TRAFFIC INFORMATION SERVICE DESIGN FOR RADIO'S CUSTOMER BASED ON AUTOMATED TRAFFIC IDENTIFICATION SYSTEM

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Abstract. *Traffic information has become the hot issue for the radio's customer in Surabaya . A radio station became popular because of its strategy to accommodate its listener to inform their traffic analysis. Therefore, the other could have certain action to avoid the traffic congestion, an accident or even catch the stolen cars. Mostly, the listeners have their own opinion about the level of traffic volume. In some ways, this difference perception could create problems. A listener can have the opinion that there was traffic congestion, while others at the same location and time disagree with that. The purpose of this research was to design the traffic information service based on an automated traffic identification system. Its cover what kind of information that the radio should offer especially for valuing the traffic congestion level. As the result, an information system has been created to fully support this traffic information service which capturing data from existing automated traffic identification system on several road.*

Keywords: *information system, automated traffic identification, service design.*

1. INTRODUCTION

Surabaya is the second largest city in Indonesia, has a density problem of traffic flow. The crowded situation during peak time and not too quiet at off peak time is a daily sight in Surabaya. X Radio is positioning itself as a strong radio with traffic information to the audience, successfully win the hearts then Surabaya community make a new paradigm that radio is a loyal friend in a drive on the road (www.suarasurabaya.net, 2008). The Success of X radio is apparently inspired one telecommunications provider ; PT Z , to provide video on demand services. This service provides the latest updates on the situation images in Porong area.

Road user community now has started to see the density of information (one of the major problems in Surabaya) is to be required. The need is primarily for insight in determining which way the decision to go to achieve workplace, schools and meet with business relation. Therefore, the traffic information is accurate is needed by the people of the subjective information of each person. Automated traffic system identification is the right solution to get traffic information accurate. Thus the level of traffic congestion can be identified through the information system is based on data obtained from traffic Automated identification system in some way.

The purpose of this study is described as follows:

1. Determining the category of traffic density (dense, medium, smooth, and so on) based on the number and type of vehicle power flow.
2. Analyzing the reference system as a means to help collect data to support (comparison data) derived from radio listener information X and PT Z telecommunication.
3. Make information systems design that process data density.

The limit used here, the observation was limited to existing roads in Surabaya.

The assumption in this paper is as follows:

1. The road in Surabaya that became observtion are

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Ahmad Yani, Diponegoro, Basuki Rahmat, Kertajaya, and Darmo. In addition to the determination of 5 is assumed to represent the way the road conditions in the city of Surabaya today.

2. Observations on the density level of the road in a day divided into 5 intervals, are 06.00 - 08.00 WIB, 08.00 - 10.00 AM, 12:00 to 14:00 pm, 16:00 to 18:00 pm and 18:00 to 20:00 pm
3. The speed of traffic flow that can be given the maximum amounts to 40 km / hour on the potential traffic jams.
4. Type of vehicles on the road is divided into Motorcycles, Passenger Cars, Truck, and Bus with a percentage (ratio of the proportion of passenger car units) are different during the last hours of observations.

2. METHODOLOGY RESEARCH

This research begins with the formulation of problems and literature review. After a literature review was carried out, it can be used for references. Urban public survey carried out to determine the traffic density category. Survey users also performed to determine the prospects of an information system that will be made. After it, will be identified about automated vehicle identification and evaluated of reference system. Information system will be made after it and to be continued with analyze and making conclusions.

