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Implementation of ANN-CFB Methods in Measuring Community Satisfaction Level of Denpasar City on the Aspect of Government Services

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Abstract. The concept of a smart city is indeed presented as an answer for efficient management of resources. Support for applications that are constantly evolving and the creation of a creative ecosystem in the field of technology, is a good first step towards a smart city. But in reality smart city is not only related to technology. This concept is a combination of new technology and intelligent thinking about the use of technology. As a city full of allure, Denpasar City along with its development and population growth, began to emerge various problems such as decreasing the quality of public services, congestion on the road, accumulation of garbage and other social problems. To solve these problems, Denpasar needs a smart, creative and innovative solution run by the ranks of government officials, from leaders to the lowest levels, and supported by the full commitment of all its citizens. Various efforts have been made by the Denpasar City government to facilitate services to the community, ranging from building a system to facilitate services to the community such as the health service system, population service system, government service system (e-Gove), and the public complaints system. To find out whether the efforts made by the government are related to the services provided to the community by implementing a smart city system. In this study various measurements of satisfaction levels were carried out to obtain significant conclusions. Of the five aspects studied, namely aspects of government services, aspects of government transparency, aspects of health services, aspects of population service, aspects of transportation services and aspects of water supply and electricity services, in general the people of Denpasar expressed satisfaction with a level of satisfaction of 76,312 and the level of satisfaction with aspects of health services have the highest level of satisfaction that is equal to 88,574.

Keywords: Smart City; service; satisfaction; community

I. INTRODUCTION

The concept of a smart city is indeed presented as an answer for efficient management of resources. Support for applications that are constantly evolving and the creation of a creative ecosystem in the field of technology, is a good first step towards a smart city. But in fact smart city not only related to technology. This concept is a combination of new technology with an intelligent mindset about the use of technology in an organization [1].

As a city full of charm, Denpasar City has a panorama of nature, culinary, plus its creative community. But along with the development and population growth, various problems began to emerge, such as the decline in the quality of public services, congestion on the highway, the accumulation of garbage and other social problems. To solve these problems, Denpasar needs a smart, creative and innovative solution run by the ranks of government officials, from leaders to the lowest levels, and supported by the full commitment of all its citizens.

Various attempts were made by the Denpasar City government to overcome various existing problems, as a form of service to the Denpasar City government towards its people. Starting from building a system to facilitate services to the community such as health care systems, population service systems, government service systems (e-Gove), and public complaints systems [2]. Where this system initially runs marginally at each Local Government Work Unit (SKPD) in Denpasar City. But over time, the Denpasar City government began to integrate the system used to improve the quality of service to its people.

To find out whether the efforts made by the government related to the services provided to the community by implementing a smart city system need to be measured properly. In this study various measurements of satisfaction levels were carried out to obtain significant conclusions [3]. In this study six aspects were examined, namely aspects of government services, aspects of government transparency, aspects of health services, aspects of population services, aspects of transportation services and aspects of water supply services and electricity to measure the level of leadership of the Denpasar City community through the application of smart cities.

Artificial Neural Network (ANN) is a network of a

group of small processing units that are modeled to resemble the human nervous system [4]. The way ANN works is based on the workings of the human brain starting from receiving input, processing the input, giving processing results, and tolerating errors or errors ANN model allows to solve complex problems into smaller elements [5], so that the process of solving problems becomes more efficient [6]. The principle of the ANN model is that a network is built with input associated with a weighing factor [7], then all inputs are added to determine the function of neuron activation (Figure 1).

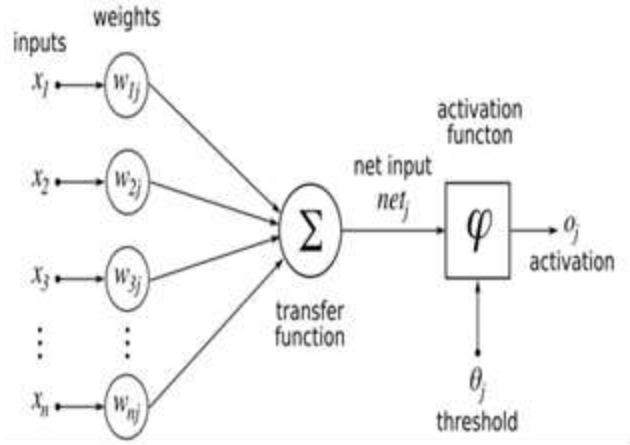

Fig 1. ANN Model

Artificial Neural Network Cascade Forward Backpropagation (ANN-CFB) has a method similar to the Feed Forward Neural Network in using backward propagation algorithms in updating its weight [8], but in CFB each layer is connected to all previous neuron layers [9].

II. RESEARCH METHODS

This section describes the design of the logic flow of forecasting system of the level of community satisfaction in Denpasar City using Artificial Neural Network Cascade Forward Backpropagation [10][11], which is represented through a flowchart in Figure 2. The expected result is that the system is able to display the forecast results that are closest to the actual data. The CFB algorithm [12], workflow flowchart can be seen in Figure 3.

