Design of Village Information Service System Using SMS Gateway

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A B S T R A C T

Information is a crucial thing that cannot be separated from everyday life. Kelambir Lima Kebun Village is part of the Hamparan Perak District with a population of 16,355 people. In community life in the village there is a lot of information that sometimes needs to be conveyed by village officials to its citizens. Some examples of this information include the announcement of the COVID-19 vaccination, information on social assistance funds, information on village cooperation, information on the August 17 competition, information on fogging for prevention of DHF, and much other information that exists every day and needs to be conveyed to residents. village. This study aims to create a website information service system website usi[3]Faculty of Science and Technology, Universitas Pembangunan Panca Budi, Indonesia ng an SMS Gateway. This information service website is used to disseminate information or announcements from the village to villagers via SMS Gateway so that each villager gets the announcement via their respective cell phones. In this way, the accuracy of the information received by residents can be ascertained when compared to when getting information or announcements from neighbors. Researchers used the prototype model for the system development method. In the design, the researcher uses a design tool, namely UML.

Keywords:

Village Information Service System, Kelambir Lima Kebun Village, SMS Gateway, Prototype Model, Gammu

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1. INTRODUCTION

Kelambir Lima Kebun Village is one of the villages in Hamparan Perak District, Deli Serdang Regency, North Sumatra Province [1]. The area of Klambir Lima Kebun Village is: 2,558 Ha, consisting of 21 hamlets, with a population of 16,355 people, consisting of 2,895 households. Kelambir Lima Kebun Village is a village that has great potential in plantations. Klambir Lima Kebun Village is part of the Hamparan Perak District, Deli Serdang Regency. There are 6 hamlets in the village of Klambir Lima Kebun, where the majority of the residents are Javanese [2].

In previous studies, a website was created as a means of information for the villagers of Kelambir Lima Kebun. In this study using the waterfall method for website development. Based on the results of this study, the results obtained are that online media increases village information transparency, can help local village governments in terms of managing data, information and presenting information broadly to the public who are the main users of village information. The provision of such information services is in the form of village profile information such as remarks, history, organizational structure, village profile, vision and mission, information on institutions, monographic information, news, activity lists, potential, galleries, guest books, and information in graphic form to the wider community. in order to realize a village government that is transparent and can promote village potential to village communities [2].

Even though a village information website has been created, in general, residentKelambir V Kebun Village residents rmation or announcements from the village through their neighbors or the regional head. Sometimes the information conveyed orally is distorted or incomplete, giving rise to misinformation. Submission of information in this way is also less in terms of speed of time.

Therefore, based on these problems, this study aims to create a website information service system using an SMS Gateway that can be used by village officials in disseminating information to its citizens quickly. Information received by residents can be guaranteed to be correct and up to date because it comes directly from village officials. With the SMS Gateway, these information messages can be broadcast directly to village residents either via SMS or WA messages.

SMS Gateway is an information system used for SMS management. SMS Gateway can be used to send and receive SMS either using 1 cellular phone number or multiple numbers. SMS Gateway consists of the following types: (1) Single-direct, namely SMS that is only one-way where the SMS recipient cannot reply to the SMS received, (2) dual-direct, namely SMS that is two-way in nature where the recipient can send SMS to the sender, (3) Multi-direct, namely SMS that can be sent with several numbers and received with several numbers and can be sent to many recipients and recipients can send SMS to the sender [3].

According to Syafiul Muzid [4], in his research on village information service systems using the SMS Gateway Multi-Direct concept, SMS Gateway can facilitate the dissemination of information from the village government. The resulting Village Information Service System (SiLISA) is able to facilitate the delivery of information from the village government to certain residents and communities, or from residents to the village government. In addition, the developed system can become a community-based information medium where the system can be used by many parties, not only by the village government.

2. RESEARCH METHOD

2.1. Stages of Research

Research is a systematic and organized investigation to investigate certain problems that require answers [5].