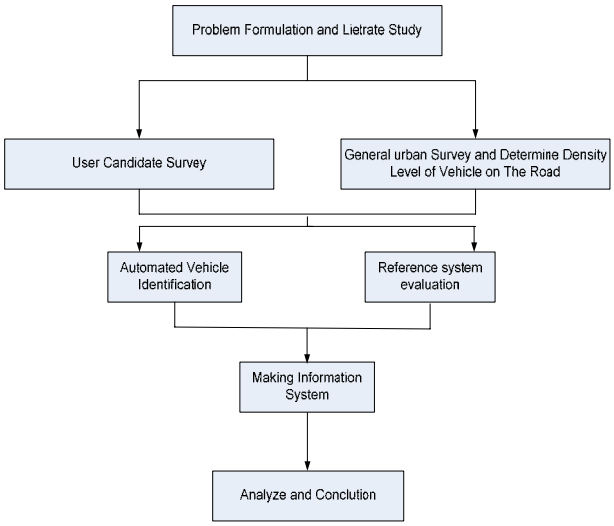


Figure 1. Flow chart of research methodology

3. INFORMATION SYSTEM DESIGN OF *AUTOMATED TRAFFIC IDENTIFICATION SYSTEM*

3.1 Reference Evaluation

Before designing the information system we have to evaluation the prior reference system. One example is the reference used the information bottlenecks in the streets of Surabaya from one radio on Friday, January 23, 2009.

Table 1. Reference information from the radio traffic

Time	Route	Condition
7:00 AM	Intersection between semolowaru and Semampir	Stuck fast
7:00 AM	Raya Darmo	Stuck fast
7:00 AM	Ahmad Yani	Stuck fast
10:00 AM	Ahmad Yani	Fast
4:00 PM	Ahmad Yani	Stuck fast
1:00 PM	Kertajaya	Stuck fast

Based on the proportion of manual counting passi ng vehicles in Surabaya, the highest traffic of each pat h is:

Table 2. Road congestion of Surabaya

Street	Time	NVK (capacity/time)
Ahmad Yani	06:00-08:00	0.82
Diponegoro	08:00-10:00	0.31
Basuki Rahmad	08:00-10:01	0.36
Kertajaya	08:00-10:02	0.9
Darmo	12:00-14:00	1.81

Cluster system will generate a form of decision are fast, medium and stuck fast of traffic situation. Division is done on the 3 division system is basically due to decide on such considerations 3. In addition to these characteristics also influence the public's curiosity of how many clusters is made of a data and used to retrieve a conclusion on the data. Cluster test is used to focus development in accordance with consumer demand, so the obtained results in accordance with the service user.

