Android-based online cattle card system for recording quality cattle in Semarang regency

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Abstract. The manual of cattle card system that contains the identity of each livestock has been made by the Ministry of Agriculture and Fisheries. The Informatics Engineering Study Program of Semarang State University through a research, had contributed to changing the manual of cattle card system into an Android-based online Information System (IS). The research by applying Science and Technology was carried out in Semarang Regency. The problem was how to change the manual of cattle card system into an Android-based online IS. Implementation of the research in Semarang Regency. The aim of this activity was that the recording of quality cattle in Semarang Regency could be changed from the manual of Cattle Card System to online Information Systems. The research activities were observations, interviews, collaborative activities, programming based on Android where the system was developed using the waterfall model, and triangulation. The result, an Android-based online IS prototype had been created to record quality cattle in Semarang Regency. This Android-based online IS had been registered to obtain intellectual property rights.

1. Introduction

This article is written based on the results of National Strategic research. Research material is related to the national strategic policies about the use of the system of manual cattle card. Innovation and development of science and technology announced by the government through the ministry of research, technology, and higher education of Indonesia Republic, is required to be supported. On the opposite side, the department of agriculture and fishery only introduced the manual cattle card system which contains the identity of every cattle, owner, mutation note, as well as animal health records. Therefore, Universitas Negeri Semarang, particularly Informatics study program of Faculty of Mathematics and Natural Sciences, has given a positive contribution within the field of Science and Technology to support the modification of manual cattle card system through the preparation of a prototype of online cattle card system based on Android for recording quality cattle in Semarang Regency.

With the online card system based on Android for recording quality cattle, all inputted data can be displayed, and all statistical data can be used as a decision-making tool from connected parties. For instance, if somebody desires to grasp the stock of cattle in Semarang regency, quality, the quantity of breeders, the granary area of cattle, the type of cattle, and others. In line with the available data on cattle card, then they will notice the information from the system. That’s why the recording of quality
cattle system is web-based applications which can be accessed online using web browser media through a computer or Android-based smartphone.

From the outline within the background above, then the formulation of the issues that are resolved through the National Strategic Research is how to build a prototype of online cattle card system based on Android for the recording quality cattle in Semarang Regency?

The objectives of this study are as follows: (1) producing a prototype of online cattle card system based on Android for recording quality cattle in Semarang Regency; (2) finding a way for the user in describing data of cattle which utilizes prototype of online cattle card system based on Android for recording quality cattle in Semarang Regency.

The benefits expected from this article are as follows: (1) the availability of an Android-based online cattle card system for recording of quality cattle in Semarang Regency; (2) helpful media because there is complete data documentation of cattle quality in the area of Semarang Regency based on Android; (3) access facility to information about the quality of each cattle, including the health, owner, and records the mutation of cattle in Semarang Regency based on Android.

1.1. Android Operating System
Nowadays, there are many users of the Android operating system. [1], [2], and [3] wrote that Android was a Linux-based software system for mobile equipment as well as the applications, operating system, and middleware discharged by Google. Whereas Android Software Development Kit provides Tools and Application Programming Interface required to develop applications on the Android platform using the Java programming language. Furthermore, [4] wrote that Google along with the Open Handset Alliance developed Android that was an open mobile equipment alliance made up of forty-seven hardware, software, and telecommunications corporations geared toward development of open standards for mobile equipment.

Competition platform of the operating system is more stringent; this can be seen from the number of existing operating systems such as Windows Mobile, BlackBerry, Symbian, iPhone, Linux Mobile (LiM0), Java Mobile Edition, and more. [5] wrote that there were some things that become the advantage of Android. [6] wrote that although some of the features had appeared earlier on other platforms, Android was the first to combine things like the following features: (1) Openness; (2) The basic Android component architecture was inspired by Mashup internet technology; (3) Lots of service support; (4) Application lifecycle was set automatically. (5) Good graphics and animation support; (6) Portability of the application means that the application could be used on devices that were current and in the future.

1.2. Recording of Cattle Quality
The quality of cattle policy in Indonesia, particularly for local cattle is systematically targeted, specifically the development of rural farms through the steerage of stock breeder teams and integrated service patterns.

[7] and [8] wrote that the recording of the quality of cattle was terribly helpful in terms of (1) arrangements in an economical management system, monitoring for animal diseases, maintenance management, and management of feeding and grazing; (2) choice of prospective studs to be used as a substitute for old males; (3) selection for cow replacement; (4) removal of the thin animals; (5) evaluation of the isolated animals in their groups; (6) developing a system for cattle production.

[9] and [10] wrote that the advantages of recording quality cattle were to (1) facilitate nursery management systems in the livestock cattle by providing information to users about cattle production and reproduction performance; (2) becomes the basis for policy development decisions at the central government level through total information on production performance through cattle records and genetic benefits; (3) provide a way out of thinking about genetic improvement that was in accordance with the characteristics of production and reproduction.

As was known, the cattle companies in Texas have developed a system of collecting data through electronic recording. In Texas, each cow has twelve types of identification of cow conditions that can
be traced electronically. Furthermore, the search results and readings could be sent to the center of the info process for further analysis using the computer code that has been made. Although, this method obviously requires very expensive and a long time to design it. However, this program had been running well, so the process of collecting data and the process of delivering data was very economical. The use of the Android-based internet can actually increase the role of the community in supporting these ideas. This is in line with the opinions of [11] and [12] over that the net and website construction may all play a task in supporting human expression and its management becomes more practical.

