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Research Paper

Designing CRM-CAR (Customer Relationship Management -- Computer Aided Recognition) Based on Facial Recognition Technology to Increase Business Competitiveness by Utilizing Artificial Intelligence

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Abstract.
The development of SMEs is the flagship of the Indonesian state. 90% of the total businesses in Indonesia are SMEs. In addition, SMEs support 60.34% of the entire GDP of the Indonesian state. Starting from basic needs such as food, beverages, clothing, and others, to supporting needs such as technology and information. The product and service sectors were not spared from the development of SMEs. One way to help improve the quality of business services is to utilize a customer database. By utilizing digital applications, a business service can be adapted to historical customer data so that it will improve the quality of service received by customers. This study aims to design, build, and test a CRM application based on facial recognition that utilizes artificial intelligence to improve the quality of business services. In addition, through this research, it is hoped that the current condition of the use of artificial intelligence to improve services will be known. This study uses a research and development approach. The research stage begins with a preliminary study and user needs, followed by the initial preparation of the application. When the application has been compiled, a validation test will be carried out by an expert who will validate whether the compiled application is feasible. It is hoped that the CRM application software based on facial recognition by utilizing artificial intelligence can be helpful and can be utilized by the business as a whole, or SMEs in particular to improve the quality of customer service, which will directly increase business competitiveness. In addition, through this research, it is hoped that the current condition of the use of artificial intelligence to improve services will be known.

Keywords: artificial intelligence, customer relationship management, facial recognition, marketing, SMEs, service quality

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1. Introduction

The development of small and medium-sized enterprises is the crowning achievement of the Indonesian government. 90% of all businesses in Indonesia are small and medium-sized. Moreover, 60.34 percent of Indonesia's GDP is supported by small and medium-sized enterprises [1]. With the progression of time and technology, it also facilitates the growth of SMEs. In addition to a rise in quantity, the number of types and varieties also increases [2]. The product and service sector are indispensable to the growth of SMEs [3]. Therefore, it is essential to consider the competitiveness of small and medium-sized enterprises that are attempting to expand their operations.

The development of small and medium-sized enterprises (SMEs) is crucial to the economic growth of Indonesia. SMEs' competitiveness can be enhanced by enhancing their business processes from upstream to downstream [4]. For the most part, service lines must be considered in business development [5]. According to a number of researchers and business professionals, the current era of business focuses on service enhancement because products and tangible advantages are easily imitated by competitors, whereas service quality is more difficult to imitate [6]. Therefore, it is essential that businesses pay close attention to the evolution of service quality.

Utilizing a customer database is one method of enhancing the quality of business services [7]. Customer Relationship Management (CRM) is one of the technological applications for enhancing the quality of business services [8]. According to Soltani, businesses that implement CRM will increase customer satisfaction by 80.53 percent [9]. With this application, a business service can be adapted to historical customer data in order to improve the quality-of-service customers receive [10]. It is hoped that the implementation of CRM applications will help businesses become more competitive.

Currently, technological advancements encourage CRM work system optimization, particularly through the use of artificial intelligence technology [11, 12]. According to Shah, businesses that implement artificial intelligence-based services will experience a 79.5% performance increase [13]. The facial recognition process is one application of artificial intelligence. This technology uses the computer's ability to process the subject's biometrics to determine the system's required actions [14]. By combining the benefits of facial recognition technology and a CRM system, the quality of business services can be enhanced [15]. Through this research, it is hoped that businesses as a whole, and SMEs in particular, will be able to improve the quality of customer service, which will directly increase business competitiveness.

2. Methodology

2.1. Study Approach

In accordance with the research's objectives, a research-and-development methodology is employed. Borg and Gall provides a systematic guide to the steps researchers must take to ensure the feasibility of the products they design [13]. In this study, the product in question is an AI-supported facial recognition-based CRM application integration system. The following stages of research will be utilized in this investigation.

