A REVIEW: ROLE OF FUZZY EXPERT SYSTEM FOR PREDICTION OF ELECTION RESULTS

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Abstract—

In this paper a review of various model of election prediction expert system through fuzzy logic has been presented. Election is the formal process of selecting a person for public office or of accepting or rejecting a political proposition by voting. Elections make a fundamental contribution to democratic governance. The universal use of elections as a tool for selecting representatives in modern democracies is in contrast with the practice in the democratic archetype. In democracy of India follows election likes general elections, assemly elections, rajya sabha election. Election is very famous same way election prediction is again have importance. It has scope as the election. To predict accurate result of elections with respect to parties is challengeable task. Social science with the study, scientific analysis and election prediction has impact on society. The use of fuzzy logic and design and develop rule based fuzzy expert system for prediction of election results with respect to political parties, is the core part of our research

Keywords— Fuzzy Logic, Election Prediction Expert System, Artificial Intelligence.

INTRODUCTION

India boasts of being the largest democracy in the world, the fact remains that the quality of democratic rights in India is indeed pathetic. India has an asymmetric federal government, with elected officials at the federal, state and local levels. At the national level, the head of government, Prime Minister, is elected by the members of Lok Sabha, lower house of the parliament of India. All members of Lok Sabha except two, who can be nominated by president of India, are directly elected through general elections which take place every five years, in normal circumstances, by universal adult suffrage.

Fuzzy logic is a form of many-valued logic and it deals with reasoning that is approximate rather than fixed and exact. Compared to traditional binary sets where variables may take on true or false values fuzzy logic variables may have a truth value that ranges in degree between 0 and 1. Fuzzy logic has been extended to handle the concept of partial truth, where the truth value may range between completely true and completely false.

Furthermore, when <u>linguistic</u> variables are used, these degrees may be managed by specific functions. The application of artificial intelligence (AI) techniques in modeling of process has been investigated by many researchers. Fuzzy logic (FL) as a well-known AI technique is effectively used in modeling of many processes such as to predict and to control various processes. Prof. Zadeh's [1] 1965 paper on fuzzy sets the basic ideas underlying soft computing in current incarnation have links to many earlier influences, among them. A precursor to fuzzy computability was the foundation of fuzzy sets since then they have found acceptance in many fields of sciences and in recent times in the industry too. Zadeh further extended the concept of fuzziness to algorithms [2]. The progress of algebraic theory of fuzzy automata and fuzzy formal languages can be seen by the amount of new research that has been reported over the years.

PURPOSE OF STUDY

We are interested to do research and study of Fuzzy Logic, Fuzzy Set, and Fuzzy Logic Inference system for the prediction of the elections result of respective political parties. So related research also as impact and importance in practical world for predicting the result of election with respect to political parties participating in election. Authors would like to extend present research using fuzzy logic in the area of prediction of election results and design and develop rule based fuzzy expert system for prediction of election results with respect to political parties which needs to get majority.

REVIEW OF LITERATURE

Harmanjit Singh, Gurdev Singh, Nitin Bhatia,(2012)

Harmanjit Singh, Gurdev Singh and Nitin Bhatia [4] had done research on election results prediction system with respect to candidate using fuzzy logic. They evaluate the prediction of a candidate in any type of election. To perform this task, a Fuzzy Inference System is used which takes into account all the arguments that must affect the prediction winning chances as well as the losing chances of a candidate. Each parameter is defined by membership fuctions. Proposed model calculates the percentage of winning chances of candidate and also losing chances of candidate in the election. If number of inputs parameters can be increased or some other parameters can be added which actually effects the prediction then same model with little modification can give the accurate result for any kind of prediction.

Campbell and coworkers Lewis-Beck and co-workers

Campbell and coworkers [5-7], Lewis-Beck and coworkers [8-10] have presented their typical contribution in the sector of presidential election forecasting with the help from political scientists. Along with political scientists, an economist, Fair [11] also generated some models which were based on economic variables. This has given the path and scope for golden era for researches to implements the concepts of social science along with the fuzzy logic technique.

