



# Design Of Teller Performance Assesment Application Using Fuzzy Logic With Sugeno Method

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## ABSTRACT

The teller performance assessment used by several banks still uses performance parameters that cannot be measured properly. Fuzzy logic using the Sugeno method can be applied to evaluate more measurable performance parameters. This paper describes the design of a teller performance assessment application in a fuzzy logic-based bank using the Sugeno method. As parameters for performance indicators, 4 parameters were chosen: time discipline, behavior attitude, work performance, and achievement from the teller. The output of the application is the performance value of the assessment object (teller) which can be used for further needs.

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## 1. INTRODUCTION

Employee performance appraisal is one of the important things for management to evaluate performance and plan future goals. However, there are several companies/banks conducting performance assessments using parameters that cannot be measured properly. As a result, employee productivity decreases and the achievement of company goals declines from year to year.

Fuzzy logic uses fuzzy sets which is an extension of classical set theory. In a fuzzy set, the membership level of an element is known as the membership value or membership degree. The degree of membership is expressed as a real number in a closed interval [0,1]. Based on the concept of fuzzy sets, a fuzzy algorithm was developed which is the basis of fuzzy logic and fuzzy reasoning.

Currently, the use of fuzzy logic in expert systems is growing. Its application covers many areas, including performance appraisal applications. In companies, performance appraisal is one tool in measuring employee productivity. Fuzzy reasoning methods that can be used in this problem include: the Mamdani method and the Sugeno method. These two methods are almost the same, the difference lies in the system output, in the Mamdani method the output is in the form of a fuzzy set while in the Sugeno method the output is a constant or linear equation. The advantage of the Sugeno method compared to the Mamdani method is that the Sugeno method is more efficient in computation (objective). This advantage is the reason for using the Sugeno method in this paper.

## 2. RESEARCH METHOD

The way FIS works is divided into two processes, the first process is the process of inputting input data such as teller names, parameter values, and so on. The second process is processing using fuzzy logic Sugeno method.

In the data processing process there are several stages, the first stage is to calculate the degree of membership of the input data according to the equation made. The results of this process will then go through the implication stage, namely the process of getting conclusions from the IF-THEN rule based on the degree of truth of each premise. The next stage calculates the system output and displays it. The output of the FIS is an evaluation value.

## 3. RESULTS AND DISCUSSIONS

### 3.1 Determining Assessment Parameters

The parameters used in this system include: time discipline, behavioral attitude, work performance, and achievement.

Table 1. Performance Assessment Parameters

No.	Parameter Evaluation	Information
1	Time discipline	Assess the Teller's discipline in terms of attendance, where the elements include the number of lateness and absenteeism except for leave (including illness, absenteeism/ without explanation)
2	Behavioral attitude	Evaluate attitude behavior tellers, which covers how employee deal with his job, including in their relationships with customers, co-workers and superiors
3	Work execution	Assessing the extent of the Teller's efforts in carrying out his daily work to achieve targets assigned or carry out their duties according to the assigned jobdes
4	Achievement	Evaluate to what extent achievement teller to goals or targets that have been given

### 3.2 Test

Tests are carried out to determine whether the system provides appropriate results or not. Testing is done by comparing the results of the application output with the results of manual calculations.

#### a. Testing with Manual Calculation

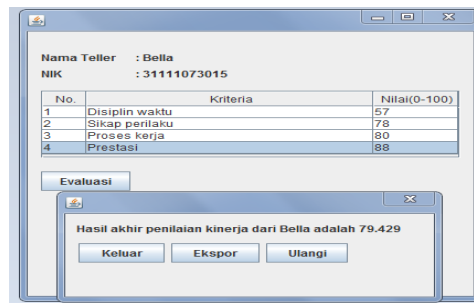
Table 2. Calculation Results of and -predicate

Rules	Discipline Time	Attitude Behavior	Process Work	Achievement	- predicate
1	0	0.4	0.5	0.9	0
2	0	0.4	0.5	0.1	0
3	0	0.4	0.5	0	0
4	0	0.4	0.5	0.9	0
5	0	0.4	0.5	0.1	0
6	0	0.4	0.5	0	0
7	0	0.4	0	0.9	0
8	0	0.4	0	0.1	0
9	0	0.4	0	0	0
10	0	0.6	0.5	0.9	0
11	0	0.6	0.5	0.1	0
12	0	0.6	0.5	0	0
13	0	0.6	0.5	0.9	0
14	0	0.6	0.5	0.1	0
15	0	0.6	0.5	0	0
16	0	0.6	0	0.9	0
17	0	0.6	0	0.1	0
18	0	0.6	0	0	0

