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Potential Regional Forecasting System for New Students at STIKOM UYELINDO Kupang

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Abstract

Universities in Indonesia, especially in the East Nusa Tenggara region, face great challenges in attracting new prospective students amid increasingly fierce competition. For this reason, effective and innovative marketing strategies are needed to increase attractiveness and strengthen the competitive position of universities. One approach that can be implemented is the utilization of information technology in a digital-based new student admission system. A data-driven approach that relies on historical data analysis has also proven to be very effective in identifying targeted marketing potential. In this context, STIKOM Uyelindo Kupang can utilize data-driven forecasting methods, such as Simple Moving Average and Weighted Moving Average, to project areas with a focus on high schools and vocational schools that have the potential to generate new students at STIKOM Uyelindo Kupang. This method allows the college to focus resources on more potential areas and optimize its promotional activities. This research aims to develop a forecasting system for potential new student areas using the Simple Moving Average and Weighted Moving Average methods, which can provide more accurate information in designing data-based marketing strategies. Thus, it is that STIKOM Uyelindo Kupang can increase the number of new students, strengthen its position in the higher education market, and adapt to technological developments in supporting a more effective and efficient recruitment strategy.

Keywords: *Forecasting, Simple Moving Average Method, Weighted Moving Average Method, STIKOM Uyelindo Kupang.*

1. Introduction

Higher education institutions in Indonesia, particularly in East Nusa Tenggara, face increasing competition in attracting prospective students. This situation demands effective and innovative marketing strategies that enhance institutional appeal and strengthen competitive positioning. Beyond academic quality, the effectiveness of marketing and service delivery significantly influences enrollment decisions. The use of digital-based admission systems improves registration efficiency and accessibility, while supporting continuous alumni tracking via e-community-based tracer studies [1]. This approach expands outreach and provides critical data for targeted recruitment strategies.

Recent studies emphasize the importance of data-driven approaches in student recruitment, as traditional methods relying on intuition and familiar areas often result in inefficient resource allocation. By analyzing historical admissions data, institutions can identify potential marketing opportunities and support strategic decision-making. Business intelligence techniques enable institutions to optimize promotional efforts and better profile prospective students, thereby improving marketing effectiveness and competitiveness [2].

In this digital era, institutions can utilize historical data such as application numbers and applicants' geographic origins to forecast regions with high potential. STIKOM Uyelindo Kupang applies Simple Moving Average (SMA) and Weighted Moving Average (WMA) methods, which analyze trends in historical data. WMA assigns greater weight to recent data, producing more accurate forecasts to guide marketing strategies [3].

This study aims to develop a region-focused forecasting system for high-potential senior high schools (SMA/SMK) using SMA and WMA methods. This system will help STIKOM Uyelindo Kupang formulate more focused, data-driven marketing strategies, increasing competitiveness and strengthening its position as a leading institution in East Nusa Tenggara [4].

Beyond benefiting STIKOM Uyelindo Kupang, this system contributes to the broader development of data-driven marketing methods in higher education. This study aims to inspire other institutions facing similar challenges in enhancing student recruitment through data-based strategies. With this forecasting system, STIKOM Uyelindo Kupang is expected not only to increase student enrollment but also to demonstrate adaptability and responsiveness to technological advancements in recruitment efforts.

2. Methodology

This study employs three complementary methods to develop a forecasting and data-driven marketing system at STIKOM Uyelindo Kupang. The Waterfall method serves as the framework for website development, following a linear and systematic process through stages of requirement gathering, design, implementation, verification, and maintenance. Each stage is completed sequentially without revisiting previous steps, ensuring an orderly and structured development. Data on prospective students is collected through literature reviews, observations, and interviews during the requirement phase. The design stage focuses on system architecture and hardware needs, followed by implementation where the system is built and unit-tested. Verification confirms the system meets requirements, and maintenance provides ongoing support post-deployment.

To support strategic decision-making in student recruitment, this study utilizes Simple Moving Average (SMA) and Weighted Moving Average (WMA) methods for time series data analysis and trend forecasting. SMA calculates the average of data over a specific period to smooth fluctuations and highlight long-term trends, helping to identify promising regions for student recruitment based on historical registration data. WMA builds on SMA by assigning greater weight to more recent data, making predictions more responsive to recent changes and thus improving accuracy in targeting marketing efforts. Together, these methods provide a solid foundation for both quality system development and effective data-driven marketing strategies.

