55	Calicut University	National	32	B
56	Devi Ahilya Vishwavidyalaya	National	32	B
57	Umeå University	International	31	B
58	University of Exeter	International	31	B
59	Baker University	International	31	B
60	Kota Open University	National	31	B
61	Maharishi Markandeshwar University	National	31	B
62	Vel's Institute of Science	National	31	B
63	Indian Agricultural Research Institute	National	31	B
64	Rajasthan University	National	31	B
65	Université de Mons-Hainaut	International	30	B
66	University of Gloucestershire	International	30	B
67	Shaw University	International	30	B
68	Duquesne University	International	30	B
69	Gallaudet University	International	30	B
70	Indira Gandhi National Open University	National	30	B
71	Manipal Academy of Higher Education	National	30	B
72	BLDE University	National	30	B
73	Thapar Institute of Engineering & Technology	National	30	B
74	Sri Chandrasekharendra Saraswati Vishwa Mahavidyalaya	National	30	B
75	Saurashtra University	National	30	B
76	Jaypee Institute of Information Technology	National	29	B
77	Jawaharlal Nehru Technological University	National	29	B
78	Sri Krishnadevaraya University	National	29	B
79	Gulbarga University	National	29	B
80	Mahatma Gandhi University	National	29	B
81	The Rashtrasant Tukadoji Maharaj Nagpur University	National	29	B
82	Liaoning University	International	28	B
83	Shenyang Polytechnical University	International	28	B
84	Indian Institute of Space Science and Technology (IISST)	National	28	B
85	Kalinga Institute of Industrial Technology	National	28	B
86	Burdwan University	National	28	B
87	Fukui University	International	27	B
88	University of Winchester	International	27	B
89	Karunya Institute of Science and Technology	National	27	B
90	Nehru Gram Bharati Vishwavidyalaya	National	27	B
91	Shri Lal Bahadur Shastri Rashtriya Sanskrit	National	27	B

	Vidyapeetha			
92	Rashtriya Sanskrit Sansthan	National	27	B
93	Vikram University	National	27	B
94	Osaka Kyoiku University	International	26	C
95	Northwood University	International	26	C
96	Madhya Pradesh Bhoj (Open) University	National	26	C
97	Gandhi Institute of Technology and Management (GITAM)	National	26	C
98	Dr. M.G.R. Educational and Research Institute	National	26	C
99	Dibrugarh University	National	26	C
100	Kurukshetra University	National	26	C
101	The Queen's University of Belfast	International	25	C
102	Qinghai University	International	25	C
103	Hokkaido University of Education	International	25	C
104	Korean National University of Arts	International	25	C
105	University of Punjab	National	25	C
106	International Institute of Information Technology	National	25	C
107	K.L.E Academy of Higher Education and Research	National	25	C
108	Harbin Institute of Technology	International	24	C
109	Golden Gate University	International	24	C
110	Central Institute of Fisheries Education	National	24	C
111	Tilak Maharashtra Vidyapeeth	National	24	C
112	Ponnaiyah Ramajayam Institute of Science & Technology Vallam	National	24	C
113	Central Institute of Higher Tibetan Studies	National	24	C
114	Utkal University	National	24	C
115	Jai Narain Vyas University	National	24	C
116	Tong Ji University	International	23	C
117	Chennai Mathematical Institute	National	23	C
118	Guangdong University of Technology	International	22	C
119	Seoul National University	International	22	C
120	Carlise College	International	22	C
121	Central Agricultural University	National	22	C
122	Gurukula Kangri Vishwavidyalaya	National	21	C
123	Chongqing University of Medical Sciences	International	20	C
124	Kitasato University	International	20	C
125	Hansung University	International	20	C
126	Kuvempu University	National	20	C
127	Mother Teresa Women's University	National	19	C
128	Nitte University	National	18	C
129	Tamil University	National	18	C
130	Vrije Universiteit Brussel	International	17	C
131	Ningxia University	International	17	C
132	Hemwati Nandan Bahuguna Garhwal University	National	17	C
133	University of Tamil Nadu	National	16	C
134	Netaji Subhas Open University	National	16	C
135	Jain Vishva Bharati Institute	National	16	C

136	Mizoram University	National	15	C
137	Lalit Narayan Mithila University	National	15	C
138	Sampurnanand Sanskrit Vishwavidyalaya	National	15	C
139	Wilberforce College	International	14	C
140	Tokyo International University	International	13	D
141	University of Jharkhand	National	13	D
142	Gujarat Vidyapith	National	13	D
143	Homi Bhabha National Institute	National	13	D
144	Xian Polytechnical University	International	11	D
145	Shimane Medical University	International	10	D
146	Yasuda Women's University	International	09	D

(Source: Secondary data-compiled by researcher)

52 point average content 4 grading system developed by researcher using GPA Scale system is used for grading allocation. Below Table 5 shows grade analysis of contents using above Table 4.

Table 5 : Grade analysis of contents

Contents Used in websites	National Universities	International Universities	Total	Grade
40-52	1 (4.54)	7 (3.45)	8	A
27-39	51 (48.32)	34 (36.67)	85	B
14-26	28 (26.15)	18 (19.84)	46	C
0-13	3 (3.97)	4 (3.02)	7	D
Total	83	63	N=146	

(Source: Secondary data-compiled by researcher)

Therefore H_0 Hypothesis is true. That is Grading is justifiable to university websites depending on their features.