1. Preliminary Study and Data Collection Stage

   At this stage, information and preliminary studies from previous research or related disciplines are gathered. Then, conduct an analysis of what must be incorporated into the CRM application.

2. Application Designing and Preparation Stage

   At this stage, the framework is planned, followed by the compilation of an application-based CRM application as the initial product form.

3. Expert Trial Stage

   In this stage, materials, media, and applications are validated beginning with the first trial conducted by experts. Then, enhancements are made based on the input of the experts.

4. Limited Scope Testing Stage

   After the CRM application has been validated by experts in their respective fields, the CRM application is tested with potential CRM application users. However, at this stage there is only a limited scope for determining how experience with CRM applications is accumulated.

2.2. Data and Analytics

In this development, descriptive qualitative data is utilized. The responses of media experts, material experts, and users, namely SME business owners, regarding the resulting application are used to generate qualitative data. Large-scale trials involving a number of carefully chosen SME participants will be able to represent and generate results that can be used in this study. This study took a sample of diverse East Java SME organizations.

This research utilizes descriptive data analysis for its data analysis. The data obtained from the validation results of material experts, media experts, and questionnaires from users, namely MSME business owners, were analysed using descriptive data analysis. This study employs a variety of data analysis techniques to process the collected data, beginning with response data from each expert and limited user trials of this CRM application.

3. Result and Discussion

This research was conducted in accordance with the research design created at the time of the proposal. This research is designed to have multiple phases based on the needs of application preparation and existing problems. Several stages have been completed by researchers in an effort to produce useful research results, as detailed in this progress report. Several stages of research with the title Design and Build a CRM-CAR (Customer Relationship Management - Computer Aided Recognition) System Based on Facial Recognition Using Artificial Intelligence to Improve Service Quality and Business Competitiveness are outlined below.

3.1. Preliminary Study and Data Collection Stage

At this stage, information and preliminary studies from previous research or related disciplines are gathered. Then, conduct an analysis of the CRM-CAR application's required components. After determining which requirements must be met by the application, the research team develops features to meet these requirements. Therefore, it is hoped that users will find the application's features useful.

According to the findings of quantitative research conducted by our team, CRM has an effect on the development of customer satisfaction, loyalty, and the company's competitive advantage. CRM is described in this study in terms of customer empowerment and customer orientation. Customer empowerment includes interaction facilities, CRM technology, and a place for customers to express their opinions, which are accommodated appropriately. While the customer orientation includes customer satisfaction with company personnel, a scale for placing customers as a priority, and the convenience and ease of using the CRM technology, customer convenience and ease of use are also included.

3.2. Application Designing and Preparation Stage

At this stage, framework planning is followed by the compilation of an application-based CRM-CAR application as the product's initial form. After determining the design of the CRM-CAR features, the design is implemented during the development of a CRM-CAR application. These capabilities are packaged as pages with integrated functionality. Here are some pages containing the necessary CRM-CAR features:

3.2.1. Login Page

The login page is the first page the user will see to access all of the application's features. This page is protected by a username and password. This feature's purpose is to restrict application access so that only authorized users can utilize it. This is done to exclude unauthorized users, as this application contains confidential customer information. The following is the design of the CRM-CAR application's login page.

