

Decision Support Systems Engineering Applied to Editorial Decisions

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ABSTRACT

Peer review is an important issue in the process of evaluation and selection of scientific materials for the purpose of publication in any conference or journal. Although incorporating such mechanism in principle may carry several merits as well as demerits.

We may also optimize the methodology of peer review implementing some of theme of evolutionary algorithm to avoid any chance of individual bias. An effort has been made to design such an editorial decision system to support this methodology.

Keywords: Editorial Decision, Process of Evaluation, Evolutionary Algorithm and Individual Bias.

Random selection of papers is the one way to ensure a wide coverage or variety of papers accumulating all forms, frames and stages of thoughts. The next strategy should certainly, be the selection of papers on quality basis. The quality control should be observed right in the beginning and also at the final stage of review and screening.

There has to be an instrument to motivate authors in order to improve their material in light of suggestions given by the reviewers. The panel of reviewers needs to be configured from time to time through a regular reshuffling mechanism as to avoid any confounding effect.

1. INTRODUCTION

Professional regulation in terms of literary performance is evaluated for its standard and novelty to improve its further prospects by employing the process of peer review. Ideally the review procedures should have certain criteria that must always be exercised to govern their frame. As many as possible, authors (participants) should get an opportunity to express their ideas may it be raw at a glance, in their respective field of science and technology. It ensures a large and diverse collection of ideas, which probably may sometimes carry some high level innovation by chance. It is also essential that authors contributing multiple papers to a journal or a conference at a time must be given a chance to avoid any disappointment and to carry out their enthusiasm for future productivity.

2. EXISTING PEER REVIEW SYSTEM

Peer review process follows a critical inspection of the literary works especially belonging to the same area of work. It is even quite difficult for authors and researchers to spot out every mistake in the complicated piece of work. Showing work to others increases the probability of getting the weaknesses identified and hence the chances can be there to get the performance be improved. It is true that reviewing the same paper by a number of reviewers [1], used to be done by the journal editor couldn't solve the disagreement problem. Clinical peer review [2] also refers to secondary rating of clinical values of the articles. Professional peer [3] review focuses on professional performances in different fields of science, technology, law and literature with a view of improving quality, upholding standards and providing certification. The sole power of distributing work of the scholars typically falls to editors [4] hand for selecting referees to check their manuscript. The extra-editorial effort using double masked process [5] has certain limitations as it is confined to a particular research

stream. But such double masked review performs to generate a better perception [6] of fairness and equality in global scientific environment. It is also true that peer review used to suppress [7] the themes of mainstream theories due to their own contradictions. It is in fact true that scientific editorial systems [8] aren't the hostile of new inventions and discoveries. Also it has been found that lack of accountability in such review process may lead to reflect it as a biased and inconsistent procedure [9]. Many high quality journals initially started a hybrid peer review system [10], incorporating open peer review with blind reviewing process, later such system not sustained longer [11]. In past times established editors were given more freedom of discretion, but opposing a new proposed idea [12] was not an easier approach without any established ground. Although peer review process shows strength and weakness [13] at various levels, pernicious publication practices [14] are very common and negative review [15] has its own importance in checking standard of publication in vital fields.

3. ASSUMPTIONS FOR DESIGNING DECISION SUPPORT SYSTEM

Relaxed evaluation criteria may result into rejection of some high quality papers due to a permissible level of randomness in selection process. Moreover the selection of low quality papers may also decline the growth performance or outcome of any journal. So keeping both the ideas of quantity and quality level assessment approach may provide a better evaluation tactics that reflects a cumulative approach in making an unbiased judgement considering all associated vital dimensions at a time to give better results in real terms regarding paper selection paradigm.

4. PROPOSED DECISION SUPPORT SYSTEM

A decision support system can be devised which may definitely be of help in conducting the selection process keeping a certain sort of algorithm in mind. Such decision support system framed to take decision on the basis of certain fixed parameters, would take into consideration a basic doctrine of collective laws that will have an influential impact over the sole decision. The support system allows all sorts of constraints in its model to attain an optimized form for evaluating a set of boundary conditions which helps to retain its predefined framework. There would be various components of decision support system mostly keeping in view that some may be flexible while others are rigid, that will collectively decide on behalf of incorporated testing information and having implicit role in making any such unitary decision.

