

# Digital Signage Application System at STMIK Kaputama

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## Abstract

This research focuses on the development of a Digital Signage Application System as a modern solution for delivering academic information at STMIK Kaputama. The inputs of this research include announcement data, class schedules, guidance schedules, activity photos, and campus profiles. The process is carried out through stages of needs analysis, system design using the System Development Life Cycle (SDLC) waterfall model, web-based implementation using the CodeIgniter PHP framework and MySQL database, and integration with Android Set Top Box (STB) devices as display media to LED monitors. The output produced is a Digital Signage system capable of displaying campus information dynamically, in real-time, and easily managed through an admin interface.

**Keywords:** *Digital Signage, Information Systems, Android STB, CodeIgniter, Web.*

## 1. Background

In the current era of industrial revolution 4.0, technology has become an inseparable part of human life. The rapid development of technology, especially in the fields of the internet and digitization, has eliminated the boundaries of space and time, giving a significant impact in various fields of life (Lila Setiyani et al., 2020).

The advancement of information and communication technology has also impacted the world of education. One of the applications of modern technology in an academic environment is the use of digital information boards or Digital Signage. Digital Signage is an electronic medium used to convey information visually through digital screens. This medium is becoming increasingly popular as it can present information dynamically, attractively, and easily accessible to many people.

In the digital era, bulletin boards have migrated from conventional forms to digital forms, thus giving rise to the term Digital Signage. The implementation of Digital Signage often utilizes hardware such as computers connected to one or more Plasma TV screens. One of the widely used supporting technologies for web-based Digital Signage implementation is the Android Set Top Box (STB). This medium has many advantages over conventional bulletin boards, such as the flexibility of updating content in real-time without additional printing costs (Nugroho et al., 2021).

As a higher education institution focused on technology development, STMIK Kaputama has great potential to implement a digital information board application system. By utilizing Digital Signage, information can be delivered in a more interactive, engaging, and efficient manner. Additionally, this system can support the campus in building a modern image that aligns with technological advancements.

## 2. Literatur Review

### 2.1. Web Application

Web-based applications are applications developed using programming languages such as HTML, PHP, CSS, and JS that require a web server and a browser to run, such as Chrome, Firefox, or Opera, Internet Explorer, Microsoft Edge, and others. These applications can operate on networks or the internet (LAN networks). Centralized data and ease of access are the main features that make web applications more popular and easier to implement in various fields of life (Novria Rahma et al., 2022).

In terminology, a website is a collection of web pages, which are usually summarized in a domain or subdomain, located within the World Wide Web (WWW) on the internet. A web page is a document written in HTML (Hyper Text Markup Language) format, which is almost always accessible via HTTP, the protocol that conveys information from the website server to be displayed to users through a web browser.

### 2.2. Information Board

Information boards are media of information that are usually created with a broader target. Information boards, commonly referred to as announcement boards, are information media/groups aimed at specific groups (Ulfa et al., 2023).

### 2.3. Digital Signage

Digital signage is a display of television program information, menus, information, advertisements, and other messages. Digital signs (such as LCD, LED, plasma displays, or projected images) can be found in public and private environments, such as retail stores, hotels, restaurants, and corporate buildings (Fachrurrazi & Hizli, 2021). Digital signage displays are usually controlled by personal computers or servers with the help of proprietary software. This serves to avoid large capital expenditures on controller equipment. The market sees digital signage as more profitable compared to static signage because with digital signage, content that frequently updates information digitally can be refreshed, thus saving printing costs.

## 3. Design And Analysis

### 3.1. Research Methodology

1. Interview An interview is a data collection technique carried out through face-to-face interactions and direct question-and-answer sessions between the data collector and the source to obtain information related to the research to be conducted. In this research, interviews were conducted with the Head of Department and Staff.
2. Literature Study A literature study is one of the data collection methods by reading books and journals according to the required data. In this research, the author collected references from books related to Digital Signage and journals that are similar in the development of this system.

### 3.2. Analysis of the System in Operation

The analysis of the current system is defined as the breakdown of a system to identify and evaluate the problems that occur. The current system is:

