



Decision making process for requirement gathering in management Information Technology (MIT) by implementing Fuzzy Logic Technique

S. Petricia Leema Roseline¹ and R. Mohan²
¹Dept of Computer Science, Christ College-Pune, India
²Dept of Mathematics, College of Military Engg-Pune India
 leema_roseline@yahoo.com

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Abstract

Requirement gathering is one of the major vital roles in projects. More than 80% of projects fail due to poor requirement gathering and tracking follow ups. There are many different ways to gather the information. In requirement elicitation every technique is not used for every project. Some techniques have some issues that cause techniques to be used according to the project's nature. MIS study helps decision-making process for requirement gathering, of suitable projects. Using fuzzy logic requirement gathering, effectiveness of selected defined techniques is calculated.

Keywords: Requirement elicitation, effectiveness, fuzzy logic, decision-making process, MIS and techniques.

Introduction

Management Information System – MIS: A Management Information System is an information system used for decision-making, for the coordination, control, analysis, and visualization of information in an organization. In short it is the Study of People, Technology and Organizations. The table1 will help to show the relationship between MIS and CS (computer science)¹. It is useful to compare MIS to some of the other fields related to information technology.

However MIS is the ONLY major that focuses on both business processes and information technology.

Management Information Technology – MIT

Management Information Technology refers to the processes, systems, hardware, and software for a company to conduct its day-to-day operations. MIT allows companies to manage their data efficiently regardless of its form. Implementing MIT not only allows employees to be more productive, but it can also be tailored to suit a company's specific needs.

Table-1: Relationship between MIS and CS

Keywords	MIS (Management Information Systems)	CS (Computer Science)
Focus	Organization	Software
Objective	More efficient or effective business	Reliable computer program
Core Skill	Problem solving	Logic/Procedure
Core Task	Determine business requirements for information systems	Deliver information systems to meet defined requirements
Theoretical vs. Applied	Balanced	Applied
Generic Job Title	Analyst/Designer	Builder
Typical Starting Job Title	Business Systems Analyst	Application Programmer
Career Goals	Senior Organizational Manager	Programming Manager
College Home	Business	Science

Phases in MIT

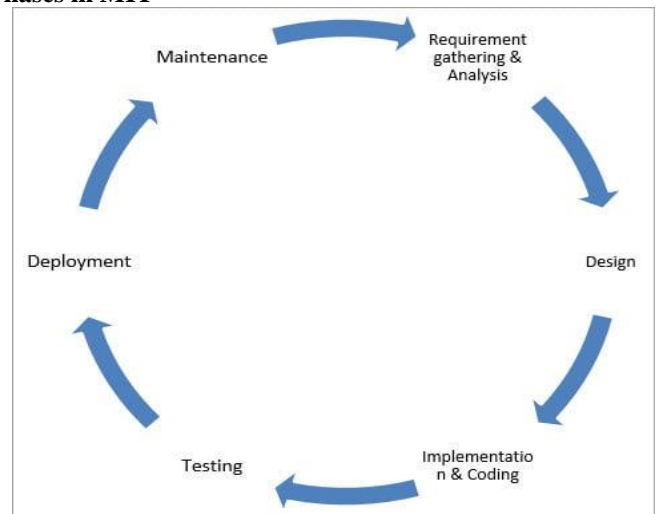


Figure-1: Phases in MIT.

The first and most important phase of MIT is the requirement gathering and analysis phase shows in figure1². During the

requirements gathering sessions, the organization team meets with the customer to outline each requirement in detail.

Requirement Gathering

Requirements Elicitation: Requirements elicitation (also known as Requirements Gathering or Capture) is the process of generating a list of requirements (functional, system, technical, etc.)³ from the various stakeholders (customers, users, vendors, IT staff, etc.) that will be used as the basis for the formal. The requirements must be revised.

Categories of Requirements: Requirements are divided into Functional requirements, Non-functional requirements, Domain requirements and Inverse requirements.

Functional requirements are defined as processes, information, and interactions. These are the desired functionality that the client wants built and describe the interaction between the system and its environment. A functional requirement generally describes what the system has to do.

Non-functional requirements are non functional characteristics that address operational and technical requirements. They may describe such factors as encryption, security, hosting, environment, disaster recovery, business continuity.

