Research Article

A Novel Technique for Fair and Accurate Reviewer Assignment in Peer Review

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Abstract

One of the normal issues looked in allocating recommendations submitted to the conferences, journal publications and so forth is the assignment of the proposition to the suitable reviewers. This is likewise named as the reviewer assignment issue. Here, where the skill level of a reviewer who is engaged with reviewing a proposal ought to be streamlined to ensure the choice of the best reasonable proposal. Picking a suitable reviewer includes the mastery as well as thinks about assorted variety and irreconcilable circumstances among them. Toward this path, various arrangements have been given by researcher previously, yet a portion of the issues continues in this field. The proposed system features a review on the current strategies proposed by the analysts to tackle the reviewer assignment issue and different keyholes in the current situation alongside the potential arrangements.

Keywords: Information Retrieval, Journals, Conferences Reviewer Assignment

Introduction

The way toward doling out a reviewer to a proposal is considered as a troublesome and testing task for different research organizations and associations. The procedure is for the most part named as Reviewer Assignment Problem (RAP) whose initial step is to send calls for recommendations accommodation. The proposal is submitted to the calling associations. The fair assignment of accommodation to reviewers is finished utilizing the most broadly utilized CMS (i.e., Conference Management Toolkit and Easy Chair) which relegates the papers dependent on reviewer offering inclinations.

In any case, the significant downside of this approach is that specialists for the most part adhere to the directions and guidelines of the financing organization for reviewing the proposition and don't offer significance to titles and modified works by and large. In light of the review done, certain collection techniques are utilized to arrange the outcomes according to their rankings Sun et al., 2008. Prior, the errand of appointing the papers to the reviewers was taken care of by a little board of trustees of individuals physically. The manual assignment of proposition takes additional time and overhead. It is an emotional methodology and is focused principally on the choice and assessments of the individuals from the board of trustees. The improvement of assignments was a difficult errand as every one of the imperatives couldn't be considered productively. A total scope of

research points and subtopics is determined before the accommodation procedure starts, and all reviewers are so-licited to indicate their territory from skill. Likewise creators are additionally approached to determine the space to which their paper applies. This built up an affiliation connect among reviewers and papers. It can once in a while bring about wrong coordinating from the meeting points also, can be deluding as for the real point of their proposition. In this way, to battle the circumstance, it is required to make the procedure of assignment of recommendations auto- mated to decide the paper points naturally as opposed to physically. The problems faced in traditional methods gave rise to an automatic mechanism for the re- viewer assignment, Dumais and Nielsen in 1992 addressed the problem by using Latent Se- mantic Indexing (LSI). As the complete idea of modeling the reviewer assignment is quite large in its stature, different and all kinds of learning methods are used to solve problems efficiently.

Literature Survey

N.Garg et.al[1] In this paper they have considered the issue of allocating papers to arbitrators. We distinguished a few attractive targets for these assignments and structured productive algorithms for them. A few variations can be unraveled ideally in polynomial time. In other cases, the issue is NP-hard thus we gave guess calculations. next objective is to play out an intensive trial assessment of our calculations cc what's more, in the long run consolidate

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them into gathering the executives programming, for example, Easy Chair.

Fan ZP et.al[2] Peer-reviewed have two key factors in determination of evaluation standards and peer designed domain experts, and the election of the domain expert is very important and very difficult work, especially like technology project evaluation, project, the project of large quantity, scattered experts widely, but also related field many questions are the frontiers of science question which specially selected domain experts more difficult. Peer review experts selected process is the rational matching process between projects and domain experts, we can use knowledge set method for said for projects and domain experts matching.

Dumais ST el.al[3]The process of assigning a reviewer to a proposal is considered as a difficult and challenging task for various research agencies and organizations. The process is generally termed as Reviewer Assignment Problem (RAP) whose first step is to send calls for proposals submission. The proposals are submitted to the calling organizations. The fair assignment of submission to reviewers is done using most widely used CMS (i.e., Conference Management Toolkit and Easy Chair) which assign the papers based on reviewer bidding preferences.