3. Result and Discussion

3.1. Analysis system

The SiPerDaBema system is developed with the primary goal of meeting user needs in forecasting potential schools and regions of origin for prospective new students at STIKOM Uyelindo Kupang. Based on analysis from interviews and observations, the system must be equipped with features that support the public relations staff in identifying and determining schools and regions that have the potential to produce prospective new students. One important feature is the system's ability to accurately process registration data so that the resulting predictions can serve as a basis for decision-making in marketing strategies and targeted approaches to potential schools.Based on these features, system users are expected to have the following capabilities:

a. Public Relations Staff: responsible for managing and analyzing prospective student registration data using the system. Therefore, the public relations staff must be able to operate a computer and understand the workflow and functions of the SiPerDaBema system to ensure that the forecasting process and decision-making run effectively and accurately.

3.2. Design

3.2.1. Use case diagram

This study focuses on the development of a use case diagram involving a single primary actor, namely the Public Relations Staff. The use case diagram aims to illustrate the functions and interactions carried out by the Public Relations Staff within the SiPERDABEMA system. The use case diagram depicts the interaction between the Public Relations Staff as the main actor and the SiPERDABEMA system. Before accessing the system's features, the Public Relations Staff is required to log in. Upon successful login, the Public Relations Staff can manage various important data such as public relations data, district data, school data, and student data. Each data management activity includes adding, editing, and deleting the necessary information.

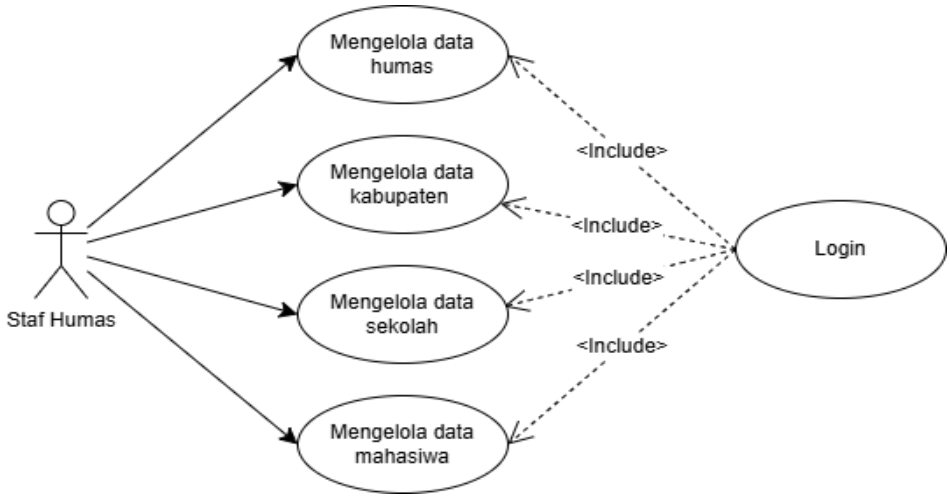

Fig. 1: Public Relations Staff Use Case

3.2.2. Entity relation diagram

Entity Relationship Diagram (ERD) is a visual model used to represent relationships between entities within a database system. It consists of entities (representing objects or tables), attributes (data columns), and relationships (connections between entities), which aid in designing the database structure. The ERD in this study illustrates the relationships among the entities: Student, School, District, and Public Relations Staff. The Student entity contains attributes describing student data and links to the School entity to store information about the student's origin. The School entity is related to the District entity, representing the administrative hierarchy. Additionally, the Student entity connects to the Public Relations Staff, who manages student data for promotional and communication purposes. This diagram reflects a structured system integrating regional administration data with student management.