Domain requirements are also important because they often reflect fundamentals of the application domain. If these requirements are not satisfied, it may be impossible to make the system work satisfactorily. This can be both functional and non-functional requirements.

Inverse requirement tells about what the system shall not do.

Requirement gathering techniques and Methods: The four main categories of requirement gathering techniques are as follows⁴. i. Classical Techniques, Intellectual Techniques, Batch Methods, Present-day Techniques.

Methods

There are many different methods in requirement information all will have merits and demerits. Cost and time management are the two most important factors when determining which method was to be used.

The method in gathering the requirements may vary depending on the situation and different constraints⁵. Some methods are Brainstorming, Interview, Focus group, Workshops, Observation, Ethnography, social analysis, Survey, Prototyping, Protocol analysis, Scenarios, story board, Questionnaires, Analysis of existing domain, Introspection, Class responsibility collaboration, Concept/ Mind mapping, Online conversation, Document analysis.

Issues in requirements gathering

When talk about the requirement gathering or requirement elicitation then there may be many issues to gather data from users or stakeholders. Here will be describing some issues, Scope, Communication and understanding, Quality of requirements, Stakeholders, Practice.

Fuzzy implementation: Input parameters: i. Project size, ii. Duration, iii. Estimation.

Output Parameters: i. Questionnaires. ii. Group Discussion, iii. Interview, iv. Survey, v. Brainstorm.

The following Figure 3 describes the input and output parameter membership function.

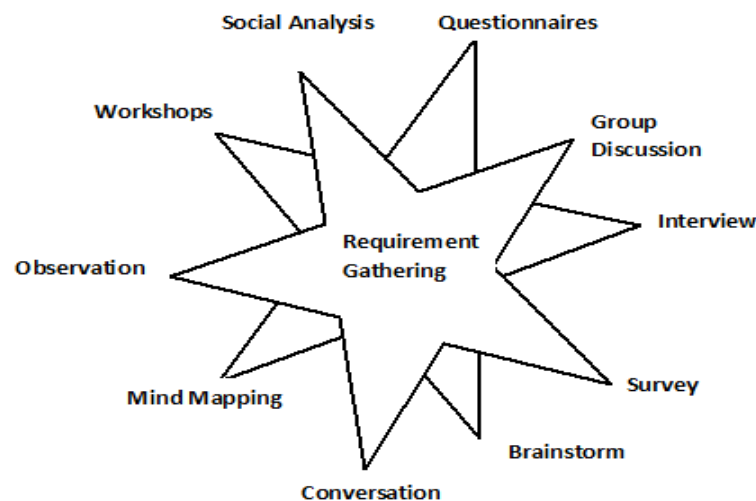


Figure-2: Requirement Gathering Methods.