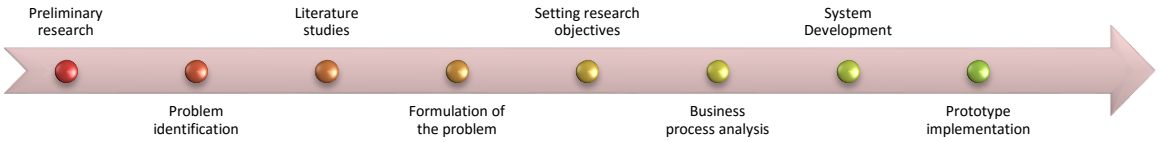

Figure 1. Flow of Research in Village Information Service System Development

The research was conducted in several stages as follows:

1. Preliminary research. The research was conducted to study the situation in Kelambir V Kebun Village by observing and interviewing.
2. Problem identification. From the preliminary research, several problems were identified that could be raised into research topics.
3. Literature Studies. Literature studies are conducted to help find solutions to the identified problems.
4. Problem formulation. At this stage the researcher determines the formulation of the problem which problem will be solved in this study.
5. Setting research objectives. After the formulation of the problem is determined then the objectives to be achieved from the research carried out are made.
6. Business process analysis. At this stage, data collection and analysis of existing business processes began. In this case the process of how village officials convey information to residents and how villagers get information from the village. At this stage, analysis of processes that have occurred to find weaknesses in existing processes then proposes new business processes to make improvements or provide solutions to weaknesses in existing business processes.
7. System development. At this stage the design process will be completed and continued with building the system.
8. Prototype implementation. The final stage is testing and implementing the prototype.

2.2. Prototyping Models

Methodology is a formal approach [6] or series of actions to implement the System development life cycle (SDLC) which is a process of understanding how an information system can support business needs, designing systems, building and presenting them to an organization. Several software development methodologies include: Linear Sequential Model or Waterfall, Parallel Model, Iterative Model, Prototyping Model, RAD (Rapid Application Development) Model, Spiral Model, V-Shaped Model and Agile Development [7].

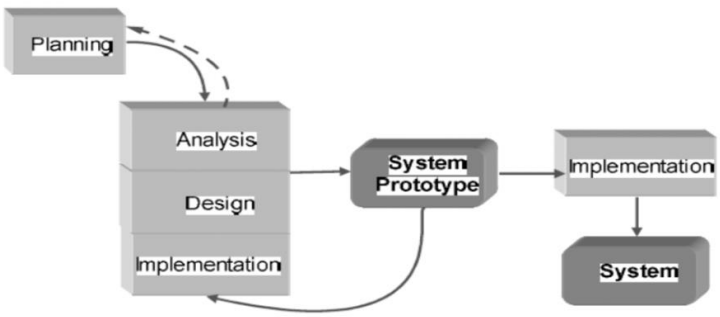

Figure 2. Prototyping Model [7]

This study uses a prototype model for the system development method. prototyping is the process of creating a simple model of a piece of software that allows the user to have a basic idea of the program and to perform initial testing. Prototyping requires more user involvement and allows them to see and interact with a prototype allowing them to provide better and more complete feedback and specifications [8].

There are 4 main prototyping methodologies [9], namely:

1. *Illustrative*, generates sample reports and screen displays.
2. *Simulated*, simulating several system workflows but not using real data.
3. *Functional*, simulating some of the actual system flows and using real data.
4. *Evolutionary*, produce models that become part of the operational system.

2.3. Stages of Village Information Service System Development

The following are the steps or stages in the prototype method [10] :

1. Communication and initial data
   Communication and initial data collection, namely analysis of user needs. At the communication stage, communication can take the form of interviews with users to obtain information about user needs. At this stage the researcher communicated with staff in the village of Kelambir Lima Kebun to obtain initial needs data.
2. Quick plan
   Quick plan, namely the stages of planning needs. After communication has been carried out to obtain initial information on user needs, the next step is to make quick plans including an analysis of the needs of the system to be built. In the analysis stage, user needs and technology requirements for system implementation are defined. At this stage, the specification of the input required by the system is also determined, the resulting output and the process for processing the input data to produce the expected output.
3. Modelling quick design
   Modeling Quick Design, stages of making designs. System design activities are carried out as the beginning of system design that will be built as needed [11]. In the quick design modeling stage we design the workflow of the system, define system user actors, and define the database structure and interface design. The design phase is carried out using the UML (Unified modeling language) Model.
4. Prototype formation
   Prototype formation, namely the manufacture of prototype devices including testing and refinement. After the design process is complete, then start the coding process to create a prototype village information service system using the SMS gateway feature on a web-based platform. The [12] software that is used as an SMS Gateway is Gammu. Gammu is a pretty good and well-known SMS gateway software [13].
5. Deployment delivery and feedback
   Deployment Delivery & Feedback [14], namely evaluating prototypes and refining the analysis of user needs. Prototype repair, namely making the actual type on the results of the prototype evaluation and then the final production, namely producing the device correctly so that it can be used by users. When the prototype has been built, the next step is to communicate with the user to get input from the user for further improvement.