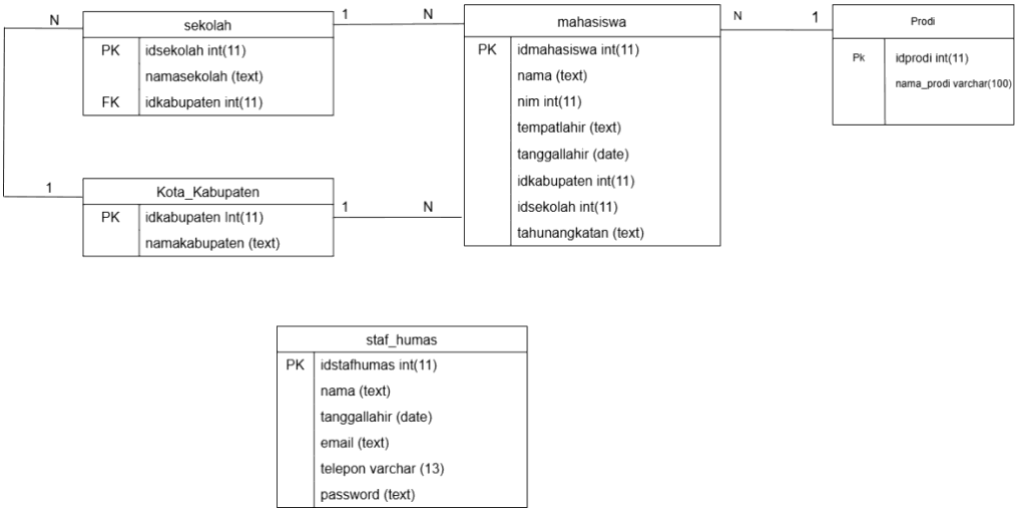

Fig. 2: Entity relation diagram

3.3. System Implementation

The implementation of the system displays the results of the design that has been implemented in a system. This website is focused on assisting in the process of managing and reporting financial data to assist the treasurer in managing and reporting the finances of the Imanuel Lalao church more quickly, precisely, accurately and transparently to the congregation leader, council and congregation.

1. Landing Page Display
   This page is the initial appearance (landing page) of the SiPERDABEMA website which is a New Student Potential Regional Forecasting System at STIKOM Uyelindo Kupang. At the top there is a logo and Login button, followed by a greeting "Welcome too SiPERDABEMA" and the main title that explains the purpose of this system.

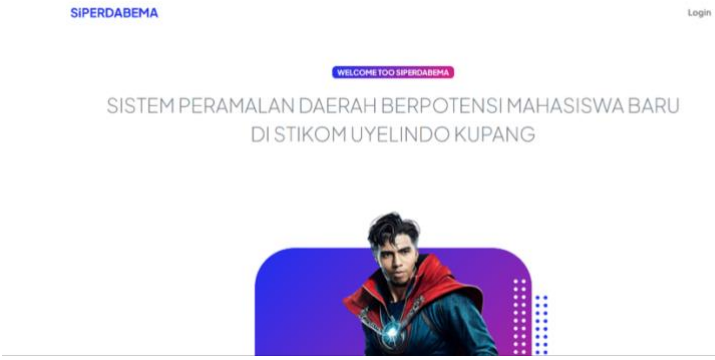

Fig. 3: Landing Page Display

2. Public Relations Staff Login Page View
   This Login page serves as an entrance for Public Relations Staff to access the SiPERDABEMA system. Through this page, staff are asked to enter the email and password that has been registered to carry out the authentication process. If the login is successful, staff will be directed to the main page of the system which allows them to manage data, view forecasting results, and use various other features. This Login mechanism aims to maintain system security and ensure that only authorized users can access important information in the application.

