

IMPLEMENTATION FUZZY INFERENCE SYSTEM (FIS) FOR IDENTIFICATION IT ENTREPRENEURSHIPS BASED ON STUDENTS POTENTIAL

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ABSTRACT

This study aims to produce Fuzzy Inference System for mapping information technology (IT) entrepreneurship of students potential. This system application will acquire competence and knowledge of the IT entrepreneurs. This study will provide benefits to further increase the interest and motivation of students to become IT entrepreneurs. Results in the first phase is the mapping Entrepreneurships of information technology into the 5 types technopreneurships namely Software Application Developer, Data Analyst, Computer System & Network Engineer, Graphics Designer & Animator and Multimedia System Developer. Mapping based Academic Potential Test and Personal Characteristics (Entrepreneurships values). The results of the mapping used as domain expertise to develop systems based on Fuzzy Inference System. Result in second phase is the Mamdani Fuzzy Inference System with knowledge base, rule of system and architecture of system for identification IT Entrepreneurships potential of students based on Academic Potential Test and characteristics personal (entrepreneurships values).

Keywords: Fuzzy Inference System, Students, Technopreneurship, Information Technology

INTRODUCTION

Unemployment is becoming a serious problem in many countries. It is increasing in some countries. The Various methods are made to solve the problem of unemployment. The governments, campuses, private institutions and the community are involved in this problem [1], [2], [3]. Technopreneurship is one of the solution of the unemployed increasing problem. Technopreneurships combines entrepreneurial skills with technological capabilities [4]. Universities or colleges play a role to provide students with knowledge for future. Students need to be given the ability and guidance to become technopreneur. Information technology (IT) entrepreneurship is entrepreneurship which is based on information technology or computing. The kinds of IT technopreneur such Software Application Developer, Data Analyst, Computer System & Network Engineer, Graphics Designer & Animator and Multimedia System Developer [4].

The potential of students to become entrepreneur is influenced by external and internal factors external factors are related to family, environment and relationships, while internal factors are related to interests, personal characteristics and self potential. The system for guidance and consultation of students to choose and determine the appropriate technopreneurship with them is very necessary. The guidance system for the selection of technopreneurship for students can be based on interests, learning styles, multiple intelligences, personal characteristics (entrepreneurships values) and academic potential [4].

Fuzzy system is part of soft computing which is widely used in various fields. Fuzzy system and Fuzzy Inference system have been widely applied for guidance and consultation. Fuzzy inference system (FIS) process begins with fuzzification, knowledge base formation, inference engine and defuzzification. FIS is used to develop the method for study program selection [5], Fuzzy system is used to develop the modeling entrepreneurial decision making process [6], Fuzzy system is used in to develop the control system [7], Fuzzy logic is used in qualitative performance measurement of supply chain management [8] and other field which fuzzy system is used.

LITERATURE REVIEW

2.1 Information Technology (IT) Entrepreneurships

Information technology (IT) entrepreneurship is entrepreneurship that is based on information technology or computing. The types of IT technopreneurships are [4]:

- *Software Application Developer*
IT technopreneurship that is based on software application, web and mobile application
- *Data Analyst*
IT technopreneurships that is based on database, data mining and data analysis.
- *Computer System & Network Engineer*
IT technopreneurship that is based on computer hardware, embedded system and computer network
- *Graphics Designer & Animator*
IT technopreneurship that is based on graphics, image processing, animation and game programming
- *Multimedia System Developer*
IT technopreneurship that is based on digital multimedia technology an application.

2.2 Fuzzy Inference System

Fuzzy logic is a computer programming paradigm that approaches the human thinking [7], [9], [10]. Fuzzy inference system there are 3 methods : Tsukamoto method, Mamdani method and Sugeno method [8], [9]. The process of fuzzy inference system (FIS) include the following steps [9], [10]:

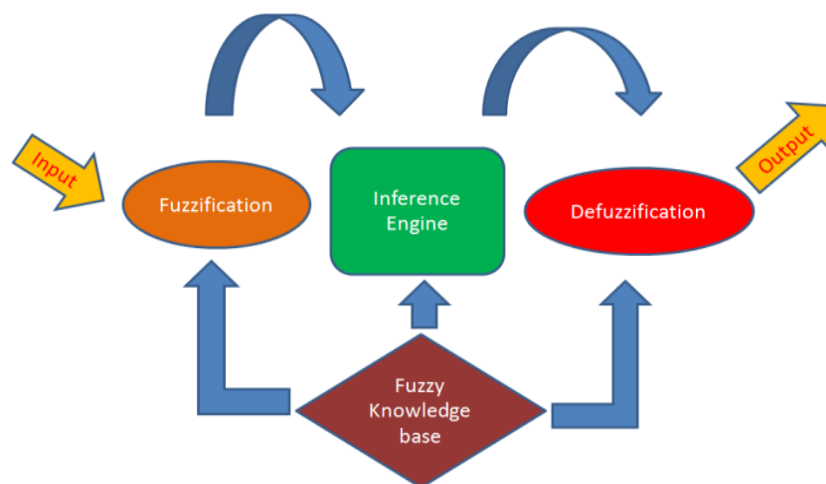


Fig.1 The Process of Fuzzy Inference System

METHOD

Research method in this research was done in three steps. Following the process of the research method shown in figure 2:

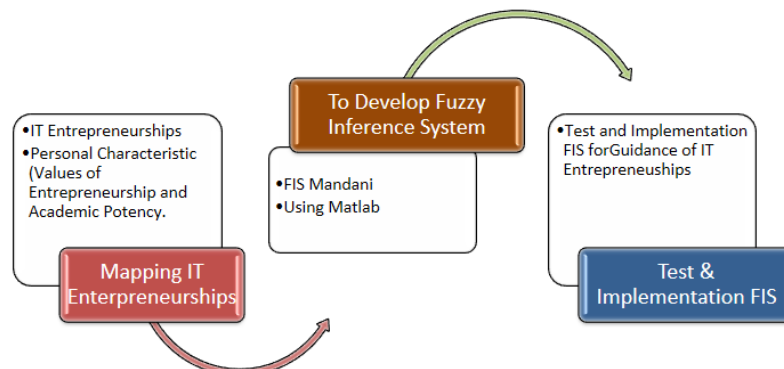


Fig. 2 Flow Diagram of the Research

The first step is mapping entrepreneurship IT based on Personal Characteristic (Entrepreneurial Values) and Academic Potential Test which includes: Verbal, Numerical, Reasoning and Visual. Five IT technopreneurship are mapped according to the score of Entrepreneurial Values inventory and Academic Potential Test inventory.

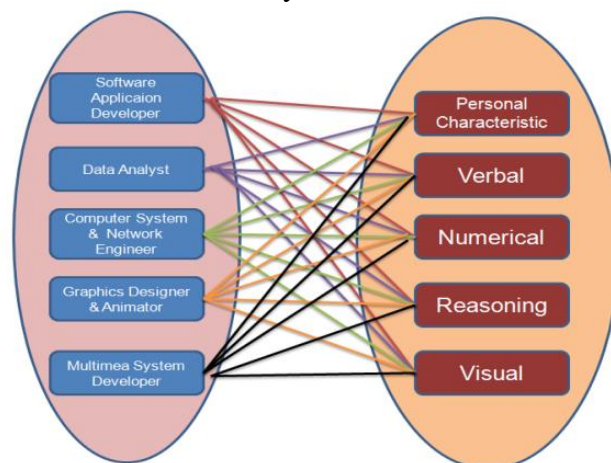


Fig.3 The Mapping of IT Entrepreneurships

The second step in this research is to build Fuzzy Inference System with Mamdani method. Development of Mamdani FIS using Matlab.

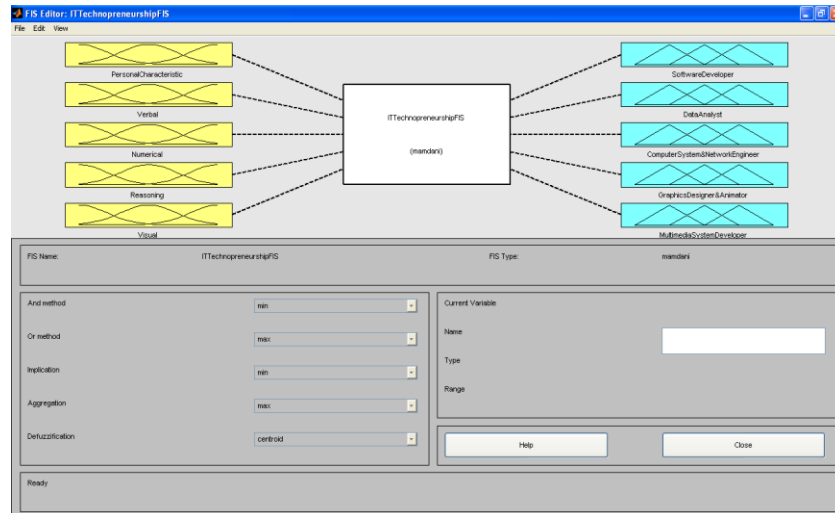


Fig.4 Mamdani FIS for IT Entrepreneurships Identification

The third or final step is to test and implement the Mamdani FIS IT Entrepreneurships Identification. Testing is conducted to ensure the FIS rule in accordance with the formulated. Implementation is implemented on a small range to ensure that the system can be used in a wider range of implementation.