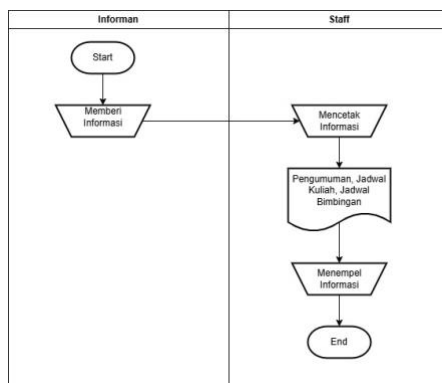


Fig.1: Flowmap of the System in Operation

### 3.3. Proposed System Flowmap

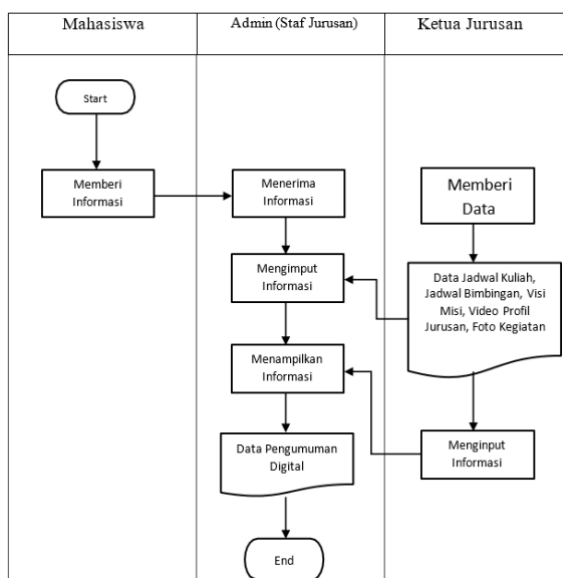


Fig. 2: Flowmap of the Proposed System

### 3.4. System Block Diagram

This system runs on hosting, allowing access and management of the displayed information anytime and anywhere. With this design, Digital Signage is expected to deliver information more quickly, efficiently, and attractively for students and academic staff at STMIK Kaputama.

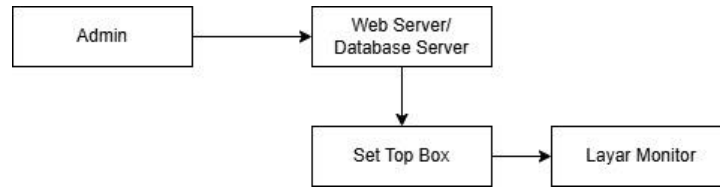


Fig. 3: Block Diagram of the System

### 3.5. Flowchart

A flowchart is a diagram that logically depicts the workflow within a Digital Signage system. The flowchart is used as a communication tool to understand the processes within the system and as documentation in software development. Below is the flowchart of the Digital Information Board Application (Digital Signage) system at STMIK Kaputama:

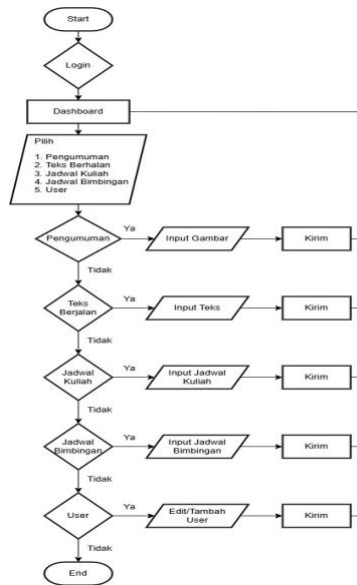


Fig. 4: Flowchart of the Digital Signage System

### 3.6. Data Flow Diagram (DFD)

Data Flow Diagram (DFD) is a modeling tool that allows systems professionals to describe a system as a network of functional processes interconnected by data flows, both manually and computerized. This DFD is often referred to as a Bubble Chart, Bubble Diagram, workflow diagram, or function model. DFD is one of the most commonly used modeling tools, especially when the functions of the system are more important and complex than the data manipulated by the system. In other words, a DFD is a modeling tool that emphasizes only the functions of the system. This DFD is a design tool focused on data flow with the concept of decomposition that can be used for both analysis and system design that can be easily communicated by systems professionals to users and programmers.

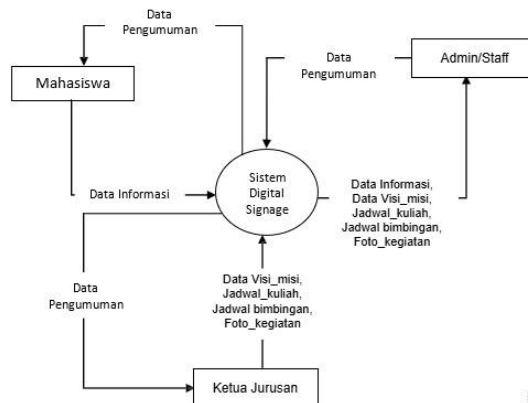


Fig. 5: Context Diagram

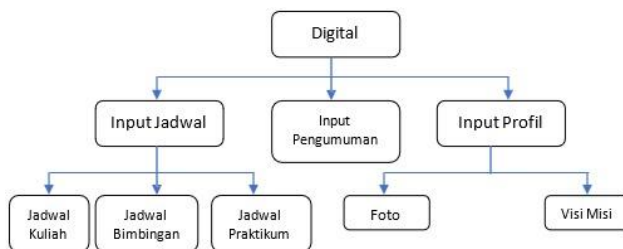


Fig.6: Hierarchical Diagram

### 3.7. Use Case Diagram

The use case diagram describes the interactions of actors within the application system. The use case diagram for this application consists of Admin/Program Head and Students/Viewers.