1.3. Online Cattle Card System based on Android
Since 2015 the central government within the field of cattle development had introduced the manual cattle card system that contains the identity of each animal, mutation records, owner, as well as animal quality records. This program was supported on Law number forty one of 2014 on Amendment to Law number eighteen of 2009 on Animal Husbandry and Health. Application of manual cattle card is still applied to certain areas only. To support this program, on February twenty three, 2015, Directorate of Animal Breeding Directorate General of Livestock and Animal Health Ministry of Agriculture of the Republic of Indonesia conducted a working meeting. The working meeting also discussed about: (1) the creation of an Employment Guide regarding the launch of the Manual Cattle Card; (2) coordinating the implementation of the use of the Manual Cattle Card system; (3) fostering livestock and buffalo cattle owners.

With the introduction of the manual cattle card system, each cattle and buffalo need to be recorded within the manual cattle card that was written by hand. The results of the first- year study, data collection had been supported by a system that records every manual cattle card (recorded hardcopy) into a web-based online system [13]. UNNES particularly the informatics study program of FMIPA, within the second year had created a positive contribution to the sector of Science and Technology to change the manual cattle card system program to the online information system by compiling a prototype of the online cattle card system based on Android for recording of quality cattle in cattle data collection. Look at Figure 1 below:

![Figure 1](image_url)

**Figure 1.** Manual Cattle Card system is replaced by Android-based Online Cattle Card system

The result of Research in the second year is further developed by making a prototype of an online Cattle Card System based on Android for recording quality cattle in Semarang Regency.

2. Methods
2.1. Methods and Subject of Research
The method was qualitative approach and the activities were observations, interviews, collaborative activities, programming based on Android where the system was developed using the waterfall model, and triangulation. The subjects of this research were cattle ranchers, cattle data in Semarang regency, and officer of manual cattle card system data from the Department of Animal Husbandry and Fishery Office of Semarang Regency.
The main activities of research were: (1) describing the identity of each cattle, owner, mutation record, and animal health and quality records in the Semarang Regency area; (2) preparing a prototype of Android program of Online Cattle Card system for Recording of quality cattle using Android; (3) making a prototype of the Online Cattle Card system based on Android for Quality Cattle Recording; (4) conducting trial of Online Cattle Card system based on Android for Quality Cattle Recording; (5) Revising Online Cattle Card system based on Android for Quality Cattle Recording, if there is need to be revised.

The prototype of an online cattle card system based on Android for the recording quality cattle in Semarang Regency was developed based on a waterfall model. This model could be a static model and approach the development of systems in an extremely linear and successive manner, before completing one activity. The waterfall model might be involving the subsequent phases: demand analysis, design, implementation (i.e., coding), testing, and operation and maintenance [14]. Waterfall model could be a rather previous however remains wide used as a lifecycle model [15].

In the need analysis, the checking process of the system need is done. In the step of designing, it is made the basic design of the Android application system. This basic design is the basis for developing the implementation steps. In the implementation process, the system is implemented using Android programming. In the implementation process, a testing process is also carried out for program improvement. At the end of the step, the process of use or operation is carried out.

2.2. Indicators of Success
The indicators of success are as follows: (1) the research team can describe the identity of every cattle, mutation record, owner, and animal quality records in the Semarang Regency area; (2) research team can make a prototype of the Online Cattle Card system based on Android for Quality Cattle Recording; (3) preparation of the Guide-line Book for usage of Online Cattle Card system based on Android for Quality Cattle Recording.

3. Results and Discussions
3.1. Results
3.1.1. Description of Livestock Data for Guidance System and Preparation
This research had produced Guidebook to operate the prototype of online Cattle Card System based on Android for the recording quality cattle in Semarang Regency. The Guidebook facilitates the cattle data collection officer in describing the health record/quality of cattle with the identity of every cattle, records of mutations, and owners in Semarang regency. In principle, the data collection of cattle based on Android was tailored to the government program that had been providing cattle data collection by filling the manual cattle card.

3.1.2. Design and Creation of Online Cattle Card based on Android.
The research team had resulted in the prototype of online cattle card system based on Android for recording quality cattle in Semarang Regency. The below figures are the display photographs of the program product. Look at Figure 2 until 5.
Figure 2. Early Posting

Figure 3. Input Posting

Figure 4. Owner Posting

Figure 5. Quality Cattle Posting

The postings above are still the result of the recording of general conditions of cattle. To get the more complete data of cattle quality, the prototype is still possible to be developed further.

3.2. Discussions
Currently, the agriculture and fisheries service has introduced a manual system of cattle containing the identity of every cattle. This government effort must be supported. As the first step, the application of science and technology innovations and development carried out by the agriculture and fisheries service that has just introduced the manual cattle card system that contains the identity of every cattle, can still be developed according to the disruption era which demands the existence of a digital system.

Therefore, the Informatics study program of FMIPA has contributed within the sector of science and technology by changing the manual cattle card system turning into an online cattle card based on Android. Data collection of cattle with an online system using Android will be optimized for use if it is supported by the strength of the internet network. As a prototype, the online cattle card system based on Android for the recording quality cattle in Semarang Regency needs to be tested. Thus, all the weaknesses of this prototype product need to be minimized. The Informatics Engineering Study Program as one of the study programs at UNNES needs to contribute their ideas and work to maintain the good name of UNNES.
4. Conclusions
Based on the results of the research and discussion above, then the conclusions of this study is as follows: (1) this research had produced Guidebook to operate the prototype of online Cattle Card System based on Android for recording quality cattle of cattle in Semarang Regency; (2) the research team had resulted in the prototype of online Cattle Card System based on Android for recording quality cattle in Semarang Regency; (3) to get the more complete data of cattle quality, the prototype is still possible to be developed further.

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