

# Street Light Monitoring Application Based On SMS Gateway

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**Abstract-** Manual street light monitoring process affects on tardiness of fixing of broken light. This can cause traffic accidents and other crimes. This study is aimed to make street light monitoring application that can be used by people by using SMS Gateway service to the Regional Office of Ministry of Energy and Mineral Resources of Kepahyang district. This study uses system development methodology by doing data-need analysis. This study uses structured modeling design started by file design to input output design. The design is implemented into Visual Basic Net Gammu and using MySQL data base. The result of this study is a street light monitoring application based on SMS Gateway that can be used by the Regional Office of Ministry of Energy and Mineral Resources of Kepahyang district.

**Index Terms-** Monitoring system, Gammu, SMS Gateway

## I. INTRODUCTION

Nowadays, technology advances fast. Information technology is something common and is a must in every aspect of life. Even, it is a back bone in human life in providing and giving information. The existing of real time, fast, appropriate and accurate information becomes very important for human life today. Street light is street facility that functions as lighting at night. In district of Kepahyang, street light management is done by the Regional Office of Ministry of Energy and Mineral Resources especially in the division of Energy and Electricity that is a governmental regional office. The government is obligated to provide street light facilities for people goodness. People have right to get the facilities as compensation of the tax they pay. Unfortunately, there are many weaknesses in implementation, especially in the monitoring of street light, thus the condition of the street light whether it is on or off cannot be checked by the management fast. This indicates the importance of effective street light monitoring. Ineffective street light monitoring can cause tardiness of problem solving that finally brings harm for people in form of increasing of social problem whether it is traffic accident or crime. Thus, a system that supports street light monitoring base on SMS Gateway is needed to be made.

## II. METHODOLOGY

### 2.1. Research Method

#### a. System

System is a network of connected procedures, gathered to do activity or to accomplish a specific target [1]. System is a group of elements integrated with the same goal to accomplish goal, and also a network of connected procedures, gathered to do activity or for specific goal [2].

#### b. Application

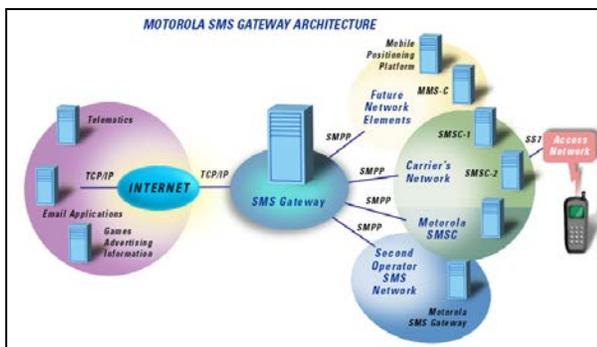
Application or is called software application is a sub-class of computer software which uses computer ability directly to do task that is wanted by user. It is usually comparing with system software which integrates various kinds of computer abilities, but does not directly implement the ability to do task which benefits the user. The main examples of application software are word processor, work sheet, and media player. [3]

#### c. Street Light Monitoring

Monitoring is supervision that can be explained as awareness about what to figure out, high level monitoring is done so that measurement through time can be done that shows the movement toward the goal or away from it. Monitoring will give information about the status and the tendency that measurement and evaluation are done over time from time to time, monitoring is usually done for specific purpose, to check on the process and object or to evaluate condition or improvement toward management goal on effect of action from many kinds such as action to keep the existing management going. Public street light is part of facilities which is installed on the left or on the right or in the middle of the street to light the street. Street light is light which is used to light the street at night so that pedestrian, cyclist and driver can see clearly the street they take at night, thus increases their safety [4].

