FUZZY LOGIC TO OPTIMALIZED THE PRODUCTION OF SANJAI FOR INCREASE THE BENEFIT IN SMALL MEDIUM ECONOMICS

Anita Rahmi[1],Abulwafa Muhammad[2], Aggy Pramana Gusman[3],Ihsan Verdian[4],
1.Universitas Putra Indonesia YPTK Padang,(arahmi94@yahoo.com)
2.Universitas Putra Indonesia YPTK Padang,
(Contact :08974665002 abulwafa@upiyptk.ac.id)
3.Universitas Putra Indonesia YPTK Padang,
(Contact :08117055537,aggy_gusman@upiyptk.ac.id)
4.Universitas Putra Indonesia YPTK Padang,
(Contact :08117055877,ihsanverdian@upiyptk.ac.id)

Abstract

The company's decision in a subsequent period depends on the rest of the supplies from a previous period and also the estimated number of supplies at one period. The number of demand and supply is an uncertainty. Fuzzy logic is one of the science that can analyze the uncertainty. One method of fuzzy rules are Mamdani, a method often used to build a system that resembles the necessary instuisi or human feeling. The calculation process is quite complex so it takes a relatively long time, but this method gives results with high-precision values. Keripik Balado Christine Hakim is a company that did the production in large quantities every day. The maximum profit obtained from the sale of a maximum, when the number of production by the company is less than the number of requests the company will lose the opportunity to get the maximum profit so do the opposite. By using this application it is expected the company could provide convenience for the company to predict the amount of production based on the number of requests and the existing inventory data, in order to achieve optimal benefit.

Keywords : Production, Supply, Demand, Mamdani Fuzzy Methods, PHP MySQL

1. Introduction

1.1 Background

The maximum profit obtained from the sale of that maximum. The previous maximum of means can meet the existing requests. When the number of products produced by the company is less than the number of requests the company will lose the opportunity to get the maximum profit. Otherwise, if the number of products produced far more than the number of requests the company will suffer losses. Therefore, planning the number of products in an enterprise is very important in order to have the market demand with precision and with the appropriate amount. So expect corporate profits will rise. Factors to consider in determining the amount of the product, among other things: the amount of inventory quantities daan. (Muhammad Yunus, Sandi Badi Wibowo Atim, 2013).

Fuzzy logic is the study of uncertainty. The number of requests at one period ahead is estimated that contain elements of uncertainty which will be foreseen. Fuzzy logic is considered able to map an input into an output without limiting factor-factor there is. Fuzzy logic is believed to be extremely flexible and have tolerance data terhadapa. Based on fuzzy logic, will be produced on a model of a system that is able to estimate the amount of production.

One model of fuzzy rules are Mamdani, i.e. models that are often used to construct a system that menerupai the necessary intuition or human reasoning. The calculation process is quite complex so it takes a relatively long time, but this model delivers high precision.

Sanjai is typical of West Sumatra which has been around since ancient times. The chips are usually made as sanjai souvenirs from West Sumatra. These chips are made from cassava and chilies give a mixture of chilies, garlic and sugar. In the mix of sugar so that cabenya can be attached to the singkongnya chips. Due to the high sales of chips sanjai, then making these chips continued even improved.

Keripik Balado Christine Hakim is a business that pioneered since 1990 that initially only capitalization 50kg 100 kg cassava, cooking oil and 10 kg of chilli and sugar 50kg. This venture is a family business. This business was founded by a housewife named Christine Hakim. To date make Keripik Balado Christine Hakim has became an icon by the tradiotional West Sumatran city of Padang is there in.

1.2 Formulation of Problem

Based on the explanation of the background to the issues that are raised, then the outline of the problem can be identified on this research:

1. How to determine the number of production Make Balado Christine Hakim Mamdani method using fuzzy logic.
2. How the application of fuzzy logic methods Mamdani can balance the supply and demand.
3. How the application of fuzzy logic methods can increase income on Mamdani make Keripik Balado Christine Hakim.
4. How to implement the system design into a web-based system and fuzzy dynamic using PHP and a MySQL database.