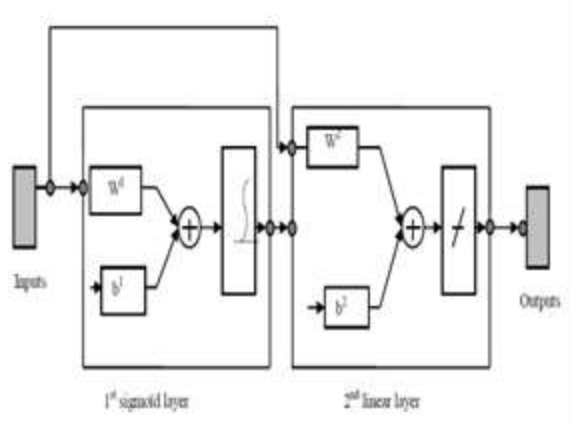

Fig 2. Cascade Forward Backpropagation Model

Fig 3. Flowchart of CFB Algorithm

III. RESULTS AND DISCUSSION

The conduct of four types of studies in conducting a Denpasar community satisfaction study aims to determine differences in the level of community satisfaction in terms of their gender, age group, level of education, and type of work. From table 1, the level of satisfaction of Denpasar City's men is higher by 5.35, which is 79,394 compared to the female population of 74,044.

In table 1, it can be seen that the level of satisfaction of the Denpasar community as a whole both men and women have satisfaction levels almost equal to only 5.35 so that the statistics are not significantly different. Likewise, the level of community satisfaction with indicators of government services, government transparency, population services, mobility and transportation as well as clean water services and waste management cannot be stated significantly differently because it only has a difference of 2,199. The level of satisfaction that is

TABLE 1
LEVEL OF COMMUNITY SATISFACTION ACCORDING TO GENDER

Sex	Criteria	Governmen t service		Government transparency		Health services		Population services		Mobility & transportation		Clean water & waste		Level of satisfaction
Female	Satisfied	388	71.06	385	70.51	478	87.5	395	72.34	364	72.90	360	69.9	74.044
	Not Satisfied	158	28.94	161	29.49	68	12.5	151	27.66	182	33.33	186	34.07	
Male	Satisfied	522	79.82	464	77.95	586	89.6	482	77.8	488	74.62	442	76.58	79.394
	Not Satisfied	132	20.18	190	29.05	68	10.4	172	26.3	166	25.38	212	32.42	
Mean Level of Satisfaction	**1200**	**75.439**		**74.231**		**88.574**		**75.072**		**73.759**		**73.24**		**76.719**

significantly different from health services in Denpasar City has been very good at 88,574. While based on age group, the highest level of satisfaction is related to health services with a satisfaction level of 88,222 while for population services, mobility and transportation as well as clean water and waste handling the level of satisfaction is 71,044 still lower than the level of satisfaction with government services and transparency of 76,363. The data can be seen in table 2.

TABLE 2
LEVEL OF COMMUNITY SATISFACTION BY AGE

Sex	Criteria	Government service		Government transparency		Health services		Population services		Mobility & transportation		Clean water & waste		Level of satisfaction
14-19	Satisfied	152	76.8	119	73.24	161	84.3	123	70.8	119	70.6	123	70.3	74.338
	Not Satisfied	46	23.2	79	26.76	37	15.7	75	79.2	79	29.4	75	29.7	
20-29	Satisfied	470	74.8	490	77.83	585	90.4	497	76.82	421	71.13	445	72.71	77.284
	Not Satisfied	177	25.2	157	22.17	62	9.58	150	23.18	224	28.87	202	27.29	
30-49	Satisfied	253	77.9	225	78.62	296	89.7	240	72.73	239	72.24	215	75.5	77.815
	Not Satisfied	77	22.1	105	21.38	34	10.3	90	27.27	92	27.88	115	24.5	
>50	Satisfied	19	76.9	16	74.8	23	88.5	21	80.77	19	73.08	20	70.6	77.438
	Not Satisfied	7	23.1	8	25.2	3	11.5	5	19.23	7	26.92	6	29.4	
Total	**1200**	**76.602**		**76.123**		**88.222**		**75.278**		**71.809**		**72.279**		**76.719**

In terms of education level, it turns out that the level of satisfaction of the Denpasar community is directly proportional to the level of education where the community with elementary / junior high school education level of satisfaction is 74,180, the level of high school education is 76,535 and the community with undergraduate education has a satisfaction level of 79,44.

While the level of satisfaction with smart market indicators is almost similar to the level of satisfaction in terms of age groups, where the highest level of satisfaction in health service indicators is around 87,568 while for government services and transparency around 76,432 and mobility and transportation and clean water services and waste management are 72,596 as shown in table 3. The interesting thing about the results of this study is that the level of community satisfaction in Denpasar City is directly proportional to the level of education for each smart market indicator studied. Unfortunately, the population of Denpasar City when viewed from table 3 is around 52%, so it is a bit interesting to decrease the percentage of satisfaction level obtained in this study and the percentage of the population with an undergraduate education level of 45%.