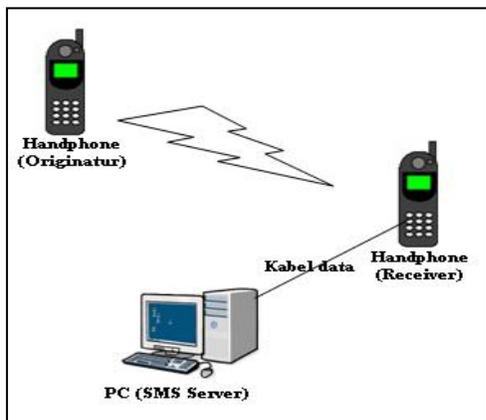
#### d. SMS Gateway

SMS Gateway is a two-direction SMS with uniqueness of same ordinary SMS tariff given by operator. Because of its two directional characteristic, it is very suitable to be SMS Center used by organization or institution. SMS center consists of two types in term of its development, they are 1) using protocol connected to the internet network, one of the protocols used is SMPP (Short Message Peer to Peer Protocol) and 2) SMS server service directly connected to GSM network. Network architecture of SMS server that is built using SMPP protocol can be seen in picture 1. SMPP protocol is a connector between IP network and GSM network device (SMSC). External Short Messaging Entities is an external device of short message entity in data network like TCP/IP which the internet is within [5].



Picture 1. Network Architecture of SMS using SMPP

Picture 1. SMS server without SMPP protocol. In this type of SMS server the connection of PC server to SMSC is not done through internet network, but directly connected to SMSC using GSM terminal (HP or modem).



Picture 2. Network architecture of SMS without SMPP

Picture 2 consists of some components such as: 1)PC/Laptop (SMS server)is used to put in the SMS Gateway application and the administration of SMS that would be built. 2) Hand phone as communication media for GSM wireless system. 3) Mini USB data cable to connect Headphone and PC .

**e. Microsoft Visual Basic .Net**

Visual basic .Net is the next generation of Visual Basic. Visual Basic .Net makes us possible to build client data base application or high performance server and is very suitable to match with SQL Server software. From the definition, it can be concluded that Microsoft Visual Basic .NET is a tool to develop and to build application which works on .NET Framework system, by using BASIC language. One version of Microsoft Visual Basic .Net is Visual Basic 2010 [6].

**f. MySQL**

MySQL is an application with daemon characteristic or stays in the memory that runs together with Microsoft Windows operating system. The main interface of MySQL data base server is command line or DOS-base so special knowledge on usage of command in command shell MySQL is needed [7].

**2.2. Methodology**

This research uses system development methodology that is aimed to increase and to make effective the existing system. The steps taken in this new system is by doing data-need analysis, data collecting, structured modeling design, design implementation into DAD, ERD, File Design, Input design, Output design and implementation into Visual Basic .Net, MySQL data base and Gammu.

**a. Actual System Analysis**

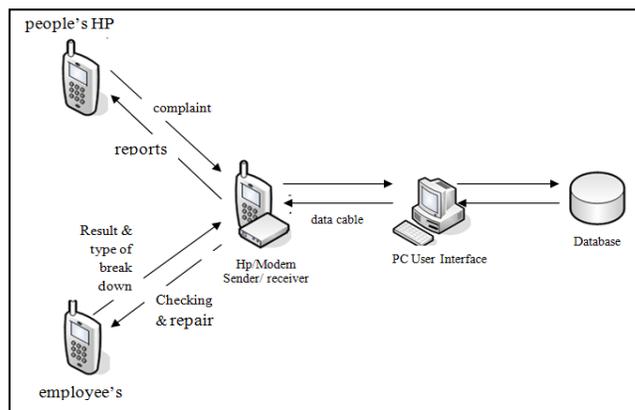
From the old system analysis result it is found that street light monitoring is done by having employee to walk around checking the condition of the street light. This is assumed to be less effective because there are so many street lights in Kepahiang district.

**b. New System Analysis**

New system analysis is aimed to create a system that can solve the existing problem in the actual system. In this case, a street light monitoring application system based on SMS Gateway will be created. With this system, the monitoring system can be done centered in an application connected with defined SMS system and SMS device.