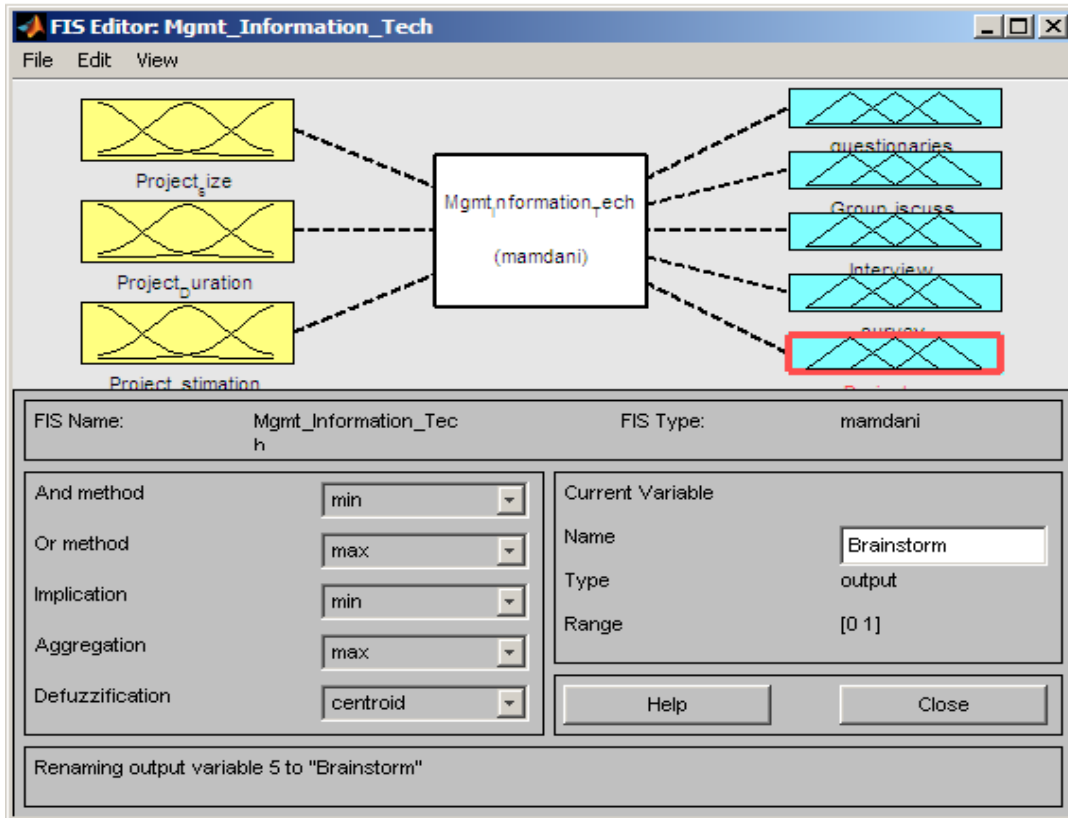


Figure-3: Input, Output Membership Function.

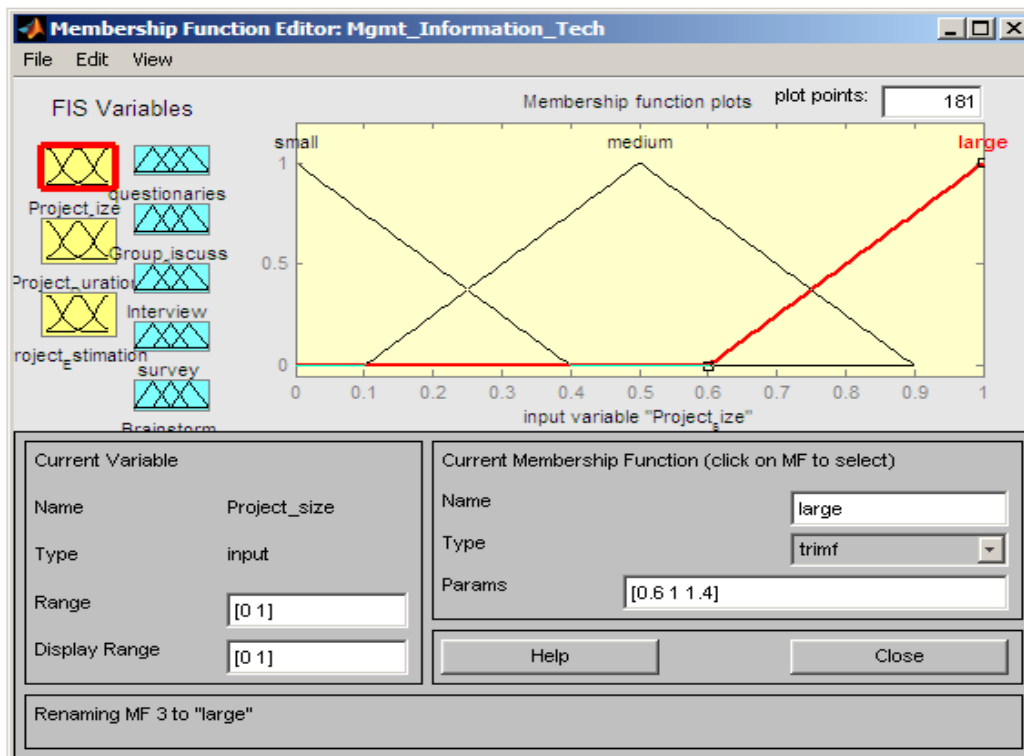


Figure-4: Input, Output Membership Function range.

