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Implementation of a Web Based influencer Recommendation System Using Content Filtering and Agile Development: A Case study at Ralya Management

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ABSTRACT

The development of digital marketing has led companies to increasingly rely on influencers as an effective promotional medium. However, selecting the right influencer remains a challenge because the process is often conducted manually and only considers basic attributes such as the number of followers and popularity level, this study focuses on developing a web-based influencer recommendation system that can provide more relevant and faster recommendations. The research was conducted on Ralya Management, an agency managing influencers in Indonesian that requires a system capable of improving the efficiency of influencer selection for various marketing campaigns. To achieve its objectives, this study adopts two main approaches. First, the Content-Based Filtering method is applied to match influencer content characteristics including category, keywords, engagement rate, and domicile with user preferences, resulting in more targeted recommendations. System testing was conducted using Black-Box Testing and user questionnaires. The testing results showed that all system functionalities operated successfully with a 100% success rate in Black-Box Testing. Based on user questionnaire evaluation using the Likert scale, the system achieved a satisfaction score of 88%, indicating that the recommendation system is effective and user-friendly. Second, the system development process utilizes the Agile Development method with the Scrum framework, enabling iterative, flexible, and adaptive development in response to influencer data updates. The results show that the system is capable of producing more accurate influencer recommendations compared to the previous manual method. Additionally. Overall, this system contributes significantly to enhancing the effectiveness of influencer marketing strategies, particularly for Ralya Management as the research subject. Overall, this system contributes significantly to enhancing the effectiveness of influencer marketing strategies, particularly for Ralya Management as the research subject.

I. Introduction

The development of digital technology has driven a significant transformation in marketing strategies, particularly through social media. Digital marketing is now one of the primary approaches used by companies to reach consumers more widely and efficiently. Based on data released in January 2023, the number of social media users in Indonesia reached 167 million people, or approximately 78% of the total internet user population [1]. This increased social media penetration presents a significant opportunity for businesses to optimize their digital marketing strategies. One of the strategies that is widely adopted by companies is influencer marketing, namely the use of individuals who have great influence on social media to promote products or services [2]. This strategy has proven effective in increasing brand awareness and reach a more specific and loyal

audience [3]. However, implementing this strategy is not without challenges, particularly in the process of selecting the right influencer. The influencer selection process is often time-consuming and suboptimal because it is based solely on limited attributes, such as follower count and popularity [4]. Furthermore, the rapid development of social media requires regular updating of influencer data. This requires a responsive, adaptive system capable of handling continuous data updates [5]. To address these issues, several studies have developed web-based influencer recommendation systems using various algorithmic approaches [6]. One relevant method is *Content-Based Filtering*, an approach that recommends influencers based on the match between their content and user preferences [7]. While this method is quite effective, there are still challenges in integrating a system that can adapt to continuously changing data [8]. To address this challenge, the *Agile Development* Agile was chosen as the framework for the system development process. Agile allows for an iterative and flexible system development process, and is able to adapt to the need for periodic data updates, including weekly updates of influencer data [9]. This approach aligns with the practical needs faced by *Ralya Management*, which requires a system with the ability to accommodate continuous data additions throughout the *lifecycle sprint* [10]. Based on this description, this study aims to develop a web-based influencer recommendation system by combining the methods *Content-Based Filtering* and development framework *Agile* The combination of these two approaches is expected to produce a system that is not only accurate in providing recommendations based on user preferences but also responsive and adaptive to the ever-changing dynamics of influencer data.

II. Method

A. Data Collection Methods

The data used in this study comes from:

a. Primary data: results of interviews and discussions with the Ralya Management team as system users.
b. Secondary data: influencer datasets from social media, as well as literature and journals related to recommendation systems.

B. *System Development Method (Agile)*

The system development method used in this research is *Agile Development Method* with the approach Scrum Framework the *Agile method* was chosen because it is iterative, adaptable to changing user needs, and capable of delivering results incrementally so that the developed system can be immediately tested and evaluated. Agile also facilitates collaboration between researchers (*developer*) and *Ralya Management* as the main user The system development in this research uses the *Agile method* with the Scrum Framework approach.

a. Product Backlog
   This stage aims to identify and design the entire system requirements desired by Ralya Management. Activities include:
   1. Conduct interviews with Ralya Management to understand the business process of searching and selecting influencers.
   2. Compile a list of the system's main features, including:
      a) Login User
      b) Influencer data management (profile, category, engagement rate).
      c) Content-Based Filtering recommendation system.
      d) Influencer search based on filters (category, location, number of followers).
      e) Admin dashboard for data management.
      f) Search results and recommendation reports.
   3. Analyze non-functional requirements, such as data security, system performance, and display responsiveness.

