Linkage Analysis of Fuzzy Decision Tree Guarantee Mechanism for Entrepreneurship and Employment of College Students

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ABSTRACT: *The issue of college students' entrepreneurship and employment has always been a focus of social attention. To provide a better guarantee for college students' entrepreneurship and employment, this article adopts the fuzzy decision tree method to conduct a linkage analysis of the guarantee mechanism for college students' entrepreneurship and employment. This article adopts the method of fuzzy decision trees to conduct a linkage analysis of the guarantee mechanism for college students' entrepreneurship and employment. Firstly, by reviewing and summarizing relevant literature, the main factors affecting college students' entrepreneurship and employment have been identified. Secondly, a fuzzy decision tree model was constructed based on these factors, and the entropy weight method was used to calculate the weights of each node. Finally, through the operation and analysis of the model, corresponding conclusions were drawn.*

Keywords: Fuzzy Decision-making Algorithm, College Students' Entrepreneurship, Government, School, Linkage Mechanism

Received: May 2023, Revised 18 August 2023, Accepted 2 September 2023

DOI: 10.6025/ijwa/2023/15/4/112-119

1. Introduction

Since the expansion of enrollment in higher education, the issue of employment has been paid attention to. The status quo of many congee diets has not been solved. Many college students cannot find satisfactory jobs every year, and entrepreneurship has become an excellent way to alleviate this problem. It is a job seeker and must be a founding entrepreneur [1]. The government has gradually recognized the necessity of college students to start a business. It has repeatedly introduced policies to encourage college students to start businesses. The government is a policy maker, and it is bound to become a leader in entrepreneurship for college students. Without a good policy environment, legal protection, and a source of capital, college students are having a hard time of successful entrepreneurship [2]. The main task of this topic is to clarify the responsibilities of the government, provide a good policy environment for college students to start a business, provide preferential policy support, and encourage college students to start their own businesses. With the continuous development

of science and technology, fuzzy decision tree algorithms are increasingly widely used in constructing university-sponsored government-school linkage mechanisms [3]. Decision tree technology is mostly used in machine learning and data mining. In data mining, a decision tree is an algorithm commonly used in predictive models, finding valuable and potential information by purposely classifying large amounts of data [4]. The main advantages are its simple description and fast classification, which is particularly suitable for large-scale data processing [5]. The decision tree ID3 algorithm is the most influential decision tree generation algorithm. The algorithm selects the attribute with the highest information gain as the test attribute of the current node. The sample set is divided according to the value of the test attribute. How many different test attributes are taken The value divides the sample set into several sample subsets and uses a recursive method further to classify the corresponding sample subsets [6].

2. The State of the Art

Some scholars first proposed a simple fuzzy control theory based on the concept of fuzzy set theory. Compared with conventional controllers, there is no need to establish a controlled object mathematical model, which has the advantage of adaptability to non-linear and time-varying characteristics of the controlled object. Still, there are also certain deficiencies such as insufficient accuracy, limited adaptive capabilities, and susceptibility to oscillations [7]. Many improvements have been proposed for these problems, and various high-performance fuzzy controllers have been designed. Most of them have been successfully applied. Since its birth, fuzzy control technology has gone from simple to complex, from imperfect to perfect, and its research has made many achievements and progress [8]. In addition, fuzzy control algorithms already existing and used in large quantities are Fuzzy-PI. Compound control; parameter self-tuning fuzzy control; model reference adaptive fuzzy control; self-organizing fuzzy control; fuzzy control with self-learning function; multi-variable fuzzy control; high-precision fuzzy controller. Because the improved fuzzy control solves the original deficiency and has better stability and robustness than conventional controller systems, fuzzy control is being applied more and more widely.

3. Methodology

3.1. Basic Principles of Fuzzy Decision Control Algorithm

For some production processes that use traditional methods to control the effect of poor performance, manual control by an experienced operator can receive satisfactory results. Fuzzy control is the summary of human experience into a series of rules stored in the computer and then quantified the rules using fuzzy theory so that the controller can imitate the operator's manual control. In this way, the fuzzy thinking method of simulating the human brain through a computer is realized, thereby completing the control of the controlled system. Fuzzy control is intelligent, so its system composition is the same as the general digital control system. The block diagram is shown in the figure below.