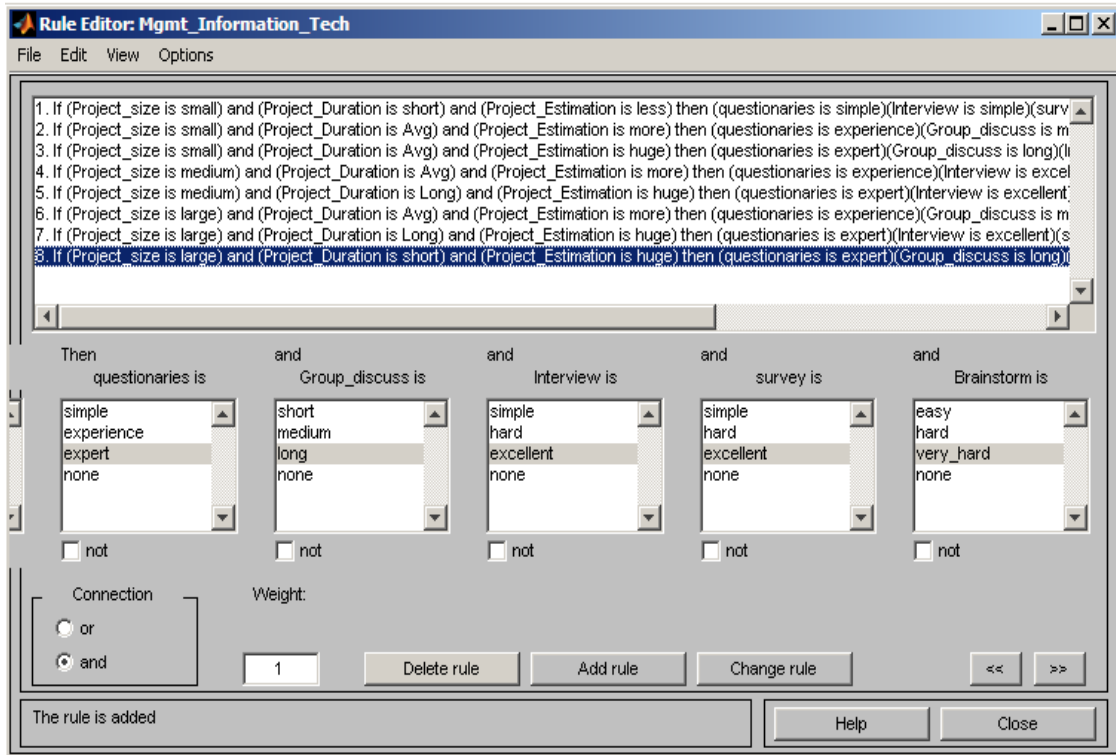


Figure-5: Fuzzy Rules for Membership Function.