3. RESULTS AND DISCUSSION

This chapter contains the stages of implementing the prototype model in the development of an information service system for the village of Kelambir Lima Kebun. The results of the research and discussion will be explained comprehensively. The research results are presented in the form of UML diagrams to represent system design and detailed drawings and system specifications to make it easier for readers to understand them.

3.1. Functional Needs

The functional requirements of the Kelambir village information service system for five gardens can be specified in the following table.

Table 1. Functional Needs

No	Name of Need	Description
1	Dashboard	Main Page of the Village Information Service System view
2	Send messages	Pages to send messages, either single message out, broadcast, sms boom
3	Contact menu	Contact list page and add to contact list
4	Incoming Message Menu	Contains incoming message data
5	Outgoing Message Menu	Contains outgoing message data
6	Sent Message Menu	Contains messages/broadcast messages that were successfully sent

No	Name of Need	Description
7	Settings menu	The settings menu can be used to add system user data and then set internet connectivity with the modem.

3.2. Hardware and Software Specification

In developing the sms gateway for the village information service system, the researcher used several software and hardware specifications.

Table 2. Hardware and Software Specification

No	Software	Hardware
1	Text editor (Atom)	Modem
2	Browser (Chrome)	Processor intel core i5
3	Local Server (Xampp)	Ram 4 Gb
4	Gammu	

3.3. Use Case Diagram of Village Information Service System

The design of the village information service system development using SMS Gateway is made with the object-oriented system method, namely UML.

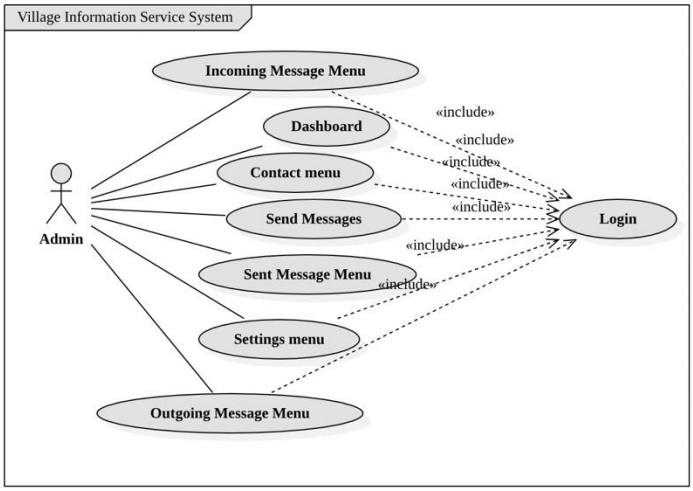

Figure 3. *Use Case Diagram* Design

Use Case Diagram [15] is a graphical representation of some or all of the actors, use cases, and interactions between them that introduce a system. Information service system with SMS Gateway is designed with several functionalities. Admin as a system user can manage the internet connection on the modem, send messages, broadcast, add contact numbers, manage incoming and outgoing messages. Gammu acts as an intermediary application that manages various functions of cellphones, modems and other devices. Gammu monitors sms device and sms gateway database.

3.4. Village Information Service System Dashboard

In this section, it will be shown the Dashboard of the village information service system. Figure 4 shows the initial view or main homepage display of the village information service system. With this system the village can send information messages or announcements to all villagers. On the start page the admin can make quick messages via the quick message feature. The admin can also add a contact list to the system which can accommodate all the mobile number data for residents of the village of Kelambir Lima Kebun.