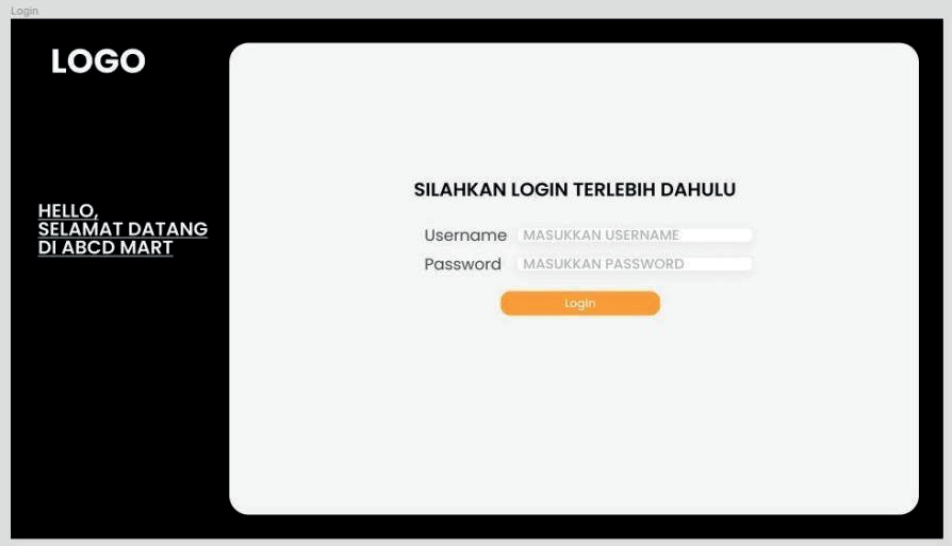

Figure 1: Login Page Interface.

3.2.2. Search and Scan Page

This CRM-CAR application's primary feature access page is the search and scan page. This page combines three functions into a single page, but the three functions replace one another. The three features are search, which searches for customer data based on known identities, scan, which searches for customer data utilizing Facial Recognition technology, and new user, which enters unrecorded customer data. These capabilities

are required to gain access to relevant customer data. The following is the layout of the CRM-CAR application's Search and Scan page.

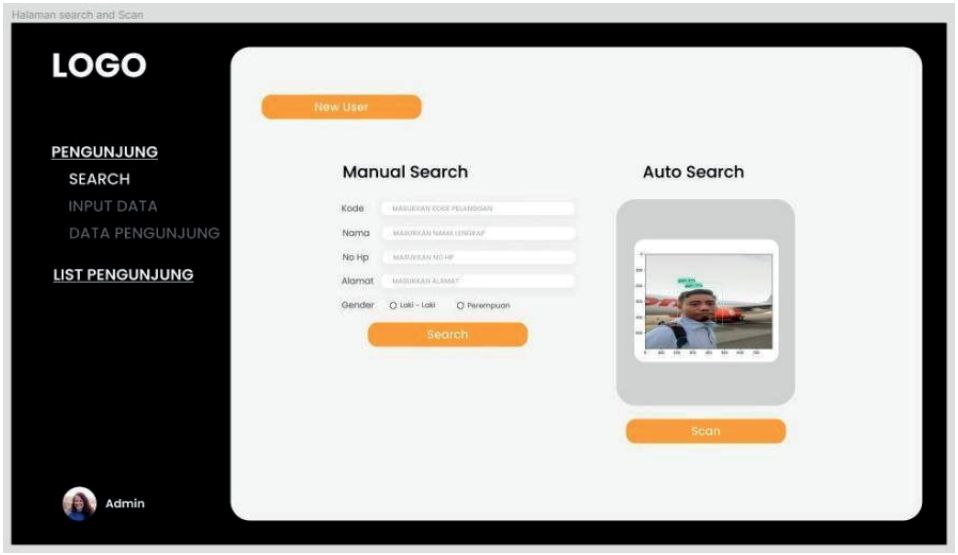

Figure 2: Search and Scan Page Interface.

3.2.3. User Viewer Page

The User Viewer page contains customer information requested on the Search and Scan page. This page contains database-scanning identity information such as personal data, purchase history, and customer photographs. These features are intended for use by users, in this case the sales force, in order to obtain vital customer information. This will enhance the sales force's ability to provide excellent customer service that is more personalized. The following is the layout of the CRM-CAR application's User Viewer page.

3.2.4. User Editing Page

User Editing Page is a page that contains editable customer data. This page has a field for entering customer information and modifying existing customer information. This function is utilized if there is a change in customer information and if the customer is new to the database. This is necessary because accurate identification will facilitate the sales force's ability to provide personalized service to customers. The following is the layout of the CRM-CAR application's User Editing page.