4.1 Decision Support System: Design

A schematic model outline, comprised of few indispensable steps is shown in the figure 1,

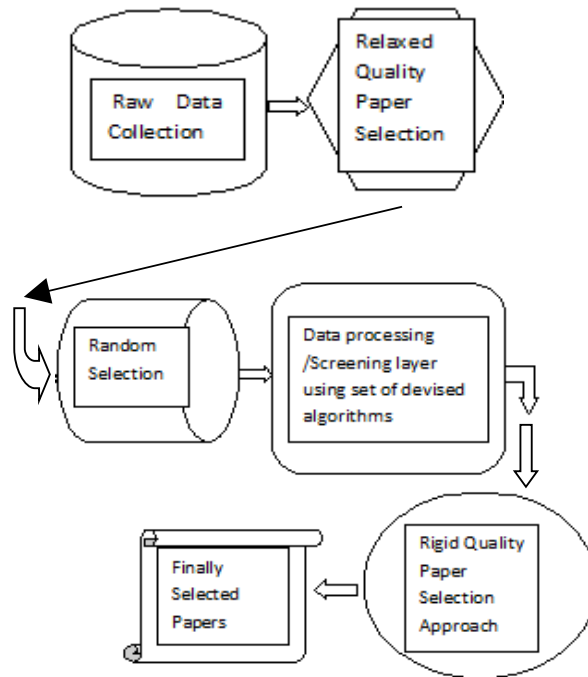


Figure 1. Units of Decision Support System

4.2 Decision Support System: Working

All the configured components of a decision are made working with certain heuristic algorithm to generate binary response or decision in absolute terms after following a few step computationally configured dynamic unit execution path.

Random selection operation pertains to Monte-Carlo based generation of random numbers with a set of trials to allow more or less even distribution of chances for the considered individuals to get selected.

The screening or processing layer implies the implementation of evolutionary algorithm to ensure the selection of most developed and novel ideas in the screening process.

A large initial database, just obtained from a sole pool of papers at the forth most raw stage, which ensures to have a variety of information.

Submission of multiple papers should give emphasis in order to maximize the selection probability.

The theme of mixing and amalgamation of similar and dissimilar ideas particularly innovative and novel themes probably give a better framework of scientific analysis and decision preface.

The selected papers on this background will be allowed to go into a rigid selection criteria which will be applied taking in view the robust and updated knowledge in the specific field.

The rigid selection criteria is required to design in such a way that precision based inference may be drawn from the obtained score for a given manuscript. Simply summation of assumed weights and their multiple with a certain factor weight (defined for the taken area of research) would be proved quite effective to find a value in terms of scoring function.

$$f(S) = \sum X_i w_j + f_w \dots\dots\dots(1)$$

The above **equation 1**, shows the summation of the product of 'X' marks and the corresponding weights 'w' in the respective area together with factor weight f_w which is derived from the scoring process of other similar manuscripts. So using such scoring function we may even evaluate each 'i-th' individual section of the manuscript accordingly by the referees in a particular area. Using this theme of mathematical ground the level of biasness can be minimized to a greater degree indeed.

The final selection can be made using the general concept of test of significance. The statistical view would definitely refine the rejection and acceptance criteria in an instrumental manner. The general knowledge base of large number of area specific cases might be helpful to draw any such conclusion from population and sample mean of score obtained by the papers and hence a test for required p -value can be performed.

5. CONCLUSIONS

Paper with innovative ideas should be weighed over a well written manuscript. It is evident that rejection of innovative ideas is one of the weaknesses of peer reviewing. The heuristics based method appeals the amalgamation of randomness property with general statistical view. So such a way of sampling really has great advantage in presenting the feature of large data base with small sampled patch of retrieved data. The two step screening with different degree of relaxation criteria in our devised algorithm would be helpful in making the operation coverage to a greater extent. All such new ideas may prove to be one of the precious steps in going towards the inventory goal.

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