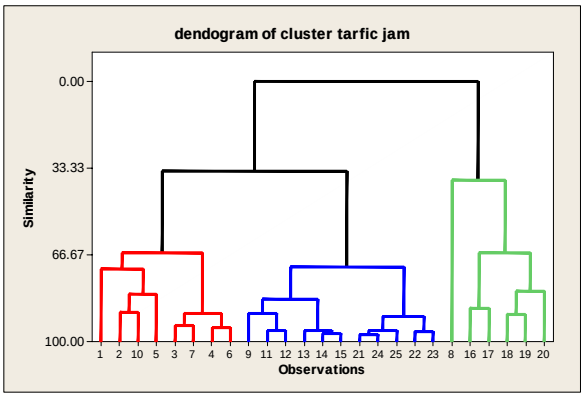


Figure 2. Dendogram of Data Processing

Table 3. Recapitulation Density Data Processing in Every Way observations

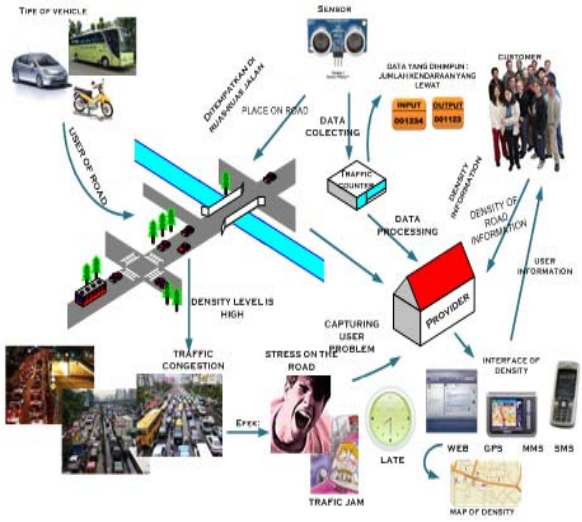
No	Street & Time	Motor cycle	Car	Bus	Truck
1	Ahmad yani (06:00-08:00)	80	65	48.75	56.25
2	Ahmad yani (08:00-10:00)	71.76	54.55	45.45	26.36
3	Ahmad yani (12:00-14:00)	46.15	52.36	41.4	23.73
4	Ahmad yani (16:00-18:00)	48	42	33	27
5	Ahmad yani (18:00-20:00)	64.9	77	58.3	19.8
6	Darmo (06:00-08:00)	53.3	46.56	36.13	24.57
7	Darmo (08:00-10:00)	55.43	51.88	43.24	22.4
8	Darmo (12:00-14:00)	97.33	106.67	84.33	45
9	Darmo (16:00-18:00)	32	28	22	18
10	Darmo (18:00-20:00)	57.86	61.71	51.11	22.18
11	Diponegoro (06:00-08:00)	34.55	28.18	20.91	7.27
12	Diponegoro (08:00-10:00)	37.14	31.43	23.81	2.86
13	Diponegoro (12:00-14:00)	20.41	15.65	15.65	3.53
14	Diponegoro (16:00-18:00)	24	21	17.33	4.33
15	Diponegoro (18:00-20:00)	20.78	22	14.06	4.28
16	Kertajaya (06:00-08:00)	126	119.64	7.64	1.27
17	Kertajaya (08:00-10:00)	119.08	130.15	12.46	15.23
18	Kertajaya (12:00-14:00)	79.57	105.38	11.4	18.71
19	Kertajaya (16:00-18:00)	94.62	101.54	13.85	20.77
20	Kertajaya (18:00-20:00)	100	125.64	7.69	23.08
21	Basuki Rahmad (06:00-08:00)	42.5	40.61	7.84	3.49
22	Basuki Rahmad (08:00-10:00)	44.9	49.29	7.89	7.45
23	Basuki Rahmad (12:00-14:00)	41.94	52.69	9.03	3.87
24	Basuki Rahmad (16:00-18:00)	39.85	41.46	7.34	0.9
25	Basuki Rahmad (18:00-20:00)	36.4	39.35	6.76	4.16

The cluster consists of three clusters . The member of each cluster is:

1. Cluster 1st in the range *0.00 - 51.21*.
   Their members are 1, 2, 10, 5, 3, 7, 4, 6.
2. Cluster 2nd in the range 51.22 – 76.15
   Their members are 9, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25,
3. Cluster 3th more than range 76.16
   Their members are 8, 16, 17, 18, 19, 20.

3.2 Automated Traffic Identification System

Automated Traffic Identification System is a system designed specifically to be able to know the density of roads in automation. The system works in automation has traffic counters to collect and update data from sensors scattered in the streets. In every street there are 2 pieces sensors. Sensor is aimed to calculate the number of vehicles passing through the road (only for each one-way). The distance between one sensor and other sensor is about 2-3 km. The first sensor is bypassed by a passenger vehicle with a sensor called a counter the number of vehicles entering, and the second sensor through which the road user is expressed as the sensor counter the number of vehicles out. Both the data from these sensors will be sent to the traffic counter each time the data update request information from providers. This data is then sent directly to the provider. Provider will process these data to produce output density level of the road. There are 3 levels of road density, which is fast, medium and stuck fast. This output is then informed to the customer through paid services such as SMS, MMS, GPS, or Web.



Picture 3. Rich picture diagram

3.3 Information System

3.3.1 Influence Diagram and DFD

Detailed design of information systems based on automated traffic identification system can be seen from the diagram as influenced several diagrams and data flow diagram. Each diagram will illustrate the details of the system with a focus different.

Influenced Diagram

Influence diagrams contained in figure 4 that illustrates the interaction between variables, controllable and uncontrollable inputs, and outputs.