**c. SMS Gateway Model**

From the new system analysis result, the model of street light monitoring based on SMS Gateway application system is defined as bellow:

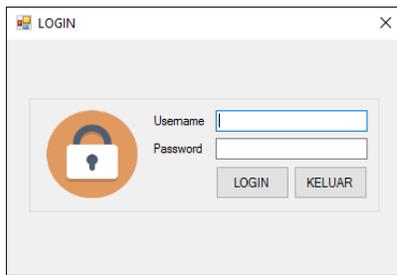


Picture 3. Model of Street Light Monitoring System

Picture 3. Monitoring process. People send complaint SMS to receiver HP/Modem (1), PC (User Interface) and Receiver HP/Modem connected with street light data base on MySQL. Then, the information about the breakdown will be processed by the Monitoring application. This information gets into the display form and the operator continues this information in form of SMS to employee for checking (2). Checking Employee sends reports to the Monitoring Application (3). This information is sent by operator to repairing employee (4). Day-shift employee will repair the breakdown and send report to Monitoring Application (5).by the Monitoring Application this report SMS will be sent to the people who directly send complaint(6).

### III. RESULT AND DISCUSSION

#### 3.1. Street Light Monitoring Application



Picture 4. Login Sub-Menu

Picture 4 is a form of user authentication. This form firstly appears when the application runs. In this form there are user name and password columns. User or admin fills in the correct user name and password to enter the main menu and use this application.



Picture 5. Main Menu

Picture 5 appears after user or admin succeeds in logging in with correct username and password. The main menu contains menu line and sub menu to manage master data, SMS, and reports.

##### a. SMS from people to Monitoring Application

People can use it easily. Served numbers are only registered numbers on Application data base. The format is: <ID\_lampu>space<information>

##### b. SMS from Monitoring Application to checking employee

After complaint SMS received by Monitoring Application, then the application sends SMS to checking employee. The format to night-shift employee is : <Ks...;Lmp...;Jl...;Bermasalah;caller's location...;Tlg dicek!>

##### c. SMS from checking employee to Monitoring Application

The format of SMS from night-shift employee to Monitoring Application is: <pcek>space<case number>space<nuisance code>

##### d. SMS from Monitoring Application to reparation employee

After case information gotten from checking employee, Monitoring Application with the help of operator sends message

to reparation employee. The format is: <Ks...;Lmp...;Jl...;mnglmi...;caller' location;Tlng dprbaiki>

##### e. SMS from reparation employee to Monitoring Application

After the problem is solved, reparation employee sends report SMS to Monitoring Application that the case is solved. The format is: <pbaik>space<case number>space<ok>

##### f. SMS from Monitoring Application to People

After one case is solved, the monitoring Application directly sends SMS to people. The SMS is a reply confirmation that the broken light has been repaired. The format is: <Lmp...telah diperbaiki, terima kasih>

#### 3.2 System Testing Result

This research uses black box testing. The result can be seen as bellow:

Table 1. Testing of SMS sending

No	Testing Scenario	Expected Result	Result	Conclusion
1	Destination number left empty and click the send button	System will reject process and show message "NOMOR TUJUAN KOSONG!, Silahkan isi dengan benar!"	As expected	Valid
2	Form, message and destination number completed	System succeeds to send message to destination number and shows message "SMS SUKSES DIKIRIM"	As expected	Valid

Table 2. Testing of SMS receiving

No	Testing Scenario	Expected Result	Result	Conclusion
1	Sending SMS from unregistered number	System will refuse and SMS is not received	As expected	Valid
2	Sending SMS from registered number	System succeeds to receive SMS and displays	As expected	Valid

on table  
based on the  
SMS source

**Table 3. Testing of Report Making**

No	Testing Scenario	Expected Result	Result	Conclusion
1	Click Menu Laporan(Report menu) button	Display form for month and year of report	As expected	Valid
2	Click Tampilkan Laporan ( Display Report) button	Display report based on chosen filter	As expected	Valid

#### IV. CONCLUSION

Street Light Monitoring based on SMS Gateway Application has been able to be used by the Regional Office of Ministry of Energy and Minerals Resources of Kepahiang district in checking and repairing street light with the participation of active people who use their hand phone to send

SMS to the Call Center. It can also be said that this application has helped the Ministry of Energy and Minerals Resources in cutting time and energy in giving services to people in Kepahyang district.

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