b. Sprint Planning
The requirements compiled in the Product Backlog stage are then broken down into Sprint Backlogs to be worked on over a specific period (for example, two weeks per sprint). Priority is given to the most important and urgent features, as follows:
1. Sprint 1: User interface (UI/UX) and database design.
2. Sprint 2: Implementation of influencer data management module.
3. Sprint 3: Implementation of the Content-Based Filtering algorithm.
4. Sprint 4: System integration, testing, and feature refinement.

c. Sprint (Development Iteration)
Each sprint includes the following processes:
1. System Design
2. Coding
3. Implementation of Content-Based Filtering Algorithm
4. Internal Testing

d. Daily Scrum
Although this research was conducted by a small team, the principles of the Daily Scrum were still applied in the form of daily journaling containing work progress, obstacles encountered, and future work plans.

e. Sprint Review
After each sprint, a review is conducted with Ralya Management to assess the interim results. The feedback provided is used to make improvements for the next sprint.

f. Sprint Retrospective
This stage aims to evaluate the overall development process, note what went well, and identify obstacles that need to be addressed in the next sprint.

g. Deployment and Final Testing
After all sprints are completed, the following steps are performed:
1. The system is deployed on the server.
2. Testing is carried out using the Black-Box Testing method to ensure all functions are running as required.
3. User Acceptance Testing (UAT) is carried out with Ralya Management to ensure the system is acceptable and usable as intended.

III. The Proposed Method/Algorithm

A. *Proposed System*

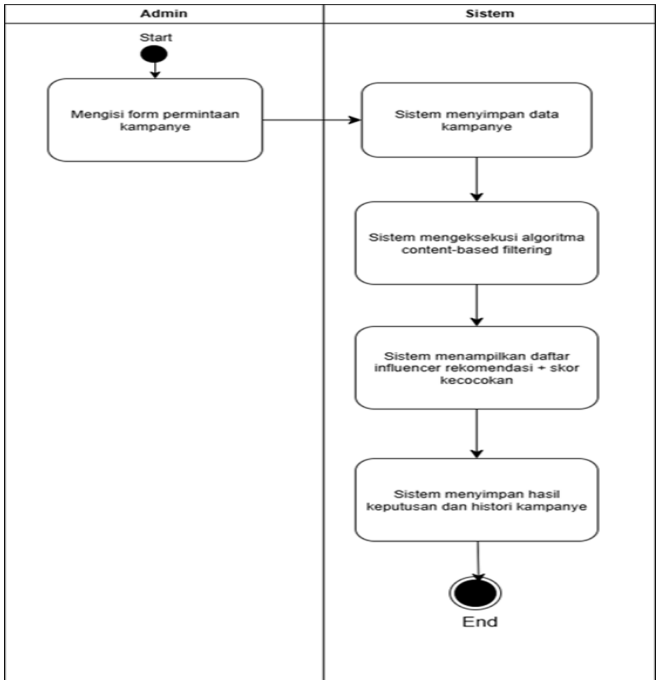

Fig 1. proposed System

In Figure 1, the proposed system is designed to replace the manual system currently running at Ralya Management, with the aim of increasing the efficiency of the selection process. Influencer, speeding up response times, and improving the accuracy of recommendations based on content relevance. This system was developed as a web-based application that can be used by admins and users to obtain recommendations. influencer that are relevant to their preferences.

B. *Use Case Diagram*

Fig 2. *Use case diagram*

Diagram use case Figure 2 visualizes the main functionality of the Influencer Recommendation System to be implemented. This diagram identifies the actors who interact with the system and use case(functions) that they can perform. Actor: a. Client: Represents external users of the system who have a need to search for and obtain recommendations influencer. Client actors can come from companies, brand, or individuals who need services influencer. b. Admin: Represents the internal users of the Ralya Management system who are fully responsible for managing the system's core data, overseeing the recommendation process, and managing user accounts