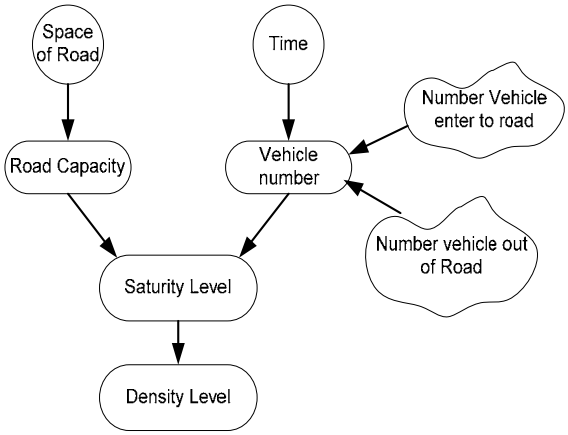


Figure 4. Influence diagram for traffic information system

A. Data Flow Diagram

Figure 5 and Figure 6 are a data flow Diagram (DFD), where each notation describing the flow of data systems, whose use is very helpful to understand the logic of the system. In Traffic Information System is divided into level 0 and level 1.

At level 0, the data source from the sensor system and the customer. The data flow from the sensors to the traffic information system is volume of vehicles on the road, while the Traffic Information System provides streets identified. The data flow the customer to traffic information system is requests data on road density and traffic information system to customer is density level.

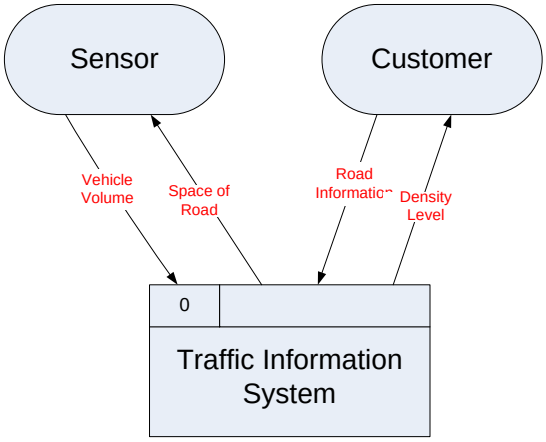


Figure 5 Data Flow Diagram level 0

At level 1, Traffic Information System on-brakedown it into traffic counters and providers. At the traffic counter, the data from road sensors was received and collected by the traffic counter, while the traffic counter on the street informs each sensor. Data from sensors that have been accepted into a data base collected volume of vehicles at that time. Vehicle volume information then is sent to the provider to be processed into the identification of density.

To be able to process it, providers need data on each road capacity road. This data comes from the data base capacity road. Information that has been processed by the provider to the customer informed in accordance with the request path info from the customer.

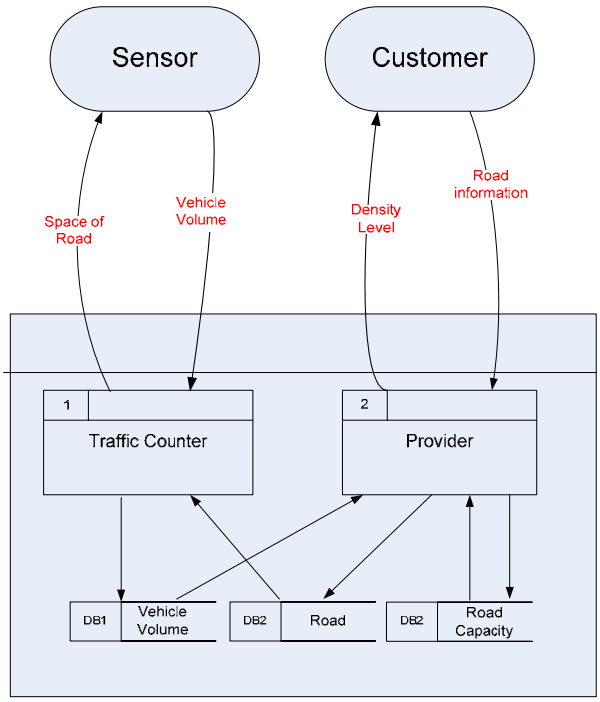


Figure 6. Data Flow Diagram level 1

3.3.2 Information System Result

Based on the influence diagram and DFD will be used to build a traffic information system. Users who use this information system will get a lot of information about traffic conditions at this time. Thus users will have the best track on the way so that it can avoid traffic jams. Some view of the traffic information system is as follows:

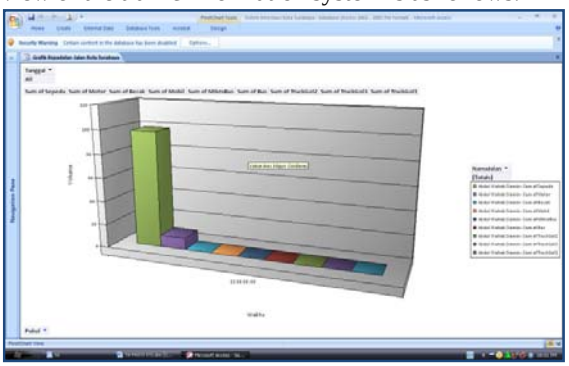


Figure 7. The density road in Surabaya

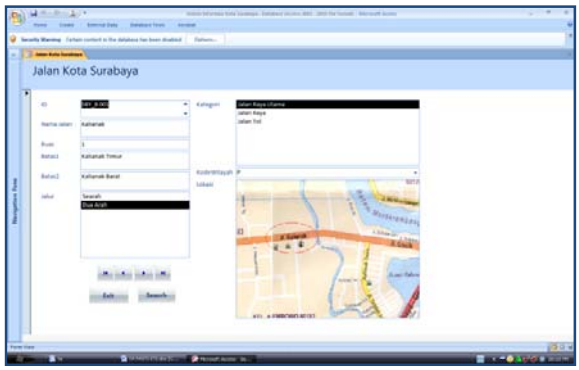


Figure 8. Road form in Surabaya

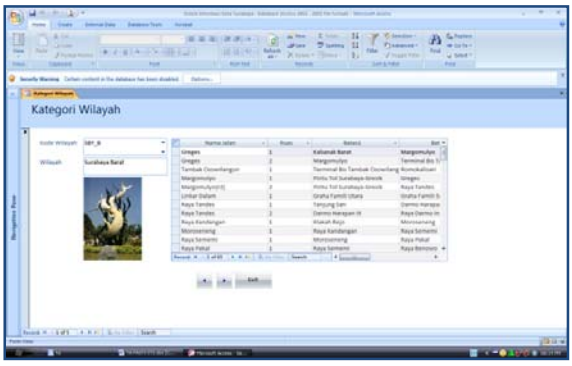


Figure 9. Region Form Kategori category

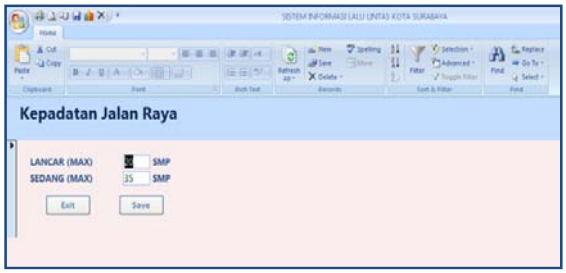


Figure 10. Density of road form

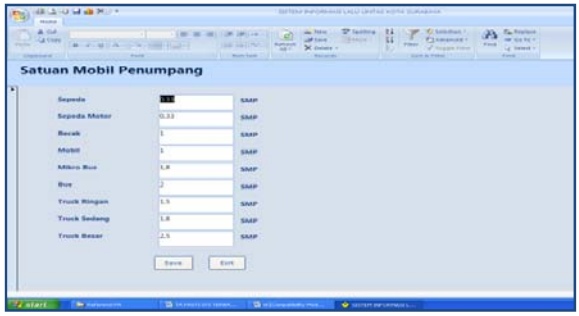


Figure 11. Passenger car unit form

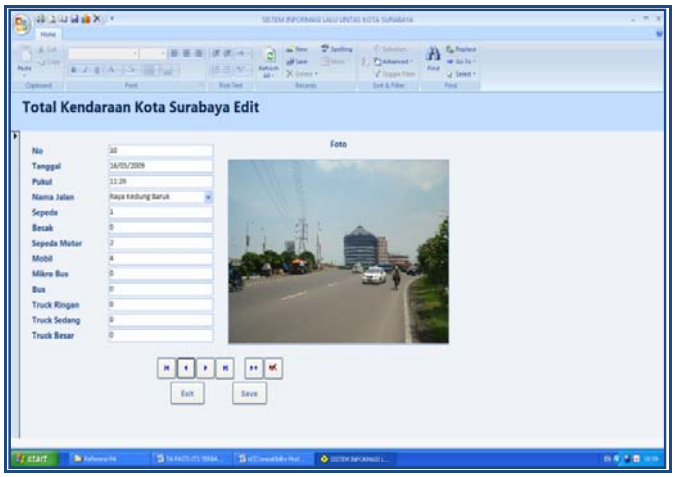


Figure 12. Total vehicle in Surabaya form

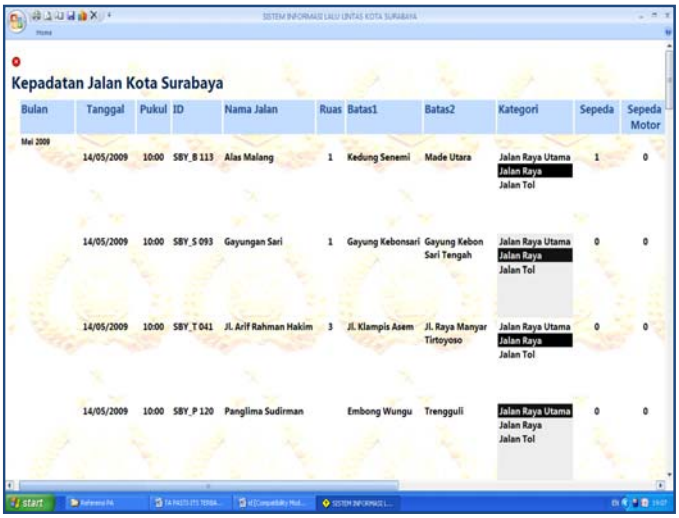


Figure 13. Surabaya density of road

3.4 Switchboard Design

Switchboard design is used to provide convenience to the user in using the traffic information system. Thus, traffic information can be obtained automatically with the user easily and more useful.

Figure 14. Surabaya traffic information system Switchboard

Figure 15. Street name information Switchboard

Figure16. Surabaya traffic dencity Switchboard

Figure 17. Surabaya traffic dencity Switchboard

Figure 18. Traffic density searching Switchboard

Figure 19. Input and edit switchboard

4. RESULTS ANALYSIS

In density analyzing by other media is to compare the information from Handphone and the information from the radio broadcast. Based on the data, information obtained from the radio is not as complete and as detailed as data obtained from identification through a mobile facility.

This information system design will help the users of road to determine the way that they choose. This system identification was used to assist road users to travel on destination. In some certain roads and at some times can not be determined sometimes congestion. Congestion is a negative impact on road users if these road users can select another alternative way that is not experiencing congestion. Each road has a capacity number of vehicles that are on the road varies.

5. CONCLUSION

The conclusions of this study are as follows:

1. Road traffic conditions are classified into cluster 3 is 1 (fluent), cluster 2 (was), and cluster 3 (bad). Cluster 1 includes Ahmad Yani (06.00-10.00; 16.00-18.00; 18.00-20.00), Darmo (06.00-10.00; 18.00-20.00). Cluster 2 includes Darmo (16.00-18.00), Diponegoro (06.00-20.00), and Basuki Rahmad (06.00-20.00). Cluster 3 includes Darmo (14.00-16.00) and Kertajaya (06.00-20.00).
2. Based on the analysis has been done there is a difference between the completeness of the information presented radio with PT Telekomunikasi Z Provider. So that it can be concluded that a better reference is used as supporting data is derived from PT. Z Telecomunication Provider.
3. The design of information systems for processing data density can be approximated by using a robust model. Information system design can be done by making nfluence diagrams and data flow diagram (DFD) first.

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