

# Selection of Candidate by Political Parties Using Fuzzy Logic

Kiran Pal <sup>a</sup>, Surendra Tyagi <sup>b,\*</sup>

<sup>a</sup>Department of Mathematics, Delhi Institute of Tool Engineering, Delhi

<sup>b</sup>Department of Computer Science, Delhi Technological University, Delhi

## Article Info

Article history:

Received 29 December 2013

Received in revised form

10 January 2014

Accepted 20 January 2014

Available online 1 February 2014

## Keywords

Fuzzy Logic

Election

Candidate

Selection

## Abstract

Party leaders in list systems must select candidates to best accomplish their electoral, organizational, and policy goals. In particular, leaders must balance nominees' policy making skills against other aspects of candidate quality, such as electoral viability. In present scenario this is very tough to decide winning ability of candidate. Party leaders shall be with an opportunity to behave strategically. Party leaders pursue a variety of goals in determining where to rank candidates on the ballot: maximizing electoral competitiveness, rewarding party stalwarts, grooming young talent, and ensuring legislative policy making ability.

There are lots of factors which decide winning of candidate, for example publicity, credibility etc. I have made this paper keeping these all issues in my mind which affect candidature of candidate. There are no hard and fast rules or mathematical equation which can show exact result. So Fuzzy logic is best and suitable tool to used in this work.

## 1. Introduction

Candidate selection is the process by which political parties decide who will be on the ballot paper as their recommended candidate(s). The way in which they make that choice is mainly determined by their own internal rules and procedures. Nomination is the legal process by which election authorities screen the candidates recommended by the party, approve their candidacy, and print their names on the ballot paper. In each election, thousands of persons could potentially stand for election, but it would be impossible for voters to make an informed choice among them. Political parties therefore act as useful and necessary gate-keepers narrowing down the list of candidates to a small enough pool.

## 2. Introduction to concept of fuzzy logic

Fuzzy logic has rapidly become one of the most successful of today's technologies for developing sophisticated control systems. The reason for which is very simple. Fuzzy logic addresses such perfectly as it resembles human decision making with an ability to generate precise solutions from certain or approximate information. While other approaches

require accurate equations to model real-world behaviors, fuzzy design can accommodate the ambiguities of real-world in human language and logic. Although genetic algorithms and neural networks can perform just as well as fuzzy logic in many cases, fuzzy logic has the advantage that the solution to the problem can be cast in terms that human operators can understand, so that their experience can be used in the design of the controller. This makes it easier to mechanize tasks that are already successfully performed by humans.[1]

In a broad sense, fuzzy logic refers to fuzzy sets - a set with unclear boundaries. Examples of fuzzy sets are "hot," "tall," "medium," etc. In a narrow sense, fuzzy logic is a logical system that aims to formalize approximate reasoning. In fuzzy logic a fuzzy symbol can take any truth values from the closed set  $[0, 1]$  of real numbers thus generalizing the Boolean truth values. As the technology was further embraced, fuzzy logic was used in more useful applications.

### 2.1 Fuzzy sets Background

The precision of mathematics owes its success in large part to the efforts of Aristotle and the philosophers who preceded him. In their efforts to devise a concise theory of logic, and later mathematics, the so-called "Laws of Thought" were

**Corresponding Author,**

**E-mail address:** surendratyagi2000@gmail.com

**All rights reserved:** <http://www.ijari.org>

posited. One of these, the "Law of the Excluded Middle," states that every proposition must either be True or False. Even when Parmenides proposed the first version of this law around 400 B.C.E. There were strong and immediate objections: for example, Heraclitus proposed that things could be simultaneously True and not True. It was Plato who laid the foundation for what would become fuzzy logic, indicating that there was a third region (beyond True and False) where these opposites "tumbled about." Other, more modern philosophers echoed his sentiments, notably Hegel, Marx, and Engels. But it was Lukasiewicz who first proposed a systematic alternative to the bi-valued logic of Aristotle.

In the early 1900's, Lukasiewicz described a three-valued logic, along with the mathematics to accompany it. The third value he proposed can best be translated as the term "possible" and he assigned it a numeric value between True and False. Eventually, he proposed an entire notation and axiomatic system from which he hoped to derive modern mathematics. Later, he explored four-valued logics, five-valued logics, and then declared that in principle there was nothing to prevent the derivation of an infinite-valued logic.

Lukasiewicz felt that three- and infinite-valued logics were the most intriguing, but he ultimately settled on a four-valued logic because it seemed to be the most easily adaptable to Aristotelian logic.

Knuth proposed a three-valued logic similar to Lukasiewicz's, from which he speculated that mathematics would become even more elegant than in traditional bi-valued logic.[2] His insight, apparently missed by Lukasiewicz, was to use the integral range  $[-1, 0 +1]$  rather than  $[0, 1, 2]$ . Nonetheless, this alternative failed to gain acceptance, and has passed into relative obscurity. It was not until relatively recently that the notion of an infinite-valued logic took hold. In 1965 Lotfi A. Zadeh published his seminal work "Fuzzy Sets" which described the mathematics of fuzzy set theory, and by extension fuzzy logic [3] This theory proposed making the membership function (or the values False and True) operate over the range of real numbers  $[0.0, 1.0]$ . New operations for the calculus of logic were proposed, and showed to be in principle at least a generalization of classic logic. It is this theory which we will now discuss.

## 2.2 Fuzzy explanation

Before illustrating the mechanisms which make fuzzy logic machines work, it is important to realize what fuzzy logic actually is. Fuzzy logic is a superset of conventional (Boolean) logic that has been extended to handle the concept of partial truth- truth

values between "completely true" and "completely false". As its name suggests, it is the logic underlying modes of reasoning which are approximate rather than exact. The importance of fuzzy logic derives from the fact that most modes of human reasoning and especially common sense reasoning are approximate in nature.