TABLE 3
LEVEL OF COMMUNITY SATISFACTION ACCORDING TO EDUCATION

Level of Education	Criteria	Government service		Government transparency		Health services		Population services		Mobility & transportation		Clean water & waste		Level of satisfaction
SD/SMP	Satisfied	30	74.2	29	73.67	38	83.8	34	72.75	32	70.6	31	70.08	74.18
	Not Satisfied	16	25.8	17	26.33	8	16.2	12	27.25	14	29.4	15	29.92	
SMA	Satisfied	435	77.7	431	76.47	542	87.7	450	74.82	408	71.3	416	71.2	76.535
	Not Satisfied	183	22.3	187	23.53	76	12.3	168	25.18	210	28.7	202	28.8	
Sarjana	Satisfied	395	78.8	199	77.68	489	91.2	198	76.5	341	71.8	432	80.6	79.441
	Not Satisfied	141	21.2	137	22.32	47	8.77	138	23.5	195	28.2	104	19.4	
Total		**76.923**		**75.940**		**87.568**		**74.690**		**71.233**		**73.959**		**76.719**

When viewed from the level of community satisfaction from the point of view of employment, of the 1,200 respondents, the highest level of satisfaction was still in health services at 89,726, followed by a level of satisfaction with population administration services of 77,743 and government services of 76,015. While the level of community satisfaction in the other three indicators is almost the same, which is around 71,327.

It is interesting from this study that the level of community satisfaction with the type of work as army and police has the highest satisfaction value of 83,333 which is higher than those who become government employees with a satisfaction level of 77,200. This difference becomes significant because it has a difference value of more than 5% that is equal to 5,133, even lower than the level of satisfaction of people who work as entrepreneurs who have a satisfaction level of 78,694. Whereas the people whose types of work as students or housewives and as workers / laborers have the lowest level of satisfaction which is around 72,050 as shown in table 4.

TABLE 4
LEVEL OF COMMUNITY SATISFACTION ACCORDING TO WORK

Kind of work	Criteria	Government service		Government transparency		Health services		Population services		Mobility & transportation		Clean water & waste		Level of satisfaction
Laborers	Satisfied	1140	67.91	1138	66.84	1180	89.3	1151	73.80	1136	65.78	1137	66.31	71.658
	Not Satisfied	60	32.09	62	33.16	20	10.7	49	26.20	64	34.22	63	33.69	
Entrepreneur	Satisfied	1083	72.01	1121	81.1	1174	94.3	1110	80.80	1087	22.97	1096	75.12	78.964
	Not Satisfied	117	27.99	79	18.9	26	5.88	90	21.53	113	27.03	104	24.88	
Government employee	Satisfied	1147	78.80	1141	76.4	1181	92.4	1152	84.38	1111	64.4	1126	70.4	72.200
	Not Satisfied	53	21.20	59	23.6	19	7.6	48	19.20	89	35.6	74	29.6	
TNI/Polri	Satisfied	1195	84.38	1193	78.13	1194	87.5	1195	71.27	1193	78.13	1194	87.5	83.333
	Not Satisfied	5	15.63	7	21.88	6	12.5	5	15.63	7	21.88	6	12.5	
Student, college, household	Satisfied	1095	76.97	1056	68.42	1133	85.3	1069	71.27	1046	60.23	1047	66.45	72.442
	Not Satisfied	105	23.03	144	31.58	67	14.7	111	28.73	154	33.27	153	33.55	
Mean Level of Satisfaction	**1200**	**76.015**		**74.178**		**89.726**		**77.743**		**69.499**		**73.155**		**76.719**

In this study using 1,200 respondents scattered in all villages in four sub-districts in Denpasar City, using 6 smart city measuring indicators that were examined in terms of gender, age group, level of education and type of work generally obtained the level of satisfaction of the City community Denpasar against the indicator used is 76,719. By using the Likert method, the level of community satisfaction has been included in the good class group or satisfied with a fourth scale Likert value of 3,888.

IV. CONCLUSION

In a study of Denpasar City community satisfaction related to the preparation of Denpasar as a smart city by using the Likert method to explore community satisfaction with eight smart city indicators, 1,200 random respondents were taken representing 27 villages and 16 villages in four sub-districts in Denpasar City. concluded as follows:

1. The level of satisfaction of the Denpasar City community on the six smart city indicators, generally can be said to be good or satisfied with a level of satisfaction of 76,719, with the highest level of satisfaction at the level of health services of 88,523.
2. The level of satisfaction of the people of Denpasar City in relation to indicators of transportation services and handling of waste is always the lowest in terms of the gender of the community, from the age group, in terms of education level and from the community work profession in Denpasar City. This requires special attention by the Denpasar City Government if it wants to realize Denpasar as a smart city.

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