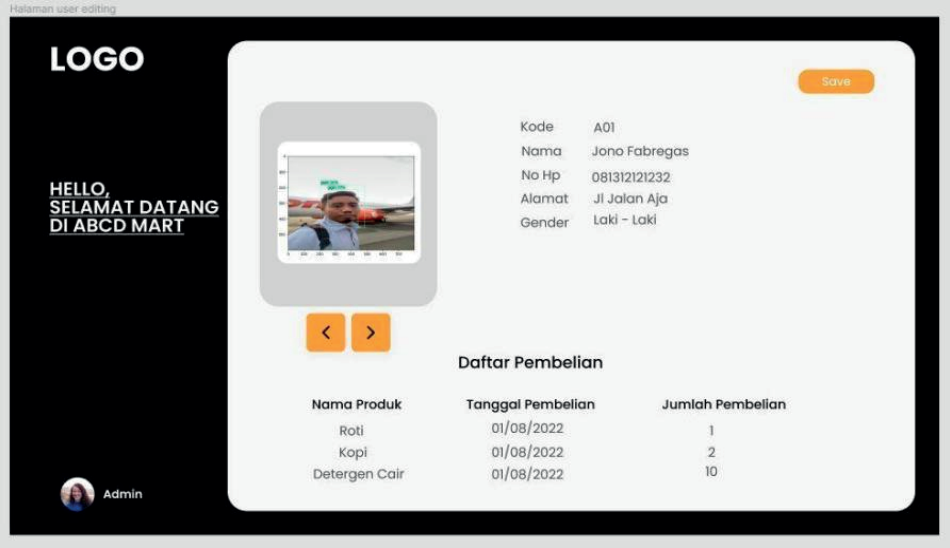

Figure 3: User Viewer Page Interface.

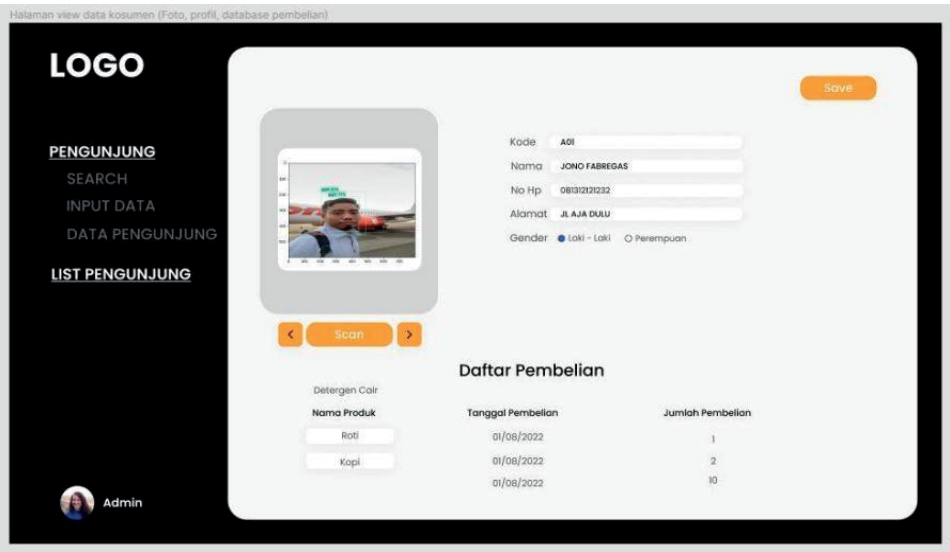

Figure 4: User Editing Page.

3.2.5. Dashboard page

Dashboard page is a page that contains registered visitor information. This function is required to keep the database organized and searchable. This will reduce the number of recognition errors caused by biometric technology. Here is the design of the CRM-CAR application's Dashboard page.