1.3 Problem

To direct research according to specifications defined then the given limitation issue as follows:

1. The Product examined is crackers sanjai on Keripik Balado Christine Hakim.
2. The factors that affect the amount of production in determining the variable demand, inventory and production quantities.
3. the method of calculation in supporting decision making using fuzzy inferrence system Mamdani method.
4. The system implemented using the programming language PHP and the MySQL database.
5. Application of fuzzy inference system Mamdani method of optimization of production output in the form of sanjai will provide the results of the next production predictions based on existing demand and supply.

1.4 Research objectives

As for the goal to be achieved from this writing is:

1. Determine how much sanjai is supposedly produced by Keripik Balado Christine Hakim based on fuzzy logic systems Mamdani method with variable demand and supply.
2. Test results of research to get the rule-the rule is clear and easily understood by all parties.
3. The results of this research system design shaped web-based applications and dynamic fuzzy which can be enabled in the computer and data-data or variables used are stored in a MySQL database.

2. Theory

2.1 UML

The Unified Modelling Language (UML) is a "language" which has become the standard in the industry for visualization, designing and documenting software systems. UML offers a standard model for designing a system. By using UML model can be created for any type of software application, where the application can run on hardware, operating systems and networks, as well as any written in any programming language. But as UML also use class and operation within the concept of essence, so is better suited to writing the software in object-oriented languages such as C, Java, or VB. NET. (Prastuti Sulistyorini, 2009).

2.2 Fuzzy Logic

Meanwhile, according to Dr. Eng. Agus Saba (2009:1) fuzzy logic is a methodology of "counting" with variable words, instead of counting with numbers. The words used in fuzzy logic indeed not sepresisi number, but the wording is much closer to the human intuition. Humans can "feel" the value of the variable words already used everyday. As such, the fuzzy logic requires a reasonably priced costs and make room in exploiting tolerance of presisian.

Fuzzy logic or fuzzy logic is one of the components of the formation of soft computing. Basic fuzzy logic is a fuzzy set. Fuzzy logic can be thought of as a black box that connects between the input space heading into the space of output. The black box shows how the method can be described or to manipulate the input data into output in the form of good information.

Membership function is a graph representing the degree of membership of each input variable which is in the interval between 0 and 1. The degree of membership of a variable x is denoted with the μ (x). Rule-the rule using the value of the membership as a factor to determine the weight of his influence at the time of inference to draw conclusions. There are several membership functions that are frequently used, such as:

1. Graph a Linear Curve Membership
On the graph of a linear membership, a variable input is mapped to the degree of its membership with the described as a straight line.

2. Graph Membership Curve Triangle
Membership graph curve triangle essentially is a combination between the two lines (linear).

3. Graph Membership Curve Trapezoid
Membership graph curve trapezoid basically like a triangular shape, it's just that there are a few points which have the value of membership.

3. ANALYSIS and DESIGN

Problem analysis phase is an important stage in the development of a system, because this is done at this stage of performance evaluation, identification of existing problems, the design of the system and the steps needed to arrive at a desired design analysis on expected.

The talk of values are allowed to be operated in a fuzzy variables. To obtain the value of the upper limit and lower limit on the value of each variable is obtained from the production of data for the past year are obtained for interviews, then served as follows:

Table 1. A Whole Talk

Function	Variable	A Whole Talk
Input	Request	[1450 – 2450]
	Inventory	[125 – 280]
Output	Production	[1585 – 2650]

The domain is the entire set of fuzzy values are permitted in semeta talks and can be operated in a fuzzy set. Of the value of the talks, then compiled the domain value fuzzy sets. As shown in the table below

Table 2. Fuzzy Set Domain

Function	Variable	Set	Domain
Input	Demands	Up	[0 – 1450]
		Down	[1450 – 2450]
	Inventory	Low	[0 – 125]
		High	[125 – 280]
Output	Production	Little	[0 – 1585]
		Much	[1585 – 2650]

The rule is a set of rules as the basis of calculation will be performed. Of the two variable inputs and one output variable has been defined, by doing data analysis against the limit on each set of fuzzy on from each, then there are 8 fuzzy rules that will be used in the system, with the order IF the demand is AND the inventory is THEN the production is, the result can be seen there in the following table:

Tabel 4.4 Fuzzy Knowledge Based

No	Variable		
	Demands	Inventory	Production
1.	DOWN	LOW	LITTLE
2.	DOWN	LOW	MUCH
3.	UP	LOW	LITTLE
4.	UP	LOW	MUCH
5.	DOWN	HIGH	LITTLE
6.	DOWN	HIGH	MUCH
7.	UP	HIGH	LITTLE
8.	UP	HIGH	MUCH

Based on the above data, with the possibility of simplifying the existing data and review of system variables then rule that can be formed are:

1. [R1] IF Demand is DOWN And Setup is LOW THEN the production is a LITTLE
2. [R2] IF Demand is DOWN And Setup is LOW THEN the production is a LOT
3. [R3] IF the demand is UP And Setup is LOW THEN the production is a LITTLE
4. [R4] IF the demand is UP And Setup is LOW THEN the production is a LOT of
5. [R5] IF Demand is DOWN And Setup is HIGH THEN the production is a LITTLE
6. [R6] IF Demand is DOWN And Setup is HIGH THEN the production is a LOT
7. [R7] IF the demand is UP And Setup is HIGH THEN the production is a LITTLE

8. [R8] IF the demand is UP And Setup is HIGH THEN the production is MUCH

4. Conclusions

Based on the analysis that has been done at Balado Christine Hakim to make regarding the determination of the amount of production using Fuzzy logic Application method based on the number of requests Mamdani and supplies, then the conclusion to be drawn as follows:

1. the Mamdani Fuzzy logic to determine the amount of production based on the amount of the demand and supply have been designed can be used to help companies in taking a decision in the determination of the amount of production.
2. application the mamdani fuzzy logic have built can grow companies in optimizing the amount of supplies that will be made to the next month
3. the System has been designed effectively applied in applications to help companies can determine the optimal amount of production so as to increase the company's revenue.
4. the System has been designed in accordance with the amount of demand and supply by Mamdani fuzzy logic and is implemented using the PHP programming language and MySQL can assist companies in determining the amount of production Keripik Balado Christine Hakim.

The suggestions can be taken from process analysis to the application development process, Mamdani fuzzy logic is as follows:

1. Determination of the amount of production using the Mamdani fuzzy can estimate the amount of market demand is always changing-Fox.
2. Application the Mamdani fuzzy logic in the wake can be expanded in terms of the determination of the amount of production using other membership function in order to obtain optimal results.
3. The application can be developed again using the variables determining the amount of production that are a lot more so that the results achieved are more optimal.

5. References

[1] Rahman, Maharani. 04181008. 2011. *Industri Keripik Balado Christine Hakim di Pada Tahun 1990-2007.* Padang: Fakultas Ilmu Budaya, Universitas Andalas.

[2] Rahmaddeni. 2013. *Penerapan Fuzzy Logic Dalam Menganalisis Tingkat Pendapatan Akhir Konsultan Produk Multi Level Marketing (Studi Kasus : Pt. Orindo Alam Ayu Cabang Pekanbaru).* Jurnal Sains Teknologi dan Industri 11: hal. 192-199. Riau: Jurusan Teknik Informatika, STMIK AMIK Riau.

[3] Suwarmi, Fitria Tri, dkk. 2015. *Proses Defuzzifikasi pada Metode Mamdani dalam Memprediksi Jumlah Produksi menggunakan Metode Mean of Maximum.* Prosiding Penelitian SpeSIA Unisba. Bandung: Program Studi Matematika, Universitas Islam Bandung.

[4] Sutojo, T, Mulyanto, Edi dan Suharto, Vincent. (2011). *Kecerdasan Buatan.* Semarang: CV Andi Offset .

[5] Naba, Agus (2011). *Belajar Cepat Fuzzy Logic Menggunakan Matlab.* Bandung: Informatika.

[6] Peranginangin, Kasiman (2006). *Aplikasi Web dengan PHP dan MySQL.* Yogyakarta: CV Andi Offset.