RESULT AND DISCUSSION

The result of mapping IT entrepreneurship based on personal characteristic and Academic Potencial Test are used to make rules in the Mamdani FIS. Mamdani FIS built on this research has specification as follows:

```

name: 'ITTechnopreneurshipFIS'
type: 'mandani'
andMethod: 'min'
orMethod: 'max'
defuzzMethod: 'centroid'
impMethod: 'min'
aggMethod: 'max'
input: [1x5 struct]
output: [1x5 struct]
rule: [1x10 struct]

```

Fig. 5 Spesification of Mamdani FIS

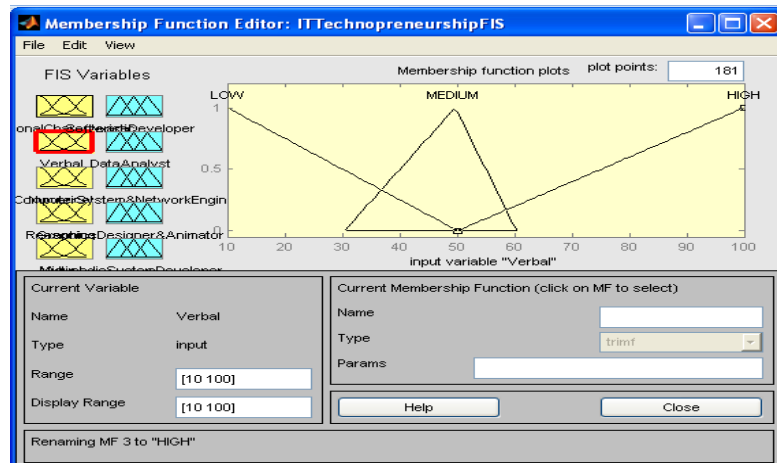


Fig. 6 Membership Function of Input

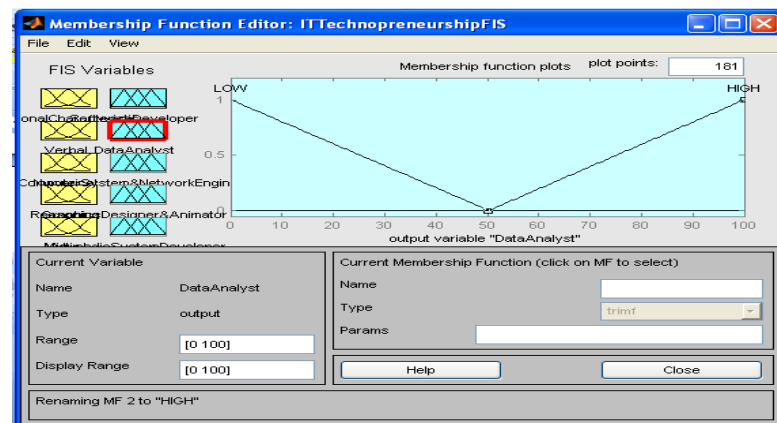


Fig. 7 Membership Functon of Output

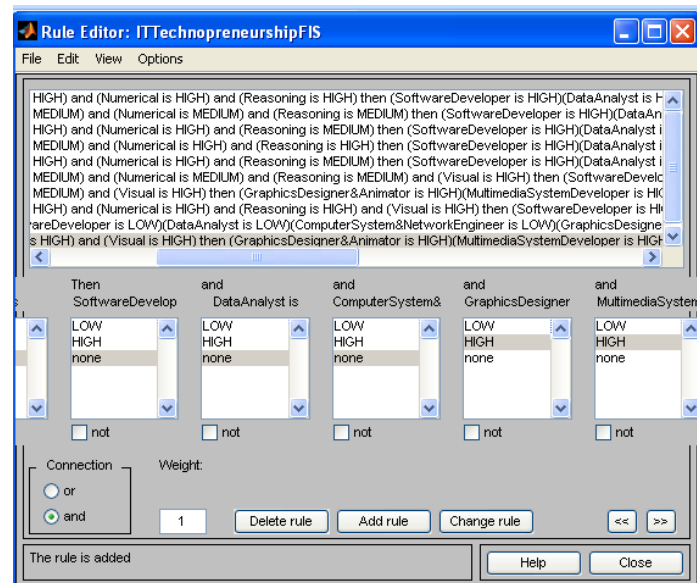


Fig. 8 he Rules of Mamdani FIS

Test Result of the Mamdani FIS for IT Entrepreneurships identification produce output data in accordance with the rules of the system.

Table 1 The Result of Implementation Mamdani FIS.

No	Input					Ouput
	Personal Characteristic	Verbal	Numerical	Reasoning	Visual	
1	Similar	High	High	High	High	All of IT Entrepreneurships are similar or high
2	Unsimilar	Low	Low	Low	Low	All of IT Entrepreneurships are unsimilar or low
3	Unsimilar	High	High	High	High	All of IT Entrepreneurships are unsimilar or low
4	Similar	High	High	High	Low	Data Analyst
5	Similar	Medium	High	High	Medium	Software Application Developer and Copute System & Network Engineer
6	Similar	Medium	Medium	Medium	High	Graphics Designer & Animator and Multimedia System Developer

CONCLUSION

The mapping of IT Entrepreneurships based on the value of Entrepreneurial Values and Academic Potential Test (Verbal, numerical, reasoning and visual) generate rules for five types of IT Technopreneurships ie Software Application Developer, Data Analyst, Computer System & Network Engineer, Graphics Designer & Animator and Multimedia System Developer . Mamdani Fuzzy Inference System (FIS) for IT Entrepreneurships Identification can be implemented according to established rules.

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