Analysis of Grading using K-means clustering algorithm technique

A *cluster* is a collection of objects which are “similar” between them and are “dissimilar” to the objects belonging to other clusters. The performances given by clustering algorithms are heavily dependent on the spread of the data and for this reason there are more than one clustering algorithms which are developed over time.

The Algorithm

K-means is one of the simplest unsupervised learning algorithms that solve the well known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed a priori. The main idea is to define k centroids, one for each cluster. These centroids should be placed in a cunning way because of different location causes different result. So, the better choice is to place them as much as possible far away from each other. The next step is to take each point belonging to a given data set and associate it to the nearest centroid. When no point is pending, the first step is completed and an early grouping is done. At this point we need to re-calculate k new centroids as the clusters resulting from the previous step. After we have these k new centroids, a new binding has to be done between the same data set points and the nearest new centroid. A loop has been generated. As a result of this

loop we may notice that the k centroids change their location step by step until no more changes are done. In other words centroids do not move any more. Finally, this algorithm aims at minimizing an objective function, in this case a squared error function. The objective function

$$J = \sum_{j=1}^k \sum_{i=1}^n \|x_i^{(j)} - c_j\|^2,$$

where $\|x_i^{(j)} - c_j\|^2$ is a chosen distance measure between a data point $x_i^{(j)}$ and the cluster centre c_j , is an indicator of the distance of the n data points from their respective cluster centers.

The algorithm is composed of the following steps:

- 1) Place K points into the space represented by the objects that are being clustered. These points represent initial group centroids.
- 2) Assign each object to the group that has the closest centroid.
- 3) When all objects have been assigned, recalculate the positions of the K centroids.
- 4) Repeat Steps 2 and 3 until the centroids no longer move. This produces a separation of the objects into groups from which the metric to be minimized can be calculated.

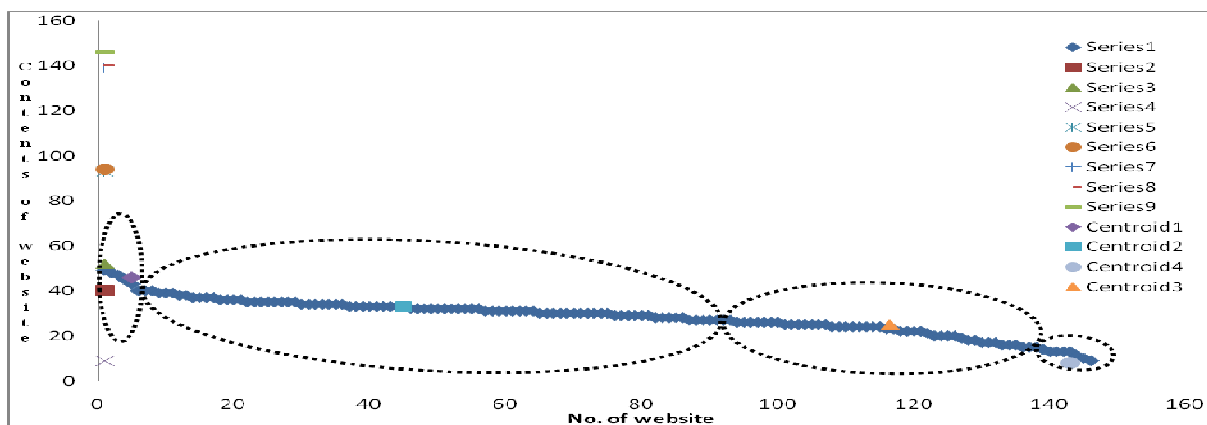
K-means is a simple algorithm that has been adapted to many problem domains

Here we have 146 sample feature vectors $\mathbf{x}_1, \mathbf{x}_2, \dots, \mathbf{x}_n$ all from the same class, and we know that they fall into $k=4$ compact clusters, $k < n$. Let \mathbf{m}_i be the mean of the vectors in cluster i . If the clusters are well separated, we can use a minimum-distance classifier to separate them. That is, we can say that \mathbf{x} is in cluster i if $\|\mathbf{x} - \mathbf{m}_i\|$ is the minimum of all the k distances. This suggests the following procedure for finding the k means:

- Make initial guesses for the means $\mathbf{m}_1, \mathbf{m}_2, \dots, \mathbf{m}_k$
- Until there are no changes in any mean
 - Use the estimated means to classify the samples into clusters
 - For i from 1 to k
 - Replace \mathbf{m}_i with the mean of all of the samples for cluster i
 - end for
- end until

Using above algorithm to Table 4 we have graph of after clustering as below

Graph 1: Clustering of Analysis of Grade A, B, C and D



From above Graph 1 researcher finds that the k-means is a simple procedure. It can be viewed as a greedy algorithm for partitioning the n samples into k clusters so as to minimize the sum of the squared distances to the cluster centers. Data Clustering or grouping together of similar data comes useful in all real world data processing applications.

CONCLUSION

Our grading is using carefully selected contents and internationally comparable data that everyone could check. Evidence has been found to indicate that, the researcher has summarized the entire research problem of Grading.

LIMITATIONS

This study has certain limitations. Due to time constraint it is impossible to study contents of all universities in India and abroad. Therefore random universities have been selected from national and international levels. The research does not contain study of design or information organization of university websites. The focus of present study is only on the types of content / features present on websites. As websites are updating frequently, same status of university websites could not be available.

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