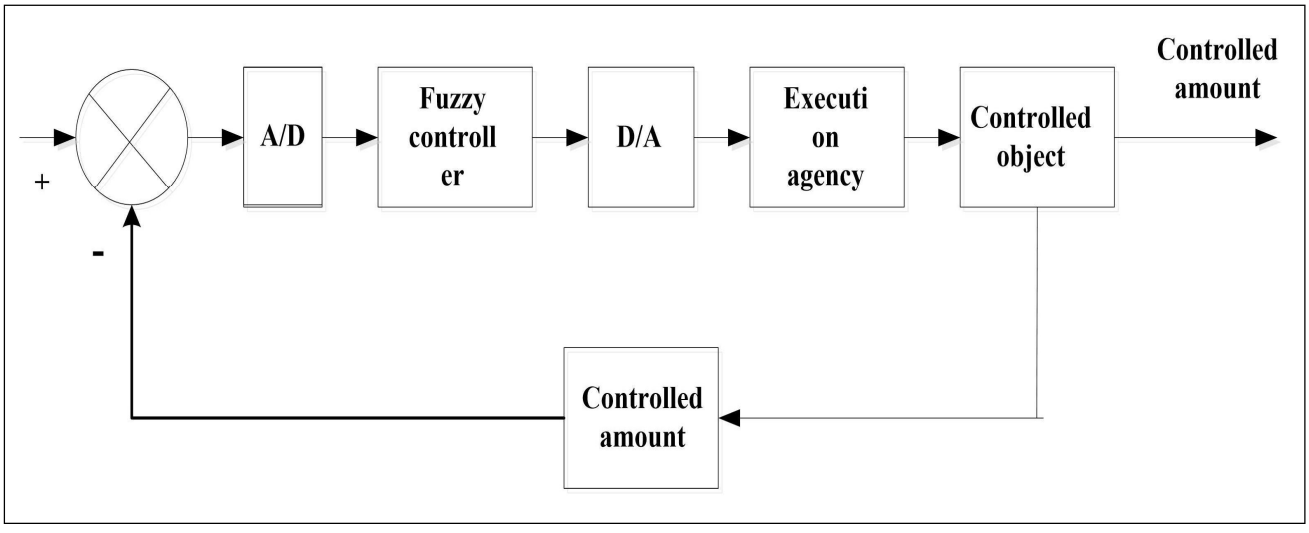

Figure 1. Fuzzy control system block diagram

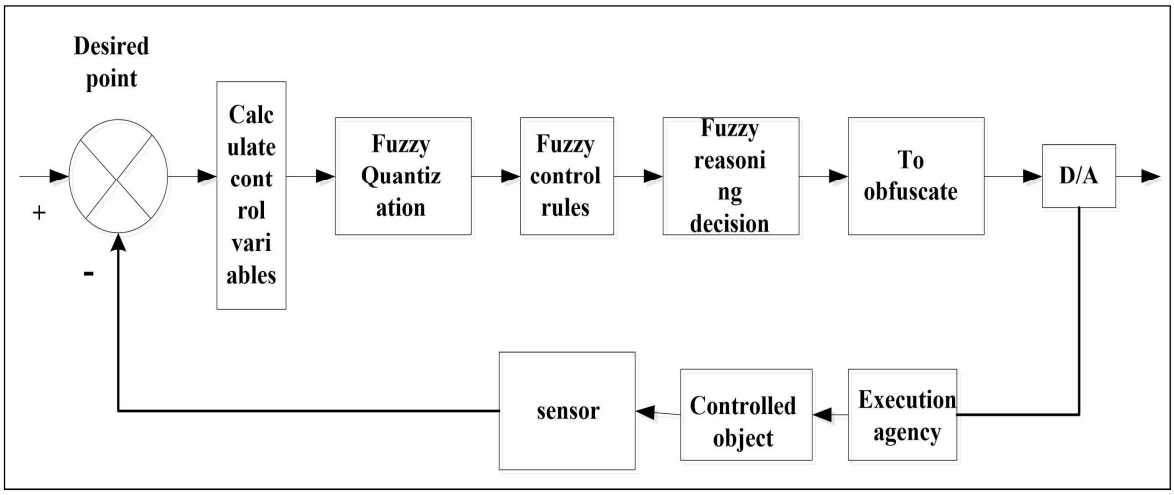

Figure 2. Fuzzy control block diagram

Figure 1 shows the basic block diagram of fuzzy control. It can be seen from the figure that the main difference between the fuzzy control system and the conventional control system is that the fuzzy controller replaces the conventional controller. Essentially, the control algorithm is different. The core part of fuzzy control is the fuzzy controller, as shown by the dashed box in the figure, and a computer program implements its control law. The performance of a fuzzy control system depends mainly on the structure of the fuzzy controller, the fuzzy rules used, and the method of fuzzy decision-making. The operation of the fuzzy controller can be described as follows: The system is sampled to obtain the precise output value of the controlled object, and then this value is compared with the given value to obtain an error signal E. After A/D conversion, an accurate figure is obtained. The amount, like the operator's eyes, and other sensor officials get a clear amount. This process is a fuzzy quantification process. After getting the fuzzified input, the next step is determining how the adjusted object should be adjusted. In practical applications, management is performed by experts or operators in a certain field based on their experience in actual operations. Similarly, fuzzy control is summarized into many control rules described in natural language based on expert knowledge or the manual operator's long-term accumulated experience. It is processed using the tool of fuzzy mathematics to form a fuzzy relation called a "rule base" modeled on the human brain. The thinking process in the fuzzy control should also determine a reasoning rule. According to the input fuzzy quantity, the fuzzy relation rule is completed by the fuzzy control rule to solve the fuzzy relation equation, and the fuzzy control quantity is obtained. However, although the operator performs a fuzzy reasoning and decision-making process while thinking, it is a precise amount when actually performing a manual control action. Therefore, in the fuzzy control, the fuzzy decision must be passed after the fuzzy decision to get an exact control amount D/A transformation is applied to the controlled object, which is called defuzzification. After defuzzification, accurate output can be obtained. After being sent to the controlled system, the system can be driven to work normally. This is the basic working process of the fuzzy control system.

3.2. Fuzzy Decision Tree ID3 Algorithm