The essential characteristics of fuzzy logic as founded by Zadeh and Lotfi are as follows.

- In fuzzy logic, exact reasoning is viewed as a limiting case of approximate reasoning.
- In fuzzy logic everything is a matter of degree.
- Any logical system can be fuzzified
- In fuzzy logic, knowledge is interpreted as a collection of elastic or, equivalently, fuzzy constraint on a collection of variables .
- Inference is viewed as a process of propagation of elastic constraints.

The third statement hence, defines Boolean logic as a subset of Fuzzy logic.

## 2.3 Fuzzy Sets

Fuzzy Set Theory was formalised by Professor Lotfi Zadeh at the University of California in 1965. [4] What Zadeh proposed is very much a paradigm shift that first gained acceptance in the Far East and its successful application has ensured its adoption around the world. A paradigm is a set of rules and regulations which defines boundaries and tells us what to do to be successful in solving problems within these boundaries. For example the use of transistors instead of vacuum tubes is a paradigm shift - likewise the development of Fuzzy Set Theory from conventional bivalent set theory is a paradigm shift. Bivalent Set Theory can be somewhat limiting if we wish to describe a 'humanistic' problem mathematically.

## 3. Candidate selection process

Parties can select their candidates in many different ways. In numerous cases, the existing legal framework establishes that political parties should "democratically" elect their candidates, but this concept is very vague, and there are few if any applicable legal provisions. Only in a few cases does legislation lay down the process by which candidates should be selected, and the selection process can have a direct impact on the depth and breadth of the democratic process—particularly if a given party's candidate selection process is non-transparent[5]

## 4. Candidate selection process Factors

Factors such as electoral system, party ideology, political culture, and the organization of government have been thought to have an influence on the centralization and participation in the candidate selection process. However, there is no evidence that any of them is decisive. It would be natural for national party agencies to be more influential in multi-member district systems (where more than one person is elected to the legislature from each constituency), while single-member constituencies would give more power to local branches.[6]

In the same logic, federal systems would tend to favor decentralized candidate selection, parties with an inclusive political ideology would favor participatory selection procedures, and parties in countries with a hierarchical political culture would foster non-participatory processes. However, all these (and more) criteria are mixed in all political parties, and conclusions are therefore hard to draw. Not even in cases where legislation stipulates a particular selection process is it always possible to say if the law has determined the processes, or if they simply reflect practice.

Following factors are considered in this project:

1. Behavior
2. Age
3. Character
4. Publicity
5. Education

#### 4.1 Primary Elections for deciding publicity among party people

Primary elections are internal party processes that choose a political party's candidate(s) for the next general election by holding an internal election. Exactly how this is done depends on the legal

framework, internal party rules, and informal practices.[7]

Primary elections are an example of a selection process with a high level of participation, meaning that ordinary members (or in some cases all voters in the electoral district) control the process.

#### 4.2 Age

Age of person decide to work ability and experience of person. If person is less than 25 years is not suitable for fighting election, if he is between 25 and 40 years has less experience but good working capacity, if he is between 40 and 65 has good experience and good working capacity. This is most suitable age for fighting election; if he is between 60 and 75 has good experience but less working power so he should have been given less chance than of 60 years person. If person is greater than 75 in present era should leave politics or given very rare chances.

#### 4.3 Behavior

It is most powerful tool of candidature which decides future of candidate. It is categorically divided as:

1. Bad
2. Good
3. Better
4. Best

#### 4.4 Education

An Educated candidate can provide good governance, so education factors as:

1. Education till 8th
2. Education till 10th
3. Education till 12th
4. Education after 12th

**Table: 1.** System Requirements

<i>S.No</i>	<i>System Hardware/Software</i>	<i>Configurations</i>
1	RAM	512MB
2	Operating System	Windows 7
3	Processor (with Speed)	Core to duo (1.6 GHz) and Upwards
4	Hard Disk Size	40 GB and above
5	Front End	C++

## 5. Conclusions

There are two concepts that are central to the issue of party selection of candidates. One is centralization, that is, what level in the party – local, regional or national – controls the candidate selection.

The second is participation, meaning who – ordinary members or top leadership – controls the process at the level where the decision is taken. Leaders determine the list rankings of a limited number of

available candidates. Obviously, candidates at the top of the list have a higher chance of winning a seat. Party leaders, therefore, choose candidates for top list positions depending on the party's goals. Experienced candidates may generally be considered of better quality; they are known to be loyal, hold promise for future elections, have more experience making policy, and are better able to attract votes in order to win elections.

## References

- [1] [http://www.doc.ic.ac.uk/~nd/surprise\\_96/journal/vol4/sbaa/report.fuzrules.html](http://www.doc.ic.ac.uk/~nd/surprise_96/journal/vol4/sbaa/report.fuzrules.html)
- [2] S. Fukumi, M. Mizurnoto, Tanaka K., Some considerations of fuzzy conditional inference, *Fuzzy Sets and Systems*, 4 (1980), pp. 243–273
- [3] L. A. Zadeh, “Similarity relations and fuzzy ordering”, *Information Sciences*, 3, 177—200, 1971
- [4] L. A. Zadeh, “Fuzzy sets”, *Information and control*, 8, 338—353, 1965
- [5] <http://aceproject.org/ace-en/topics/pc/pcb/pcb02/pcb02a>
- [6] G. Rahat, R. Y. Hazan, \Candidate Selection Methods: An Analytical Framework." *Party Politics* 7(3):297-322. URL: <http://ppq.sagepub.com/cgi/doi/10.1177/1354068801007003003>
- [7] <http://www.danpemstein.com/files/MPB-experience.pdf>