Hettich set.al[4] In this paper they examine a model application conveyed at the U.S. National Science Foundation for helping program executives in recognizing commentators for recommendations. The application helps program executives sort proposition into boards and discover commentators for recommendations. To achieve these assignments, it extricates data from the full content of proposition both to find out about the subjects of recommendations and the skill of analysts. We talk about an assortment of choices that were investigated, the arrangement that was executed, and the involvement with utilizing the arrangement inside the work process of NSF

Johan bollen et al[5]The Peer review process is the most generally acknowledged affirmation component authoritatively for tolerating the composed of analysts inside mainstream consequences researchers. A basic part of friend survey is the ID of skilled refs to audit a submitted composition. This article shows a calculation to naturally decide the most proper analysts for a composition by method for a cocreation organize information structure and a relativeposition molecule swarm calculation. This methodology is novel in that it isn't constrained to a pre-chosen set of arbitrators, is computationally productive, requires no humanintercession, and, in certain occasions. can naturally distinguish irreconcilable situation circumstances. A valuable utilization of this calculation is open analysis peeraudit frameworks since it gives a weighting to each official concerning their ability in the space of a composition. The calculation is approved utilizing ref offer information from the 2005 Joint Conference on Digital Libraries.

Biswas HK et.al[6] In this paper, they focus on (a) building researcher's profile using the researcher's publications and domain ontology, (b) topic extraction using free text of a paper and ontology driven inference, and finally, (c) automatically driven inference, and finally, (c) automatically similarity. In this research, we used the powerful vector space modelling (VSM) technique and machine learning tools I or extracting features such as key phrases, and Semantic Web technology such as ontology-driven topic inference to facilitate efficient Paper-Reviewer assignment. Both Reviewer's Profiles and Papers are identified using automatic methods and matching is also done automatically to avoid human-bias and to find the best possible Paper-Reviewer matches. Shah, N. B et al.[7] Design and analysis of the NIPS 2016 review process In this paper, they analyze several aspects of the data collected during the review process. including an experiment investigating the efficacy of collecting ordinal rankings from reviewers. goal is to check the soundness of the review process, and provide insights that may be useful in the design of the review process of subsequent conferences. Yichong Xu et al.[8] On Strategyproof Conference Peer Review In this paper they address the issue of planning strategyproof and effective friend survey instrument. The setting of friend audit is trying because of the different eccentricities of the friend audit process: commentators survey just a subset of papers, each paper has various creators who might be analysts, and every commentator may creator various entries. We give a system and related calculations to grant strategyproofness to meeting peer survey. Our system, other than ensuring strategyproofness, is significantly very adaptable in permitting the program seats to utilize their preferred dynamic criteria. They supplement these positive outcomes with negative outcomes indicating that it is outlandish for any algorithm to remain strategy proof and satisfy the stronger notion of pairwise unanimity.

Proposed Methodology

<u>Classification</u> <u>by discipline</u> >Reviewer >Proposal	Assesment of expertise level of reviewer		Solution for conflicts of interest Coauthor		Assignment >Only the first area of proposal >Both two discipline of proposal	
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Step 1 Classifying reviewers and proposals according to discipline areas As mentioned above, reviewers and proposals are classified by the discipline areas they belong to. Under each discipline area, there are corresponding reviewer and proposal sets. That is, we can classify reviewers and proposals through the discipline areas they declared. Table 1 illustrates the sample rules for reviewer classification.

Step 2 Assessing expertise levels of reviewers Determination of the expertise level of any reviewer in a specific area has been a research concept in the literature related with human science, education science and other similar areas [11]. To determine the expertise level, NSFC asks all reviewers to fill in a form

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related with the discipline areas of their professional subject, and of their published papers. Then with a counting procedure, a level between 1 and 3 is assigned to each reviewer to indicate their expertise. Level three represents reviewers are very familiar with the corresponding area, level two familiar, and level one less familiar respectively. In formulating the problem, some additional notations are needed.

Step 3 Solving conflicts of interests between reviewers and applicants. In order to obtain objective and fair evaluation of the proposed projects, the conflicts of interests between applicants and reviewers should be avoided. For example, the affiliation of the applicant should not be the same as that of reviewer. Applicants and reviewers should not be the coauthor which indicates that they had cooperated in research before. These knowledge rules can be abstracted from NSFC guidebook to forma rule base.