The fuzzy decision tree is the expansion and improvement of the traditional decision tree, which extends the application of decision tree learning to handle uncertainty. There are a lot of ambiguities in real life. Most of the knowledge is ambiguous and uncertain. Human experts usually use fuzzy expert knowledge to solve practical problems, so that traditional decision tree learning methods mainly dealing with discrete variables-Transformation begin. First, select the classification attribute at each node to establish a fuzzy decision tree. The fuzzy ID3 algorithm uses the concept of entropy, which is inversely proportional to the degree of data ordering in the sav and vice versa. If you choose a classification attribute to classify the sample data at the node so that the entropy value at that node decreases the most, then choosing it as the classification attribute is optimal. The fuzzy ID3 algorithm defines the information gain $G(Ai, D)$ to represent this reduction in entropy, so the attribute with the greatest information gain should be chosen as the extended attribute of the node.

Let the domain of the domain $D = \{e1, e2..., en\}$ represent an example set of summary prediction rules. Each element $ek(k = 1, 2, ..., n)$ in the sample set has m attributes: $A1, A2, ..., Am$. The value range of each attribute Ai is $\{a1i, a2i, ...,aiki\}$ $(i = 1, 2, ..., m)$ respectively. The value of the jth instance ej on the $i\text{-}th$ attribute is represented by the corresponding degree of

membership μij. It is a fuzzy subset defined on the Ai value range $\{a1i, a2i, ..., aiki\}$. The class to be divided is $C=\{C1, C2, ..., CK\}$. The calculation formula for $G(Ai, D)$ assumes that the A and B phases are turned on at the beginning, and the current direction is *VT*1-*A*-*B*-*VT*4. Suppose the torque generated by the current flowing into the winding is positive, and the torque generated by the outgoing winding is negative. In that case, the resultant torque direction is located on the angle bisectors of *TA* and *TR* as follows:

$$T_{AB} = \sqrt{3}T_A = \sqrt{3}T_B \tag{1}$$

The fuzzy information gain of each attribute at each node is calculated by $G(Ai, D)$, and the attribute with the largest information gain is selected as the extended attribute of the node to implement the division of the sample set. When the rotor rotates counterclockwise through 60 degrees under the action of the torque T_{AB}, the control signal sent by the position sensor turns off the power transistor *VT*1, the *VTS* is turned on, the current flows from the *C* phase, and the *B* phase flows out. At this point, the synthetic electromagnetic torque T_{BC}, size:

$$T_{BC} = \sqrt{3}T_B = \sqrt{3}T_C \tag{2}$$

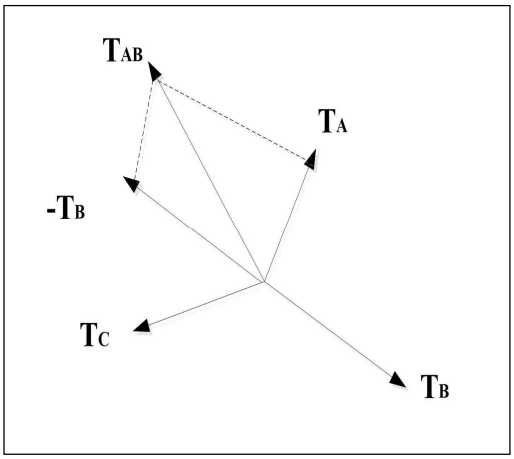

Figure 3. Torque TAB

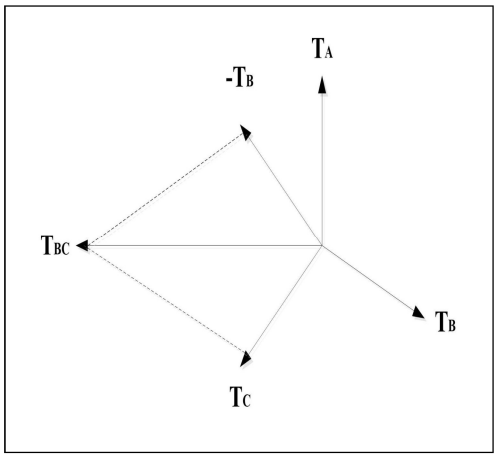

Figure 4. TBC torque synthesis

However, when the direction is rotated counterclockwise through 60 degrees, the electromagnetic torquewill drive the motor's rotor to turn over a certain angle.

According to this rule, each time the conduction state is changed, the vector direction of the resultant electromagnetic torque is rotated through 60 degrees, and the motor's rotor is rotated in the same direction. Under this law, the conduction sequence of each power tube is *VT*1*VT*4, *VT*4*VT*5, *VTSVT*2, *VT*2*VT*3, *VT*3*VT*6, *VT*6*VT*4, *VT*4*VT*1 in order. Each 1/6 cycle is changed once, and only one power tube is replaced at a time for each power. The tube conducts 120 electrical degrees. The process forms the so-called three-phase six-shot state, pushing the motor to rotate regularly. *A*, *B*, *C* three-phase current waveforms under normal commutation conditions. The conduction sequence of the switch shows that the current flow sequence is *AB, CB, CA, BA, BC, AC*, and then the next decision tree commutation cycle.

The government has organized a series of concrete measures to organize "one-stop" services, including entrepreneurial training, opening guidance, policy consultation, project demonstration and follow-up guidance, etc., and established the entrepreneurial service system for university graduates. This year, the Communist Youth League Central Committee and the National Association of Students The "Entrepreneurship China - National College Student Entrepreneurship Service Project" organized and implemented by the Deployment, Mission Central School Department and China Youth Talents Training Center was officially launched in China University of Petroleum Beijing. Its main contents include targeted business start-up training services for college students to provide entrepreneurial projects, venture capital, entrepreneurship counsellors and other consulting services for college students to provide personnel 'recommendations, dispatches, exchanges, quality assessment, personnel file agents and other services to start building a national college student credit Service system, establishing credit files for college students, conducting credit training, etc. Yang Yue, executive secretary of the Central Committee of the Communist Youth League, attended the opening ceremony and delivered a speech. He called on the Communist Youth League and the Association of Scholars at all levels to effectively increase the support and service for college students' entrepreneurship, integrate social resources, and form a good atmosphere for the whole society to support them in starting their own businesses. Gradually establish a complete set of college student entrepreneurship service system.