C. *Entity Relationship Diagram (ERD)*

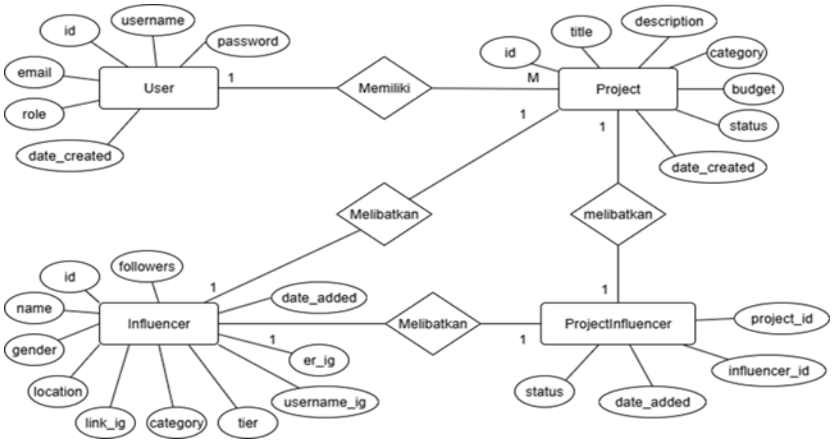

Fig 3. ERD

Figure 3 shows the Entity Relationship Diagram (ERD) design for a website-based influencer recommendation system. This ERD consists of four main entities: User, Project, Influencer, and Project Influencer, which are interconnected through specific relationships.

IV. Results and Discussion

A. *Home Website*

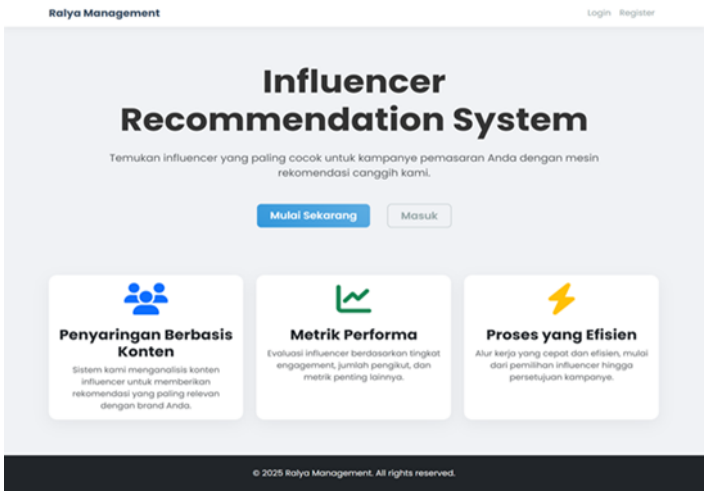

Fig 4. Home Website

Figure 4 shows the main page of the Influencer Recommendation System. This page welcomes users and provides buttons to "Start Now" or "Login." Below, three key features are explained: how the system filters influencers based on content, how they evaluate their performance, and how it streamlines the workflow.

B. *Login*

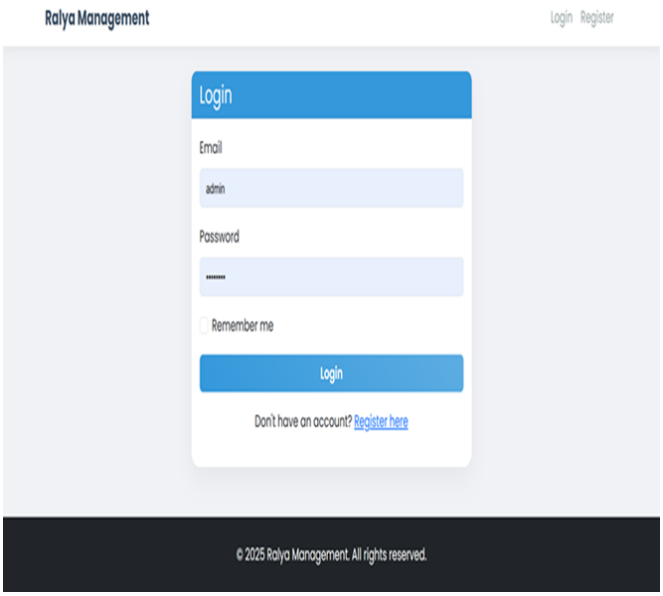

Figure 5 Login

Figure 5 This is the page for logging into the account. Users can enter-mail and password, then press the Login button. There's also an option to remember your account and a link to register if you don't already have one.