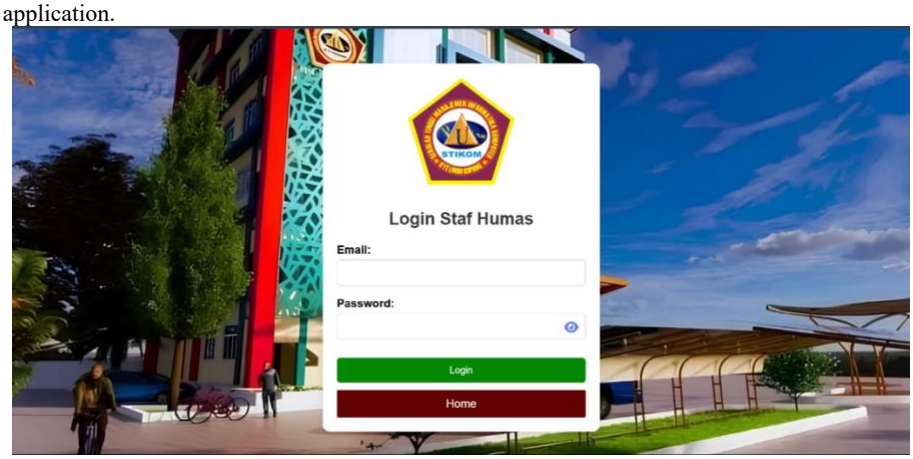

Fig. 4: Public Relations Staff Login Page View

3. Student Data Page View

The Student Data page is used by staff to manage student information, including adding, editing and deleting data. In addition, there is a data import feature through Excel files, which allows staff to input student data in bulk into the system. This feature facilitates the process of inputting large amounts of data without having to add one by one manually. All student data that has been added will be displayed in the student table for easy checking and data management.

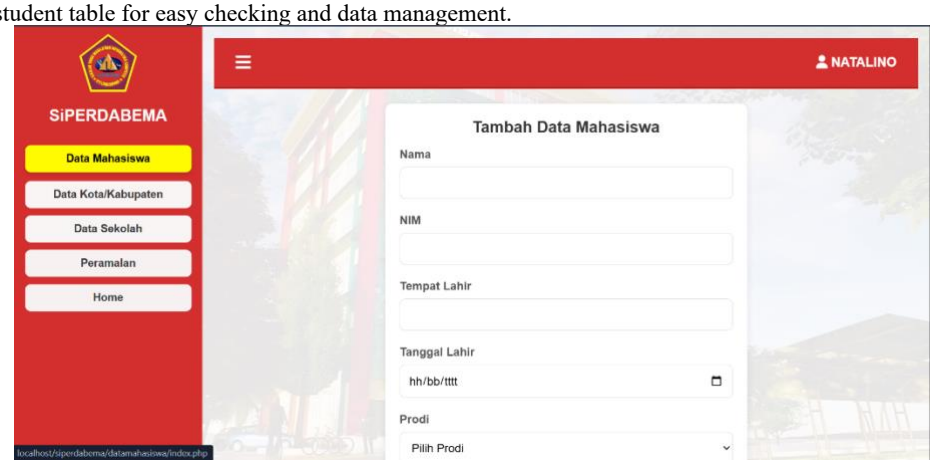

Fig. 5: Student Data Page View

4. City/District Data Page View

The City/District Data page in the SiPERDABEMA system functions to manage a list of cities and districts in the East Nusa Tenggara (NTT) Province. On this page, users can add new city/district data through the input form provided, as well as edit and delete data as needed. All data that has been saved will be automatically displayed in tabular form, making it easier for users to view and manage the available information in a more structured and efficient manner.

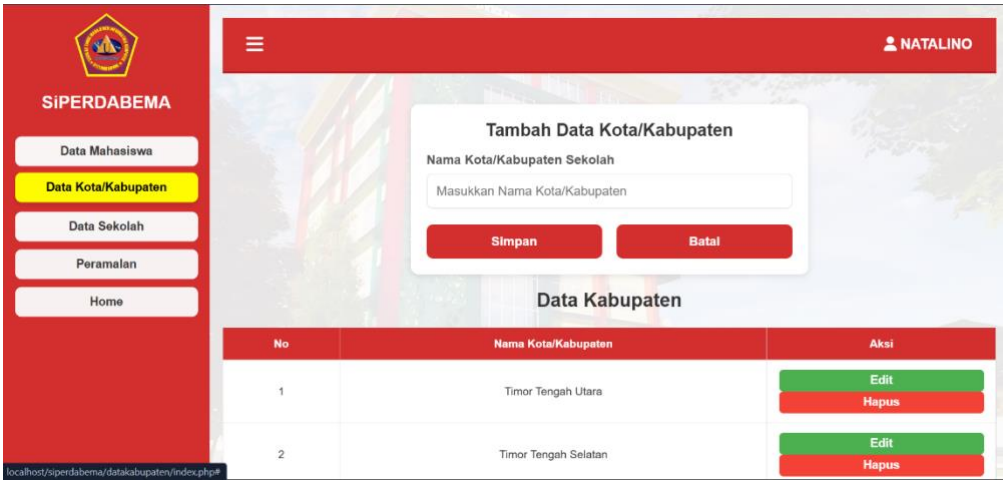

Fig. 6: City/District Data Page View

5. School Page View

The School Data page is used by staff to manage information on the school that students come from. On this page, users can add a new school by filling in the school name and selecting the city/district of origin. In addition, there is a feature to edit and delete school data that has been stored. All data that has been entered will be displayed in the school table, which is also equipped with a search feature to make it easier to find data based on the school name.