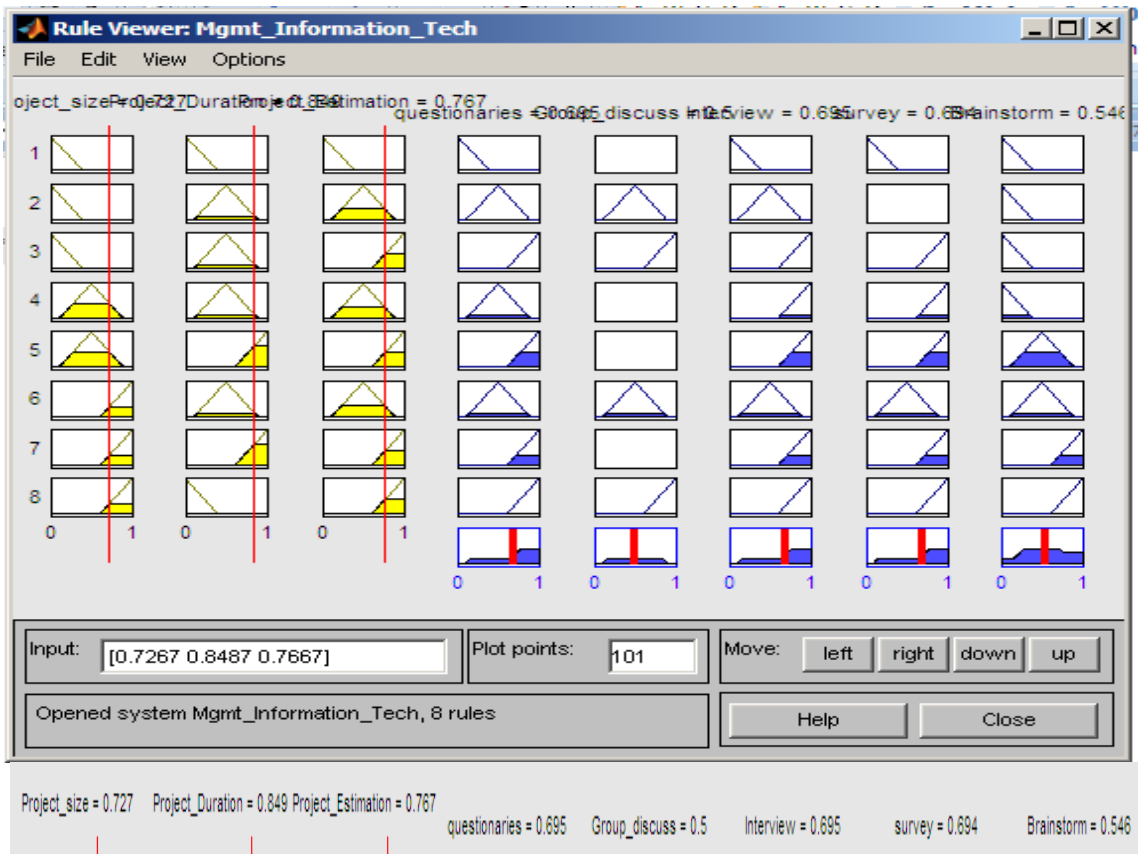


Figure-6: Rule Viewer with Input range of 0.72, 0.84, 0.76.