Step 4 Assigning reviewers to proposals After three steps above, we have got the pool of qualified reviewers for proposals. Recall that the research problem is to let the most qualified referees to review proposals. That is, choose the assignment that maximizes the total expertise level of the reviewers. As mentioned above, different reviewers have different expertise levels in a discipline area, and a reviewer may declare several discipline areas; at the same time, each proposal is required to declare two discipline areas. Furthermore, both funding agencies and applicants hope that proposals can be evaluated according to their first discipline areas if possible, because the first area of proposals represents the highest degree of match between proposals and discipline areas. So, proposals should be assigned to reviewers according to their first discipline area firstly.

A. Algorithms

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Cluster Creation (K-MEANS ALGORITHM)

Clustering is the process of partitioning a group of data points into a small number of clusters. A method commonly used to automatically divide datasets into k-group is called as, kmeans clustering. Main objective of k-means algorithm is to reduce total sum of the squared distance of every point to its corresponding cluster centroid. Given a set of observations (x1, x2,., xn), where each observation is a d-dimensional real vector, k-means clustering aims to partition the n observations into k (\leq n) sets S = S1, S2,..., Sk so as to minimize the within-cluster sum of squares where i is the mean of points in Si.

 $\sum k \sum x \sin \frac{|x-\mu||^2}{i}.$
argmin i = 1

The k-means algorithm is guaranteed to converge a local optimum.

Algorith m: Input:

Set of k cluster centres C Set of threshold THmin

Processing Steps:

1. While k in not stable

2. Generate a new set of cluster centres C0 using k-means

- 3. For every cluster centre C0,*i*
- 4. Get the minimum relevance score; min(Si)
- 5. If min(Si)≤THmin
- 6. Add a new cluster centre: k=k+1;
- 7. Go to while

8. Until k is stable

Output:

Cluster Centre.

Quality Hierarchical Clustering Algorithm

Input:

Set of documents Set of threshold TH

Processing steps:

1. The data set containing the tow variables score on every seven individuals.

2. Two clusters is getting grouped for the data set. For finding a sensible partition, make the two values of A B apart. (By using Euclidean Distance measure).

3. The rest of the individuals are identified in the series and assigned to the nearest cluster by following the Euclidean distance. Every time a new object is getting add in this making available to recalculate

4. The partition has been change which was done in initial step and two another cluster have some special properties.

5. Compare each individual's distance to it's own cluster mean and to that of the opposite cluster.

Output:

QHC: quality hierarchical clustering.

Mathematical Notation

Notation	Description	
U = U1, U2, U3,	The set of Reviewer	
S = S1, S2, S3,	The set of Assignments	
P = P1, P2, P3,	The set of Journals	
T = T1, T2, T3,	The set of Domains	
A = A1, A2, A3,	The set of different Area	

Result and Discussions

Specialists submit papers to gatherings expecting a reasonable result from the friend audit process. This desire is frequently not met, as is delineated by the

challenges that non-standard or between disciplinary research faces in present friend survey frameworks. We structure a commentator task calculation PR4A to address the significant issues of decency and precision. Our assurances bestow guarantee for conveying the calculation in gathering peer-audits. As a subsequent stage, we plan to give it a shot the calculation in peerlooked into workshops.

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Figures and Tables



Fig. 1. Architecture Diagram



Fig. 2. Use case Diagram

Conclusion

This framework plunge into different strategies for giving various systems. As the analysts have fluctuating degrees of aptitude in various spaces which can The commentators having various degrees and levels of mastery in various areas join to shape a fresh set which can thusly give mistaken or misdirecting data. We have additionally seen that it may not prompt coordinating of definite skill of a commentator with that of the proposition submitted. RAP itself is an unpredictable and confounded undertaking. Finding a proper diary for the proposition is significantly progressively unwieldy. A far reaching study is introduced here for the techniques that have been proposed before with issues that are trying in this field. A reasonable comprehension of the difficulties is, in this manner, important to tackle such issues.

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