4. Result Analysis and Discussion

This paper establishes the linkage mechanism between government and school based on a fuzzy decision tree mathematical model in *Matlab* and simulates the system with *dSPACE*. To compare the control effect, the *PID* control algorithm was used for comparison. It represents the speed response curve of the linkage mechanism of the adaptive fuzzy and *PID* algorithms in college students' entrepreneurial stage.

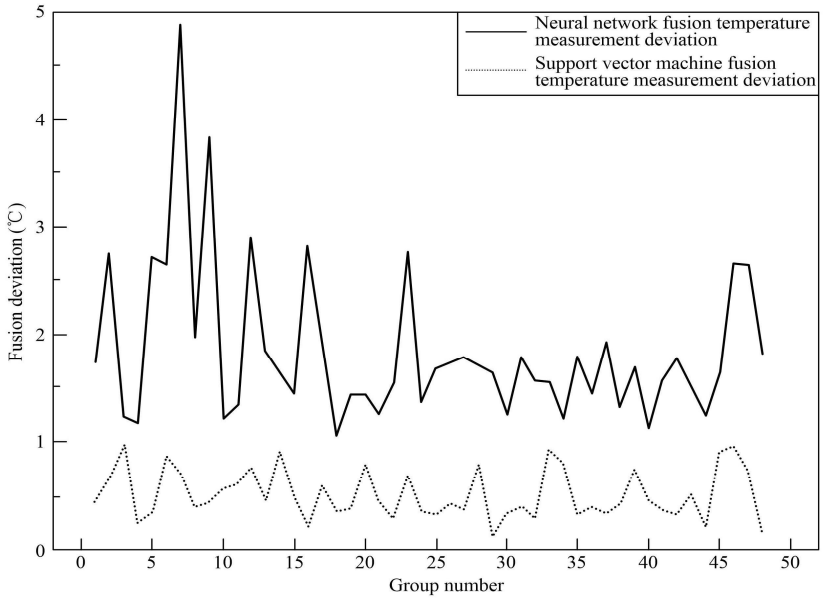

Figure 5. Velocity response curve

Because the setting speed is 1800*r*/*min*, the overshoot using adaptive fuzzy control is 120*r*/*min*, and it takes 1.7*s* to reach the highest point from the start of the motor. Then there is a speed drop process; the lowest point is 1700*r*/*min*, and the corresponding speed drop is 100*r*/*min*; this process took 0.4*s*. When the speed is less than the setting speed of 1800*r*/*min*, the controller adjusts the speed of the motor to increase. At this time, the speed control error becomes slow due to the decrease of the speed error when it is used for 0.2*s*, after fluctuating at a speed of about 10*r*/*min*, the time it takes is that the speed of the motor is always stable at 1800*r*/*min*. The speed fluctuation is very small, not exceeding 10*r*/*min*. The *PID* control is used, the speed overshoot is 150*r*/*min*, and the time taken is 2*s*. Then, the speed is reduced by 250*r*/*min* to 1700*r*/*min* in the controller adjustment process, the time is 0.5*s*, the speed is low, and the time is consumed. The same as above and adaptive fuzzy controller. Then, the speed increases; after 0.6, the speed of the rear motor is stable, but it can be seen from this that the speed of the motor at this time has a fluctuation of about 15*r*/*min* up and down. In both control algorithms, the speed of the motor fluctuates. There are many reasons for this, including the error in speed acquisition, slight changes in the load on the motor, and so on.

Analysing the students' employment methods, it is necessary to discuss employment-related indicators such as students' gender, professional achievement, English level, and professional skills. Among them, gender and English grades are attributes with clear class values. Professional grades and professional skills are more specific. In the past, the data mining process based on decision tree *ID*3 often just averaged all the grades and divided them by the method, which finally gets a clear and good evaluation of the classification. Given the ambiguity of data partitioning, it is necessary to introduce a fuzzy decision tree algorithm that can handle ambiguity problems. Data mining should have clear data analysis objectives; some data can be directly obtained, and some data can only be obtained through investigation. The data in this article comes from a computer science graduate from 2007 to 2010. It mainly includes basic student information, student achievement information, and student employment information. After collecting this information, a small portion of the data is collected as a training set. Table 1 shows the data after the fuzzification.

