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Citation-based Transparent Ranking of Indian Institutes of Technology

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Abstract

The study has ranked Indian Institutes of Technology based on the number of citations of top 10 profiles on Google Scholar. The methodology prescribed by the Ranking Web of Universities has been adopted. Top ten user profiles based on the number of citations on Google Scholar have been considered for each of the 23 IITs using institutional email domain. The first (top 1) profile of the list is excluded for improving representativeness. The number of citations for the rest of the top 10 profiles has been added and IITs have been ranked in the descending order of this indicator. IIT Delhi secured the top position, while IIT Goa is placed last. Seven IITs did not have institutional profile on Google Scholar, though individual user profiles use institutional email address.

Keywords: IITs**,** Transparent ranking, Webometrics, Google Scholar

Introduction

Dissemination of research has become as important today as doing research itself. Publishing ensures dissemination of research. Facilitating the discovery of research ensures that the research finds wider application and impact. With the proliferation of author self-archiving platforms and preprint archives, authors have found new avenues for facilitating the discovery of published (and unpublished) research. "Transparency, openness, and reproducibility are readily recognized as vital features of science" (Nosek et al., 2015, p. 1422). This global consciousness on making scientific discovery open and transparent has led to the emergence of "open science movement" which advocates making scientific research (including publications, data, physical samples, and software) and its dissemination accessible to all levels of an inquiring society, amateur or professional ("Open science," 2019).

Most publishers have embraced electronic online publishing as it may reduce costs and increase the efficiency of peer-review process. As a result, enormous amount of scholarly information is available online. This calls for scholarly information search and retrieval systems. Google Scholar is a freely accessible academic and scholarly "search engine which indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines" ("Google Scholar," 2019). Google Scholar, over the years, has grown to be an important freely

accessible indexed searchable database of scholarly content. A recent study estimates that Google Scholar, with 389 million records, is currently the most comprehensive academic search engine (Gusenbauer, 2019).

Ranking Web of Universities

The Ranking Web of Universities or Webometrics Ranking of World Universities is an initiative of the Cybermetrics Lab, a research group belonging to the Consejo Superior de Investigaciones Científicas (CSIC), Spain. "The original aim of the Ranking was to promote Web publication. Supporting Open Access initiatives, electronic access to scientific publications and to other academic material are primary targets. However web indicators are very useful for ranking purposes too as they are not based on number of visits or page design but on the global performance and visibility of the universities." ("Objectives," 2018). The Ranking Web of Universities has prescribed composite Webometric ranking indicators. These indicators are: Presence, Visibility, Transparency (or Openness), and Excellence (or Scholar) ("New edition: January 2019," 2019).

Transparent Ranking

Ranking Web of Universities uses "Transparency or Openness" as one of the indicators for Webometric ranking of universities. Universities are ranked by citations in top Google Scholar profiles. The citation data is used as transparency or openness indicator. As of January 2019, Transparent ranking is in its seventh edition (version 7.1.2 BETA) ("Transparent ranking: Top Universities by Citations in Top Google Scholar profiles," 2019). The methodology of transparent ranking has been explained in the subsequent section.

Indian Institutes of Technology (IITs)

There are 23 Indian Institutes of Technology (IITs) ("IITs," 2019). Table 1 lists the IITs and their year of establishment ("Indian Institutes of Technology," 2019).

Sl. No.	IIT	Short Name	Year of Establishment
1.	Indian Institute of Technology Kharagpur	IITKGP	1951
2.	Indian Institute of Technology Bombay	IITB	1958
3.	Indian Institute of Technology Madras	IITM	1959
4.	Indian Institute of Technology Kanpur	IITK	1959
5.	Indian Institute of Technology Delhi	IITD	1963
6.	Indian Institute of Technology Guwahati	IITG	1994
7.	Indian Institute of Technology Roorkee	IITR	2001
8.	Indian Institute of Technology Ropar	IITRPR	2008
9.	Indian Institute of Technology Bhubaneswar	IITBBS	2008
10.	Indian Institute of Technology Gandhinagar	IITGN	2008

11.	Indian Institute of Technology Hyderabad	IITH	2008
12.	Indian Institute of Technology Jodhpur	IITJ	2008
13.	Indian Institute of Technology Patna	IITP	2008
14.	Indian Institute of Technology Indore	IITI	2009
15.	Indian Institute of Technology Mandi	IITMandi	2009
16.	Indian Institute of Technology (Banaras Hindu University) Varanasi	IITBHU	2012
17.	Indian Institute of Technology Palakkad	IITPKD	2015
18.	Indian Institute of Technology Tirupati	IITTP	2015
19.	Indian Institute of Technology (Indian School of Mines) Dhanbad	IITISM	2016
20.	Indian Institute of Technology Bhilai	IITBH	2016
21.	Indian Institute of Technology Goa	IITGOA	2016
22.	Indian Institute of Technology Jammu	IITJM	2016
23.	Indian Institute of Technology Dharwad	IITDH	2016

Objective of the study

The objective of the present study is to explore the research productivity of IITs in terms of number of citations as reflected in Google Scholar. The study has ranked IITs on the basis of number of citations of top user profiles.