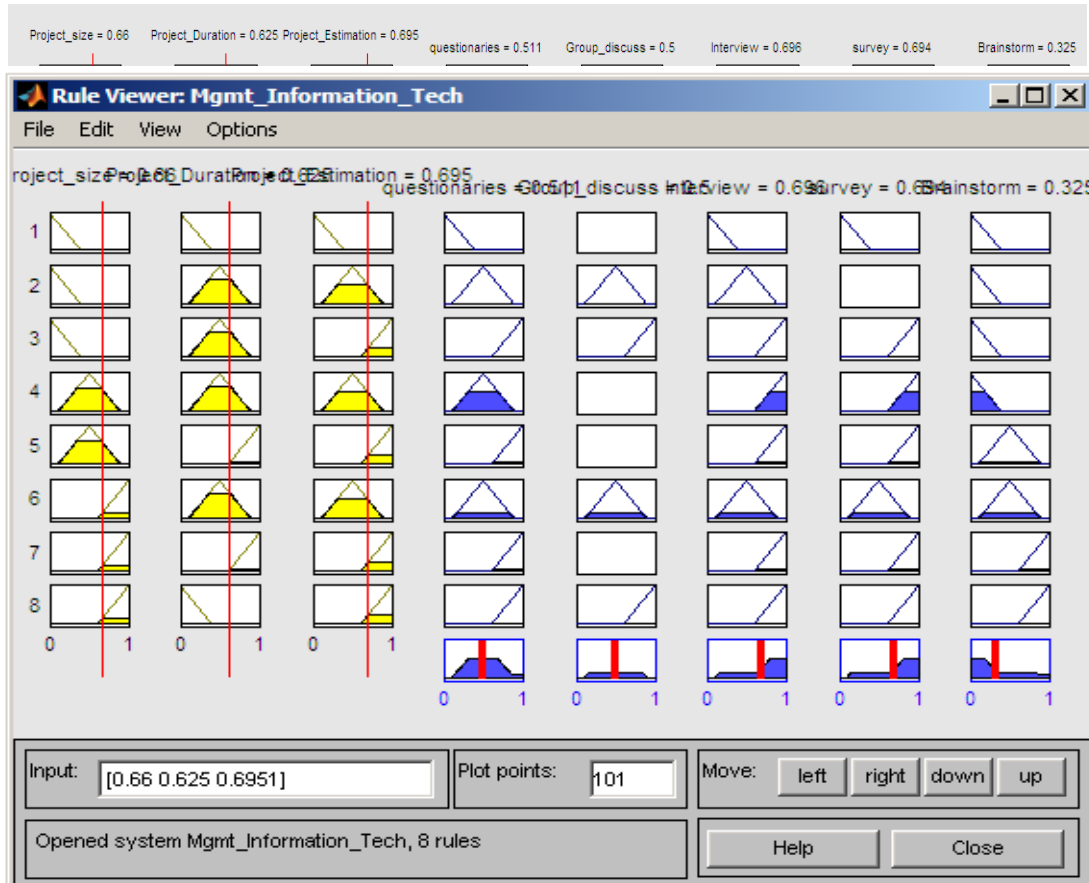


Figure-7: Rule Viewer with Input range of 0.66, 0.62, 0.69.

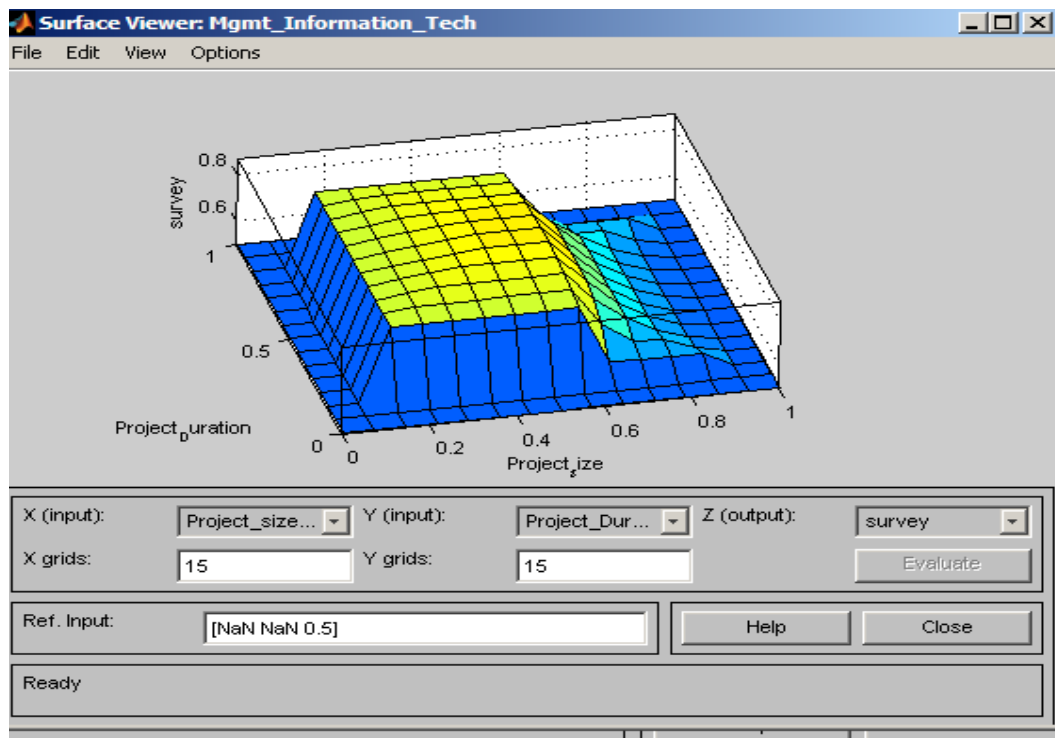


Figure-8: Surface Viewer.

Conclusion

Each elicitation technique has a predefine set of specific and unique characteristics and their context of application. In requirement gathering every technique is not use for every project. Some techniques have some issues that are a cause techniques are used according to project's nature. Every technique has some benefits and some drawbacks. Before using technique check specifications of these techniques, which one is best or suitable for which type of project? At the end of this paper defined result of techniques of requirement gathering, effectiveness of selected defined techniques. The output five parameters are analysed using fuzzy logic Centroid method.

Using 8 fuzzy rules the three inputs i.e., Project Size, Duration, Estimation and the output value of Questionnaires, Group Discussion, Interview, survey, Brainstorm are calculated.

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