Adaptive Fuzzy Algorithm	Motor speed	1920	1700	1812	1800+-10
	Speed overshoot	120	-100	12	+-10
	Response time	1.7	0.4	0.2	-
PID algorithm	Motor speed	1950	1700	1820	1800+-20
	Speed overshoot	150	-100	20	+-20
	Response time	2.0	0.4	0.6	-

Table 1. Start the Process Speed Correspondence Table

The reasoning for the decision tree starts from the root node and uses the attribute values to search down the branches of the decision tree until the leaf nodes get the desired result. The fuzzy decision tree searches downward along multiple branches with a certain degree of trust and eventually reaches numerous leaf nodes. In the fuzzy decision tree algorithm, the examples match all the rules in the fuzzy rule group, and the example may belong to various types. Because of this, each category's result is the degree of membership in the [0, 1] interval. After the decision tree is generated, the next thing to do is express the fuzzy decision tree as a rule. Like the decision tree *ID*3 algorithm, the fuzzy decision tree can also represent the classification rules in if-then form. The classification rules converted by fuzzy decision trees are a set of fuzzy rules, and each rule yields ambiguous conclusions. In this example, some meaningful information discovered through the fuzzy decision tree algorithm is as follows: Professional achievement Excellent employment possibility is high because students with excellent professional achievement often become graduate students or enter institutions; professional achievement is not special. Yes, but students with strong professional skills are also very likely to be employed. This is mainly because most of them need hands-on students. The proportion of students with professional and professional skills in middle school is roughly equal to that of unemployed students. Therefore, this part of the student needs to focus on guidance in the employment

process, guidance in changing employment concepts, reducing employment expectations, and achieving employment before job selection.

To verify the effectiveness of the proposed fuzzy decision tree algorithm for college employment data mining, the experimental environment adopted is as follows: hardware Pentium (R) 4, *CPU* 2.6*GHZ*, 512 *MB* of memory, software: Windows *XP*, Matlab 7.0. Using the fuzzified data in Table 1 to construct a fuzzy decision tree, use the data before the fuzzification in Table 1 to construct a clear decision tree and analyze the employment data. The results are shown in Table 2.

Adaptive Fuzzy Algorithm	Motor speed	1800	1710	1800	1800	1800
	Speed overshoot	0	-90	0	0	0
	Response time	3.5	0.8	0.2	-	-
PID algorithm	Motor speed	1800	1650	1800	1840	1800
	Speed overshoot	0	-120	0	40	0
	Response time	3.5	0.3	0.2	0.1	0.1

Table 2. Load Mutation Speed Correspondence Table

The experimental results show that the fuzzy decision tree is superior to the decision tree *ID*3 algorithm in test accuracy and runtime. Therefore, the fuzzy decision tree algorithm has a stronger classification ability. The accuracy of the decision tree *ID*3 algorithm is higher than that of the fuzzy decision tree because the *ID*3 algorithm of the decision tree is overfitting the training data. In natural and social phenomena, the difference between objective things often forms an intermediary transition. This kind of intermediary transition creates uncertainty in the division, and the fuzzy data treatment can well reflect this uncertainty.

5. Conclusion

In the current harsh employment situation, applying the fuzzy decision tree algorithm to college employment is proposed, excavating student data and employment-related knowledge and providing a decision-making basis for employment guidance. Because the fuzzy decision tree reasonably handles inaccurate information in learning and reasoning, it has strong classification ability and robustness. The fuzzy decision tree indicates the generated rules with a certain degree of confidence. The knowledge representation is natural and easier to understand. The fuzzy decision tree algorithm is applied to college employment, and students and employment mentors more easily accept the excavated knowledge. Using this knowledge, students can reasonably plan the direction of employment. School employment guides can make correct decisions regarding graduate employment promotion, job placement, etc. to improve students' employment rate and enhance their competitiveness. The rules generated by the decision tree *ID*3 algorithm are all clear, ignoring the uncertainty of the classification. The fuzzy decision tree fully considers the uncertainty of the classification, so it is more robust. The rules generated by the fuzzy decision tree are marked with a certain degree of confidence, which is under the facts, and the generated knowledge is easier to understand.

Acknowledgement

Social Science Research Accreditation Committee Project in Hunan Province, Governance Capability of Government and Promotion Approaches About Public Crisis (GLX232).

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