Kapoor and N. Bhatia (2011)

Kapoor and N. Bhatia [12] used fuzzy in risk management of financial organization. A fuzzy logic based application to predict risk in loan providing organizations was developed and tested

on different financial organizations. They also work on risk of software and they calculated risks using fuzzy logic [13].

Gursharan Singh and N. Bhatia (2011)

Gursharan Singh and N. Bhatia developed a fuzzy logic based cricket player performance evaluator in 2011. They designed many rules in FIS to check the performance of a player via fuzzy logic. There was positive as well as negative performance was there in this research. They also used input and output membership functions in the research [14].

Lius Teran (2011)

Lius Teran introduced new concept in social science which was totally web based Voting Assistance Application (VAA) used to aid voters for finding the party or candidate that is most in line with their choice. This is treated as the latest concept in the field of social science [15].

M. Z. Shafiq et al (2008)

M. Z. Shafiq et al[9] has explained the importance of Fuzzy Inference System with respect to Fuzzy, Neural and Neuro Fuzzy Inference System (NFIS) are there to empower the importance.Ths FIS study is done for Portscan Detection [16].

A. Abraham(2008)

A. Abraham [17] has explained Fuzzy Inference System also with neural network techniques. Neural learning with Fuzzy Inference System (FIS) is again a wide concept which is also used for decision making. It shows the reliability of FIS. It gives the transformation from more than one independent variable to only one output using fuzzy logic toolbox in MATLAB. In FIS numbers of rules are there based on "if-then" conditions. These rules are very smooth to learn, smooth to use and can be converted according to the scenario. They help to find out the conclusion easily. He explained FIS in distinct ways.

Wang and Brigde(2007)

Wang and Brigde[18] explained fuzzy rules plays vital role in fuzzy inference system (FIS) and the same approach from latest point of view are verify to provide the helps to learn such rule based model for any kind of difficult task.

Zhiyi(2004)

Zhiyi coined the formula based on Mamdani type FIS to assess compost maturity and stability [19]. Zhiyi explained how multi-decision making system can be formulated with the help of fuzzy. The concept was fabricated formula based.

Davidson and Harward(2003)

Davidson and Harward [20] explained different kind of applications based upon fuzzy logic / fuzzy set

Yao (1998)

The Yao [21] explained similarities and differences between rough set theories and fuzzy sets with respect to two formulation of fuzzy set and two views of rough sets are explained.

Yamashita's (1998)

Yamashita's provides the concept of fuzzy system in the context of decision aid. After the fuzzy reasoning applied on the input values supplied by the students the system acts as a kind of vocational guidance [22].

Dimitrov(1997)

Dimitrov done research in the major role to provide the importance of FL in social sector. He has given the practicality of fuzzy logic to deal with paradoxical and chaotic nature of social system [23]. This kind of system provides the help to deal with opposite opinions.

Samuel O. Russell and Paul F. Campbell (1996)

Samuel O. Russell and Paul F. Campbell [24] worked on Reservoir Operating Rules with Fuzzy Programming. Relatively little of the research on reservoir operating procedures has found its way into actual practice. One reason is that operators are uncomfortable with complex optimization models and reluctant to use procedures that they do not fully understand. Fuzzy logic seems to offer a way to improve on existing operating practices, which is relatively easy to explain and understand. The main concepts in fuzzy logic and a procedure for applying them are explained. These are applied to finding operating procedures for a single-purpose hydroelectric project, where both the inflows and the selling price for energy can vary. Operation of the system is simulated using both fuzzy logic programming and fixed rules. The results are compared with those obtained by deterministic dynamic programming with hindsight.