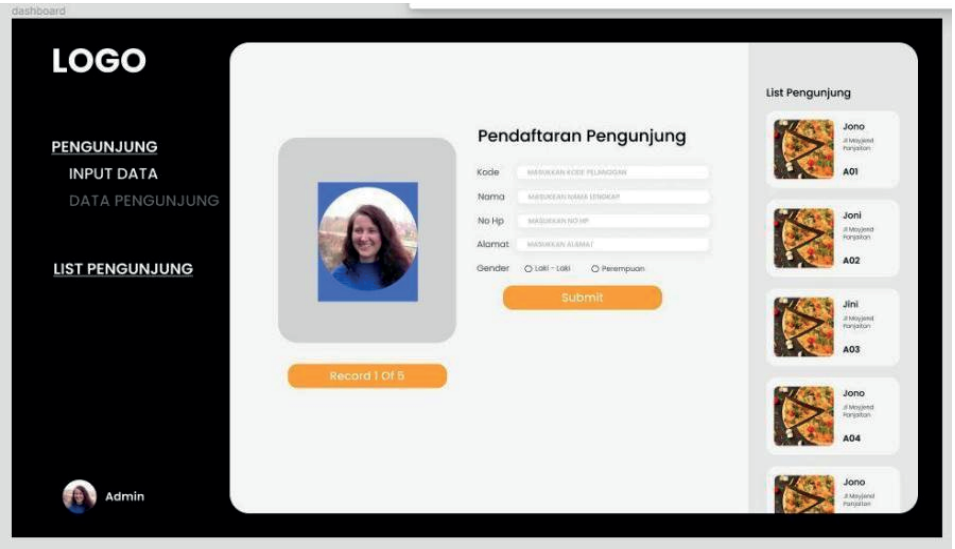

Figure 5: Dashboard Page Interface.

3.3. Expert Trial Stage

The validation of the CRM-CAR application at this stage begins with trials conducted by experts. Then, enhancements are made based on the input of the experts. Here are some expert test results.

TABLE 1: Result of Validity Test by Experts.

Category	Score	Result
Programming	81,5%	Valid
Feature	83,1%	Valid
Interface	79.4%	Valid

Based on three assessment components, namely programming features, features, and the visual appeal of the CRM-CAR application that was designed to improve customer service. Based on the validation results, the experts in this study determined that the compiled CRM application was worthy of testing.

3.4. Limited Scope Testing Stage

In this phase, the CRM-CAR application is validated through trials with a limited number of prospective users. Then, improvements are made based on the feedback of potential users. Here are some limited-scope test results from potential users.

The CRM-CAR application's acceptability is evaluated based on whether the user, in this case the sales force, finds it useful for providing personalized service to customers.

The results of the CRM-CAR application acceptability test to support personalized customer services are summarized in the table below.

Table 2: Result of Application Acceptance by Potential User.

Category	Score	Result
Interface	84.8%	Accepted
Features	88.5%	Accepted
Benefit	85.1%	Accepted

The acceptance of the CRM-CAR application as a tool for providing personalized services to customers has a score greater than 80%, indicating that users, in this case the sales force, view the CRM-CAR application as excellent in terms of appearance, features, and benefits. The application can assist the sales force in carrying out their responsibilities.

4. Conclusion

The following conclusions can be drawn from the findings of this study, which aims to develop a CRM-CAR (Consumer Relationship Management – Computer Aided Recognition) application for use in customer service.

1. The CRM-CAR application can be used to enhance the quality of service provided to customers, thereby increasing a company's competitiveness. This can be accomplished with the assistance of technology in the form of facial recognition to assist sales person in recognizing customers in order to provide more personalized services.
2. Based on the results of expert testing on the compiled application, it can be seen that the experts in this study decided to accept the CRM-CAR apps that was compiled. It can be said that this CRM-CAR application can be used in the business process while servicing the consumers.
3. Based on the results of the limited scope testing performed on the compiled application, the prospective user accepts the CRM-Car apps that have been compiled. It can be said that this application is acceptable and beneficial to their businesses.

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