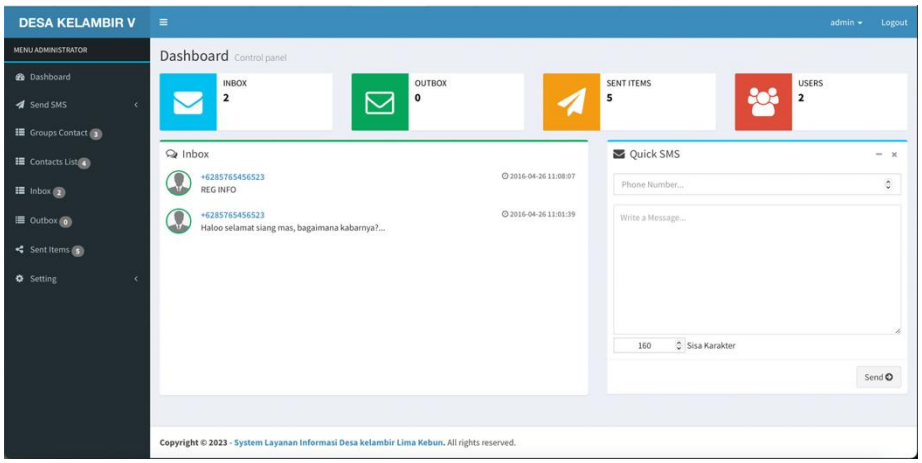

Figure 4. Main Home Display of Village Information Service System

4. CONCLUSION

A village information service system using an SMS gateway has been successfully designed and built. Functionally the features of the system have met user needs based on test results. With the village information service system using the SMS gateway, village officials can more easily, efficiently and effectively disseminate information to all residents of Kelambir Lima Kebun village. The system currently being built is still limited to communication from village to user. In the future, the village information service system can be developed again so that it can become a forum for residents. When villagers also want to provide information or announcements.

5. REFERENCES

[1] D. A. Luta, F. H. Syam, and W. Warisman, "Pemberdayaan Lahan Pekarangan Masyarakat Di Desa Kelambir V Kebon," *Empowerment: Jurnal Pengabdian Masyarakat*, vol. 1, no. 3, pp. 316–321, Apr. 2022, doi: 10.55983/empjcs.v1i3.126.

[2] H. Hermansyah, S. Wahyuni, and A. Akbar, "Perancangan Sarana Media Informasi Berbasis Web Desa Klambir Lima Menggunakan Metode Waterfall," *JURIKOM (Jurnal Riset Komputer)*, vol. 9, no. 2, p. 515, Apr. 2022, doi: 10.30865/jurikom.v9i2.3803.

[3] V. K. A. V. T. Katankar, "Short Message Service using SMS Gateway," *International Journal on Computer Science and Engineering*, vol. 02, no. 04, 2010.

[4] Syaiful. Muzid. and Noor. Latifah., "Pengembangan sistem layanan informasi desa (silisa) terintegrasi berbasis sms gateway," *Prosiding SNATIF*, vol. 2, no. 2010, 2015.

[5] Sekaran, "Tahapan Penelitian," *Tahaan Penelitian dalam Metodologi Penelitian*, 2014.

[6] M. Bolung and H. R. K. Tampangela, "Analisa Penggunaan Metodologi Pengembangan Perangkat Lunak," *Jurnal ELTIKOM*, vol. 1, no. 1, pp. 1–10, Jun. 2017, doi: 10.31961/eltikom.v1i1.1.

[7] D. S. Budi, T. A. Y. Siswa, and H. Abijono, "Analisis Pemilihan Penerapan Proyek Metodologi Pengembangan Rekayasa Perangkat Lunak," *Teknika*, vol. 5, no. 1, pp. 24–31, Mar. 2017, doi: 10.34148/teknika.v5i1.48.

[8] R. Ganpatrao Sabale, "Comparative Study of Prototype Model For Software Engineering With System Development Life Cycle," *IOSR Journal of Engineering*, vol. 02, no. 07, 2012, doi: 10.9790/3021-02722124.

[9] D. Purnomo, "Model Prototyping Pada Pengembangan Sistem Informasi," *J I M P - Jurnal Informatika Merdeka Pasuruan*, vol. 2, no. 2, Aug. 2017, doi: 10.37438/jimp.v2i2.67.

[10] Roger S. Pressman, *Rekayasa Perangkat Lunak Pendekatan Praktis Buku Satu*, vol. 1, no. February. 2020.

[11] I. D. Perwitasari and J. Hendrawan, "Analisa dan Perancangan Aplikasi Info Wisata Kabupaten Mukomuko Berbasis Android," *Jurnal Teknik Dan Informatika*, vol. 5, 2018.

[12] D. Desmira and N. Singgih, "Rancang Bangun Sistem Informasi Pengingat Jadwal Pembayaran Angsuran Berbasis Sms Gateway," *JSiI (Jurnal Sistem Informasi)*, vol. 1, 2017, doi: 10.30656/jsii.v1i0.76.

[13] W. Y. Antoro, "Perancangan Sistem Informasi Pelayanan Posyandu Berbasis Web Dengan CodeIgniter Dan Materialize CSS," *Jurnal Teknologi dan Informatika*, vol. 3, no. 2, 2017.

[14] R. Aditya, V. H. Pranatawijaya, and P. B. A. A. Putra, "Rancang Bangun Aplikasi Monitoring Kegiatan Menggunakan Metode Prototype," *Journal of Information Technology and Computer Science*, vol. 1, no. 1, pp. 47–57, 2021.