C. *Influencer admin Management*

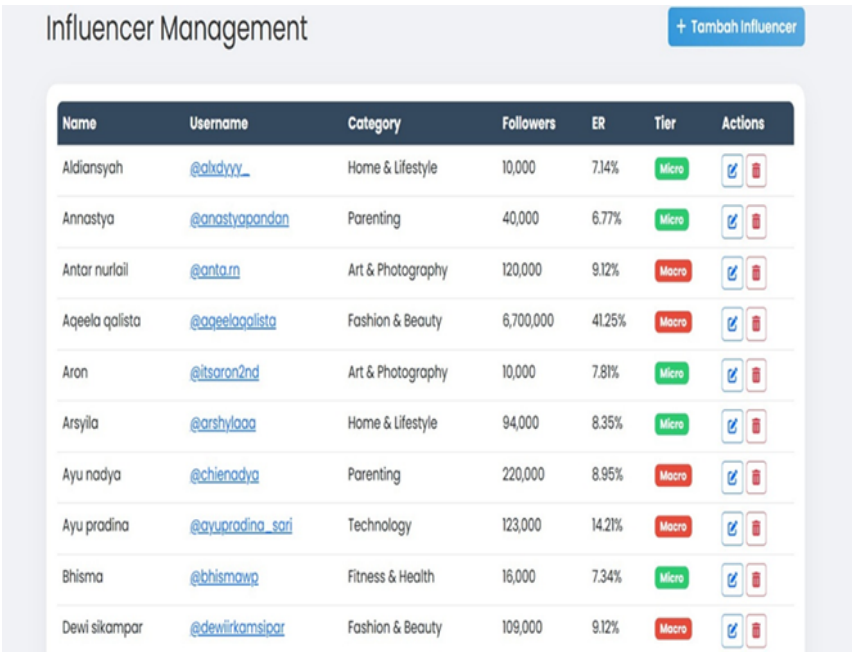

Fig 6. Influencer admin Management

Figure 6 shows the influencer data management page. A table displays all influencer data, such as name, category, number of followers, and more. Admins can edit or delete influencer data here, or click the Add Influencer button to enter new data.

D. *Management Approve Project*

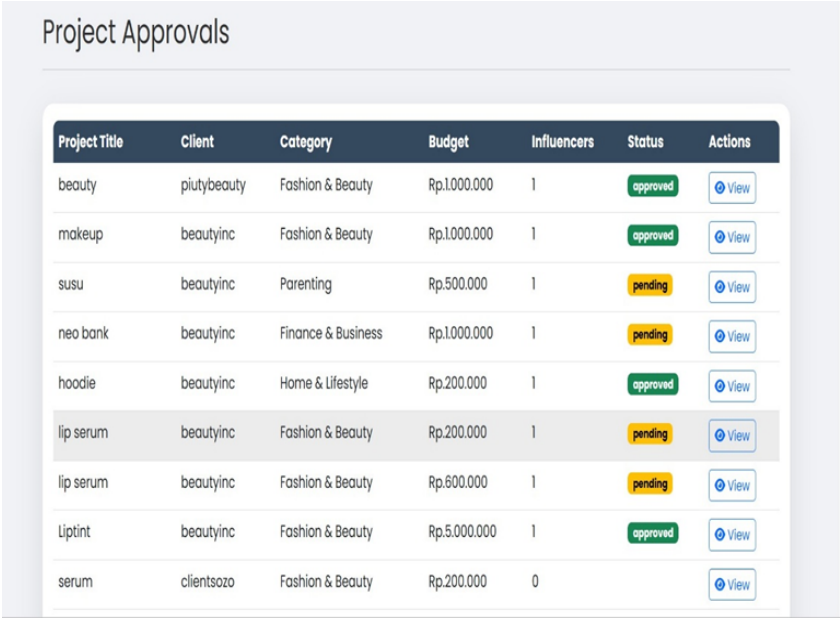

Fig 7. Management Approve project

Figure 7 shows the admin's page for managing all projects in the system. Projects are displayed in a table, complete with title, client, and status, such as 'approved' or 'pending'.