Royes and Bastos (1988)

Royes and Bastos used the fuzzy concepts to build a fuzzy expert system based on the vagueness and imprecision of the statement. Those investigators concluded that the outstanding feature of political science is reasoning based on imprecise statements and vague concepts. Royes and Bastos [25] also provided an example for predicting the chance of re-election using fuzzy logic Due to the efforts and the practical utility of these above applications in the field of social science along with fuzzy logic it clearly indicates that how much woks has done and still there is a scope of improvement to provide the better result in the term of prediction.

Assilian and E. Mamdani (1974)

They developed first fuzzy logic controller in United Kingdom. This controller and its reliability, capability researchers are using this concept for designing, developing and implementing algorithms as well as the working models with the help of fuzzy controller. Along with fuzzy logic, Genetic Algorithm (GA) is also used to design and implement with fuzzy logic controllers to make models and application [26].

Smithson

Smithson [27] describes the theory of FL along with Fuzzy Set in Psychology. His theory was not only in one particular sector but in several fields as perception and memory theories to solve measurement problems.

J. Russell

J. Russell done another research. He has contributed the logic for facial emotion recognizer based on fuzzy logic [28].

J. M. Mendal

Fuzzy also helps to solve different real world due to its systematic rule depended concept. They says that fuzzy logic system as a non linear mapping of an input data vector into a scalar output [29]. Theory of rough set discussed about the different kind of formulation and interpretations. This is also the part of fuzzy.

Prof. Zadeh's (1965)

The basic ideas underlying soft computing in current incarnation have links to many earlier influences, among them Prof. Zadeh's[1] 1965 paper on fuzzy sets. A precursor to fuzzy computability was the foundation of fuzzy sets since then they have found acceptance in many fields of sciences and in recent times in the industry too. Zadeh further extended the concept of fuzziness to algorithms [2]. The progress of algebraic theory of fuzzy automata and fuzzy formal languages can be seen by the amount of new research that has been reported over the years. Tatjana Petkovic's work [3] is a good pointer to the same.

CONCLUSIONS

This review of literature contains information of many researches of fuzzy logic. In this review authors have extensive review of academic article and provided a comprehensive study cannot be claimed to be exhaustive and complete. Study with some result analysis along with the prediction of or analysis of or risk of any system using fuzzy logic was done. Because prediction play an important role in election and it is the demand of time to provide the accurate prediction by using tools or technology. So related research also as impact and importance in practical world for predicting the result of election with respect to political parties participating in election. From the review of literature it is clear that majority of research are done for the prediction of election results of candidate participating in the election. Authors would like to extend present research using fuzzy logic in the area of prediction of election result with respect to parties which needs to get majority. Authors would like to design and develop rule based fuzzy expert system for prediction of election results with respect to political parties. This research help to predict the election results so respective action should done by that particular party to win the elections. Prediction is good area for further research. Regular and better research is always in demand for accuracy.

REFERENCES

[1] L.A.Zadeh, Fuzzy sets Information and Control 8 (1965) 338-353. Zadeh, L. A. (1965). Fuzzy sets. Information and Control. 8, 338-353. Fuzzy sets and information granularity (1979) Zadeh and

[2] Zedeh, L.A.:Fuzzy Algorithms. Information and Control 2 (1968) 94-102

[3]Tatjana Petkovic "Varieties of fuzzy languages " Workshop on Semigroups and Automata,a satellite workshop to ICALP'05

[4] Harmanjit Singh, Gurdev Singh, Nitin Bhatia research in fuzzy research paper Election Results Prediction System based on Fuzzy Logic(2012)

[5] J.E Campbell, J.C. Garand (Eds.) (2000). Before the Vote: Forecasting American National Election, Sage Publication, Inc.

[6] J.E Campbell, (1992) Forecasting the presidential vote in the states, American Journal of Political Science 36 386-407

[7] J.E Campbell, K.A. Wink, (1990) Trial-hear forecasts of the presidential vote, American Politics Quarterly 18, 251-269

[8] M.S Lewis-Beck, T.W. Rice, (1984) forecasting presidential election: a comparison of native models, politics behavior 6, 9-21

[9] M.S Lewis-Beck, T.W. Rice, (1984). Forecasting U.S House Election, Legislative Studies Quarterly 9, 475-486

[10] M.S Lewis-Beck, T.W. Rice, (1992). Forecasting Elections, Congressional Quarterly Press, Washington DC.