Methods

The present study uses the methodology prescribed by the Ranking Web of Universities for transparent ranking of Universities ("Transparent ranking: Top Universities by Citations in Top Google Scholar profiles," 2019). Following methods have been adopted for collection of data and ranking:

- The normalized (official) name of the IIT or its email domain was searched on Google Scholar. Preference was given to email domain institutional members tend to use institutional email address in their profile and Google Scholar groups the user profiles by email domain. For instance, the email domain iitm.ac.in was entered in the search box of Google Scholar. The first search result showed *"User profiles for: Indian Institute of Technology, Madras – iitm.ac.in".* This result was clicked to obtain the user profiles of IIT Madras.
- Google Scholar sorts the user profiles in the descending order of number of citations by default. The top 10 profiles (based on the number of citations) were selected. This is to facilitate size-independent comparison. The number of citations were collected and entered on a Microsoft Excel worksheet. The profiles were numbered 1 to 10.
- As prescribed in Transparent ranking methodology on Ranking Web of Universities, the top 1 profile was excluded "for improving representativeness".
- The number of citations for the rest of the top 10 (maximum 9 profiles) was added and the IITs were ranked in the descending order of this indicator.

Results and Discussion

Table 2. Transparent ranks of IITs

IIT	Google Scholar Top-10 Profiles										Total No. of citations (excluding the top 1 Profile)	Transparent Rank
	1	2	3	4	5	6	7	8	9	10		
IITD	34948	25834	23318	21701	21832	19808	16527	16104	14006	13961	173091	1
IITK	33351	28044	26012	18238	16186	14957	14001	13294	11867	11049	153648	2
IITB	159369	22293	21404	18293	17075	16614	15138	14905	12929	12135	150786	3
IITKGP	47451	18076	17962	16979	16624	14683	14366	14217	12926	12251	138084	4
IITM	23147	22979	14038	12422	11015	10818	10236	9550	9322	8594	108974	5
IITBHU	19591	19368	17254	11024	10957	9550	7602	7212	6755	5701	95423	6
IITG	45561	18235	14787	9998	6769	5367	5332	4858	4814	4789	74949	7
IITR	12013	11207	10265	8068	7692	7540	7417	7269	7167	6187	72812	8
IITI	48613	26024	7949	3889	3634	3341	3287	2684	2465	2230	55503	9
IITH	11363	5277	5183	4524	4098	3898	3854	3212	2807	2463	35316	10
IITRPR	16765	11286	3728	2858	2543	1999	1964	1864	1798	1716	29756	11
IITISM	9259	4698	4416	3530	3182	2567	2065	2047	1857	1762	26124	12
IITBBS	9273	4714	2929	2872	2842	2540	2125	1873	1835	1587	23317	13
IITGN	11932	5979	2866	2367	1982	1614	1504	1472	1376	1285	20445	14
IITMANDI	8288	4196	2481	2083	1860	1781	1770	1757	1490	1466	18884	15
IITPKD	9181	8157	2720	1642	1430	919	799	633	408	396	17104	16
IITP	15020	2961	2353	2032	1651	1592	1506	1428	1306	1255	16084	17
IITJ	1645	1477	1246	1190	984	965	884	732	726	707	8911	18
IITBHILAI	1374	1185	1103	1080	1016	1013	987	838	808	655	8685	19
IITTP	2810	2088	1088	1009	957	831	737	585	497	429	6133	20
IITDH	4143	1589	825	429	418	385	377	147	96	67	4333	21
IITJAMMU	6261	1597	550	513	397	388	300	176	170	125	4216	22
IITGOA	8802	1013	838	804	446	361	266	248	199	143	4175	23

Table 2 presents the transparent ranks of 23 IITs. IIT Delhi tops the list with 173091 citations, while IIT Goa stands last at 4175 citations. IIT Kharagpur and IIT Bombay secure second and third positions, respectively. It may be noted that though IIT Bombay secures third position since there is huge gap in the number of citations between top 1 profile and the rest.

Seven IITs – IIT Palakkad, Bhilai, Tirupati, Dharwad, Jammu, Goa, and Dhanbad – did not have institutional profile on Google Scholar. However, individual user profiles could be discovered using institutional email domain.

Conclusion

Ranking Web of Universities provides a methodology to rank universities/higher educational institutions based on their "transparency or openness". Transparency ranking constitutes one of the four indicators in the Webometric ranking of universities/institutions. An attempt has been made under this study to show the position of IITs based on Google Scholar citations.

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