E. *Project User*

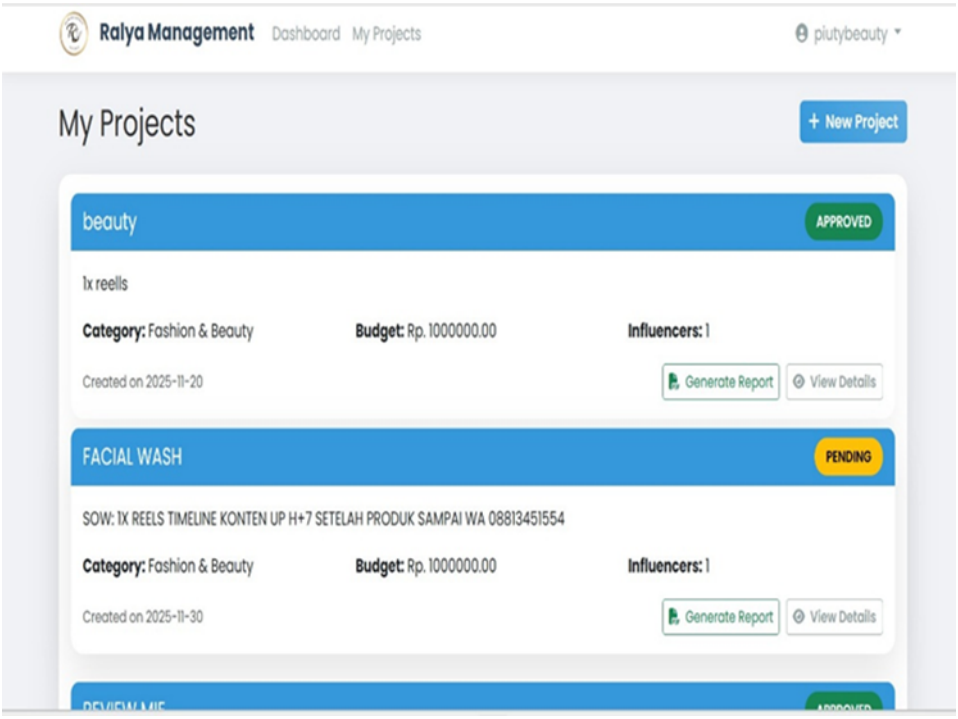

Fig 8. Project User

Figure 8 shows a page displaying all of a user's projects. Each project is displayed as a card, indicating its status (such as 'approved', 'pending', or 'draft') and buttons to view details or create a report.

F. *Influencer Recommendation*

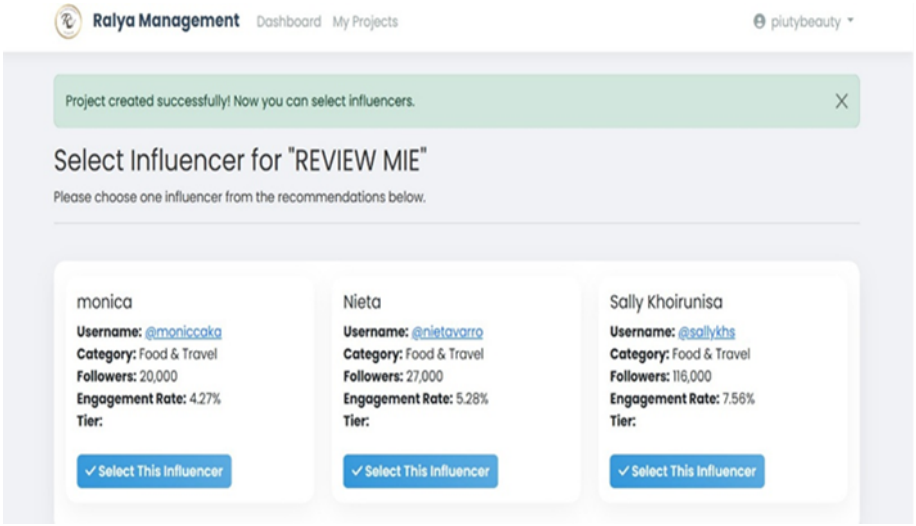

Fig 9. Influencer Recommendation

Figure 9 shows the page for selecting recommended influencers for a project. The system displays several influencer options, and users can view brief details about them. Users can select the most suitable influencer by clicking the Select This Influencer button.

V. Conclusion

Based on the results of research, analysis, design, implementation, and testing that have been carried out, the following conclusions can be drawn:

a. This study successfully implemented a website-based influencer recommendation system using the Content-Based Filtering method, which is able to increase the relevance of influencer recommendations based on the content's suitability to user preferences. This answers the first research question regarding the effectiveness of the Content-Based Filtering method in increasing recommendation relevance.

b. The application of Agile Development methods (Scrum Framework) to the system development process has proven effective in supporting regular influencer data updates. With weekly sprints, the system can adapt to data changes, thus addressing the issue in the second problem formulation regarding data update efficiency.

c. The developed system provides practical benefits for Ralya Management in accelerating the influencer selection process for marketing campaigns, as well as providing theoretical contributions in the application of Content-Based Filtering and Agile Development methods in the development of recommendation systems.

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