[11] R. Fair, (1988). The effects of economic events on votes for president : Update, Political Behavior 10, 168-179

[12] Kumar, S., Bhatia, N. and Kapoor, N. (Feb 2011). Fuzzy logic based tool for loan risk prediction. In Proceedings of International Conference on Communication and Computing Technologies (ICCCT-2011), 180-183.

[13] Kumar, S., Bhatia, N. and Kapoor, N. (2011). Software risk analysis using fuzzy logic. International Journal of Computer Information Systems, 2 (2), 7-12.

[14] Singh Gursharan, Bhatia N. and Singh Sawtantar (2011). Fuzzy logic based cricket player performance evaluator. IJCA Special Issue on "Artificial Intelligence Techniques - Novel Approaches & Practical Applications" AIT.

[15] Luis Teran, (2011). A Fuzzy based advisor for election and creation of political communities, Information System Research Group. Vol. 3.

[16] Shafiq, M. Z., Farooq, M. and Khayam, S. A. (2008). A comparative study of fuzzy inference systems. Neural Networks and Adaptive Neuro Fuzzy Inference Systems for Portscan Detection. EvoCOMNET, LNCS.

[17] Abraham, A. (2005). Adaptation of fuzzy inference system using neural learning. Fuzzy System Engineering: Theory and Practice. N. Nedjah, Ed. et al. Berlin, Germany: Springer-Verlag, 3, 53–83.

[18] Wang, W. and Bridges, S. M. (March 2000). Genetic algorithm optimization of membership functions for mining fuzzy association rules. In Proceedings of The International Joint Conference on Information Systems, Fuzzy Theory and Technology Conference.

[19] Zhiyi, F. (March 2004). A fuzzy inference system for synthetic evaluation of compost maturity and stability. Masters of Engineering thesis, University of Regina, Saskatchewan.

[20] Hayward, G. and Davidson, V. (2003). Fuzzy logic applications. Analyst. 128, 1304–1306.

[21] Yao, Y. Y. (1998). A comparative study of fuzzy sets and rough sets. Information Sciences. 109 (1-4), 227-242. And Yao, Y. Y. (1996). Two views of the theory of rough sets infinite universes. International Journal of Approximation Reasoning. 15, 291-317.

[22] T. Yahashita, (1998). On a support system for human decision making by the combination of fuzzy reasoning and fuzzy structural modeling, Fuzzy Set and System, Vol. 8, 257-263

[23] V. Dimitrov, (1997). Use of Fuzzy Logic when dealing with Social Complexity, Complexity International, Vol. 04.

[24]Russell, S. and Campbell, P. (1996). "Reservoir Operating Rules with Fuzzy Programming." J. Water Resour. Plann. Manage, 122(3), 165–170.

[25] G.F Royes, R.C Bastos, (2001). Fuzzy Sets in Political Science. In: IFSA World Congress and 20th NAFISPS International Conference, Vol. 2, 935-940

[26] Homaifar, A. and McCormick, E. (May 1995). Simultaneous design of membership functions and rule sets for fuzzy controllers using genetic algorithms. IEEE Trans. Fuzzy Systems. 3 (2).

[27] M. J. Smithson, G. Oden.(1999). Fuzzy set theory and application in psychology, in D. Dubios & H. Prade (Eds), International Handbook of Fuzzy Sets and Possibility Theory, Vol. 5, Kluwer, Amsterdam.

[28]] J. Russell, M. Bullock, (1986). Fuzzy Concepts and the perception of emotion in facial expression, Social-Cognition, Vol. 4, 309-341

[29] Mendel, J. M. (March 1995). Fuzzy logic systems for engineering: a tutorial. In Proceedings of the IEEE. Vol. 83. No. 3.