19	0	0	0.5	0.9	0
20	0	0	0.5	0.1	0
21	0	0	0.5	0	0
22	0	0	0.5	0.9	0
23	0	0	0.5	0.1	0
24	0	0	0.5	0	0
25	0	0	0	0.9	0
26	0	0	0	0.1	0
27	0	0	0	0	0
28	0.35	0.4	0.5	0.9	0.35
29	0.35	0.4	0.5	0.1	0.1
30	0.35	0.4	0.5	0	0
31	0.35	0.4	0.5	0.9	0.35
32	0.35	0.4	0.5	0.1	0.1
33	0.35	0.4	0.5	0	0
34	0.35	0.4	0	0.9	0
35	0.35	0.4	0	0.1	0
36	0.35	0.4	0	0	0
37	0.35	0.6	0.5	0.9	0.35
38	0.35	0.6	0.5	0.1	0.1
39	0.35	0.6	0.5	0	0
40	0.35	0.6	0.5	0.9	0.35
41	0.35	0.6	0.5	0.1	0.1
42	0.35	0.6	0.5	0	0
43	0.35	0.6	0	0.9	0
44	0.35	0.6	0	0.1	0
45	0.35	0.6	0	0	0
46	0.35	0	0.5	0.9	0
47	0.35	0	0.5	0.1	0
48	0.35	0	0.5	0	0
49	0.35	0	0.5	0.9	0
50	0.35	0	0.5	0.1	0
51	0.35	0	0.5	0	0
52	0.35	0	0	0.9	0
53	0.35	0	0	0.1	0
54	0.35	0	0	0	0
55	0.15	0.4	0.5	0.9	0.15
56	0.15	0.4	0.5	0.1	0.1
57	0.15	0.4	0.5	0	0
58	0.15	0.4	0.5	0.9	0.15
59	0.15	0.4	0.5	0.1	0.1
60	0.15	0.4	0.5	0	0
61	0.15	0.4	0	0.9	0
62	0.15	0.4	0	0.1	0
63	0.15	0.4	0	0	0
64	0.15	0.6	0.5	0.9	0.15
65	0.15	0.6	0.5	0.1	0.1
66	0.15	0.6	0.5	0	0
67	0.15	0.6	0.5	0.9	0.15
68	0.15	0.6	0.5	0.1	0.1
69	0.15	0.6	0.5	0	0
70	0.15	0.6	0	0.9	0
71	0.15	0.6	0	0.1	0
72	0.15	0.6	0	0	0
73	0.15	0	0.5	0.9	0
74	0.15	0	0.5	0.1	0
75	0.15	0	0.5	0	0
76	0.15	0	0.5	0.9	0
77	0.15	0	0.5	0.1	0
78	0.15	0	0.5	0	0
79	0.15	0	0	0.9	0
80	0.15	0	0	0.1	0
81	0.15	0	0	0	0

### 3.3 Testing Using Applications

With the same input, the following results are obtained from the application :



No.	Kriteria	Nilai(0-100)
1	Disiplin waktu	57
2	Sikap perilaku	78
3	Proses kerja	80
4	Prestasi	88

Hasil akhir penilaian kinerja dari Bella adalah 79.429

Figure 1. Test Results with Applications

#### 4 CONCLUSION

Applications designed to perform performance assessments. The results of the performance appraisal using this application are close to the results of the performance appraisal used by the bank. This is due to the use of value limits on the parameters used in this application based on bank standards. In other words, the results of performance appraisals can change according to the value limits that we set or use.

#### REFERENCES

- Frans Susilo SJ. 2003. Himpunan dan Logika Kabur Serta Aplikasinya. Yogyakarta: Graha Ilmu.
- Naba, Eng Agus. 2009. Belajar Cepat Fuzzy Logic Menggunakan MATLAB. Yogyakarta: Penerbit ANDI.
- Kusumadewi, Sri, et al. 2006. Fuzzy Multi-Attribute Decision Making (Fuzzy MADM). Yogyakarta: Graha Ilmu.
- Much Junaidi, Eko Setiawan, Adista Whedi Fajar. 2005. Penentuan Jumlah Produksi dengan Aplikasi Fuzzy Mamdani. <http://eprints.ums.ac.id/198/1/JTI-0402-06-OK.pdf>. Diambil tanggal 25 September 2015.
- Hataman Eryah. 2008. Implementasi FIS Menggunakan Metode Sugeno untuk Memprediksi Produksi. <http://rac.uir.ac.id/index.php/record/view/117179>. Diambil tanggal 13 Oktober 2015.