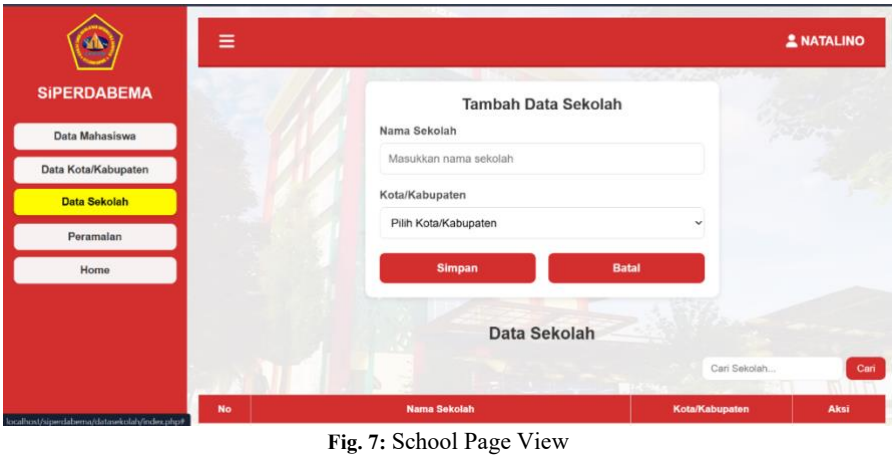

Fig. 7: School Page View

6. Forecasting Page View
   The Forecasting page is the main feature in the SiPERDABEMA system that is used to forecast the regions and high school/vocational school origins that have the potential to contribute new students at STIKOM Uyelindo Kupang. The forecasting process uses two data analysis methods, namely Simple Moving Average and Weighted Moving Average, based on historical data of new student admissions. The calculation results of both methods are displayed in the form of bar graphs to facilitate visual comparison between the two. There are three main graphs on this page, namely the Top graph which displays the regions/schools with the highest potential, the Middle graph for the middle category, and the Bottom graph which shows the lowest potential. Each graph is accompanied by a conclusion that helps users understand the results of the analysis in a concise and comprehensive manner.

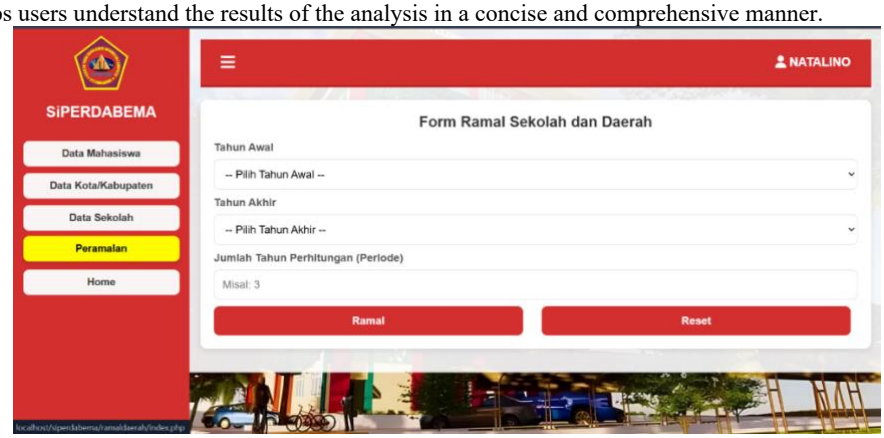

Fig. 8: Forecasting Page View

4. Conclusion

The SiPERDABEMA system is designed to assist the public relations staff at STIKOM Uyelindo Kupang in analyzing prospective students' school origins using historical registration data. The system features a simple and responsive user-centered interface, and black box testing confirms its reliable functionality. Forecasting using Simple Moving Average (SMA) and Weighted Moving Average (WMA) methods shows that SMA provides more stable results, while WMA is more sensitive to recent data changes. Predictions for 2024 indicate a general decline in student numbers compared to 2023, with variations across different schools and regions. Overall, SiPERDABEMA offers an effective tool to support strategic planning and decision-making in student recruitment.

Acknowledgement

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