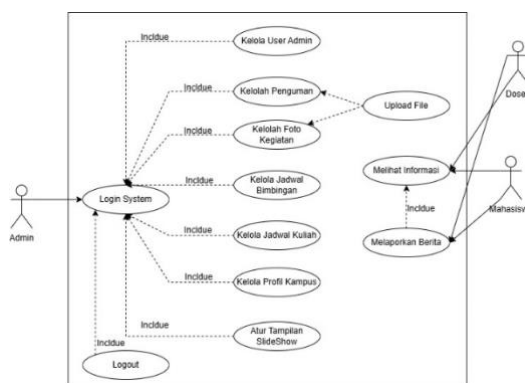


Fig.7: Use Case Diagram

## 4. System Implementation

At this stage, the implementation of the system that has been designed and developed using web-based technology is explained, to be applied as a Digital Signage Application System in the STMIK Kaputama environment. This implementation includes the development environment, the devices used, the system menu structure, and the user interface display of each feature.

### 4.1 Login Page

This page is the starting gateway of the system used to authenticate users. Only admins who have a username and password can log into the system. After successfully logging in, the admin will be directed to the main dashboard to manage the information that will be displayed on the digital signage.

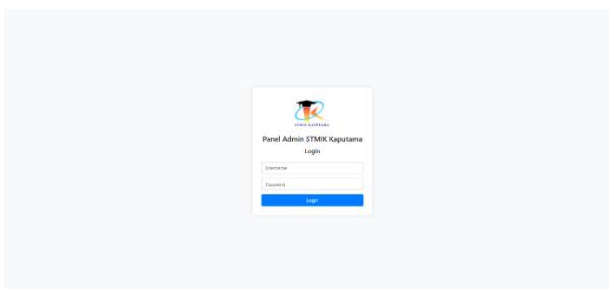


Fig.8: Login Page

### 4.2 Admin Dashboard Page

- a) The dashboard page presents a summary of the data that has been entered into the system. There are four main information boxes, namely:
  - a. Total Announcements: Displays the number of image-based announcements.
  - b. Total Schedule: The total number of lecture schedule data that has been input.
  - c. Total Activity Photos: The number of campus activity photos that will be displayed on the screen.
  - d. Total Users: Displays the number of system users (admin).

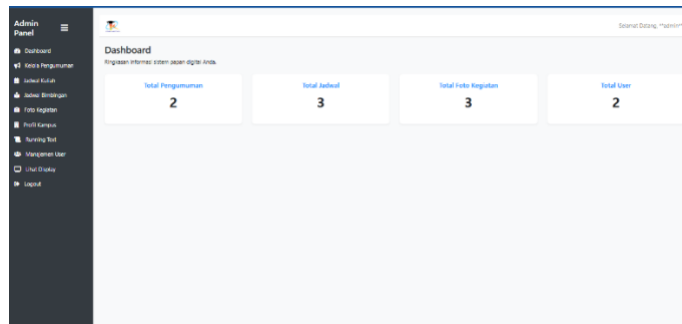


Fig.9 : Admin Dashboard Page

### 4.3 Announcement Input Page

This menu is used to upload announcement images, such as competition information, seminars, or important circular letters. The admin only needs to select an image file from the device, and the system will save it to the database and display it on the digital screen in rotation every 5 seconds.

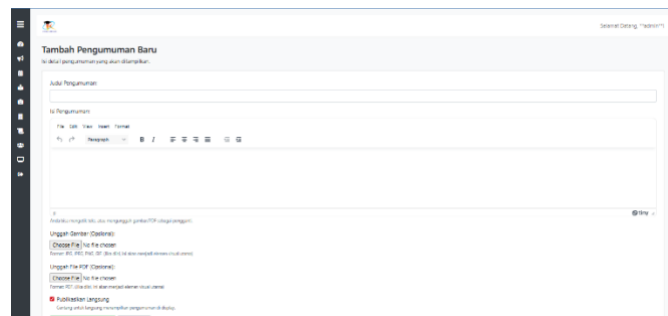


Fig.10: Announcement Page Input Image

### 4.4 Course Schedule Input Page

This menu is used to input the data of class schedules which consists of subjects, lecturers, days, and lesson times. This data will be displayed in a tabular format on the digital display to provide real-time information to students.

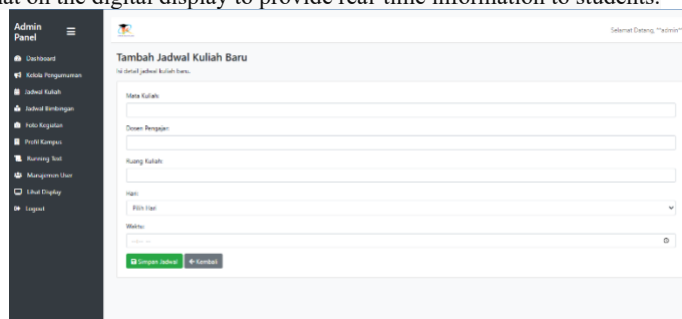


Fig.11: Course Schedule Input Page

### 4.5 Guidance Schedule Input Page

It serves to add the schedule of academic guidance from lecturers. This information is important to be displayed visually so that students know the time for academic consultations.

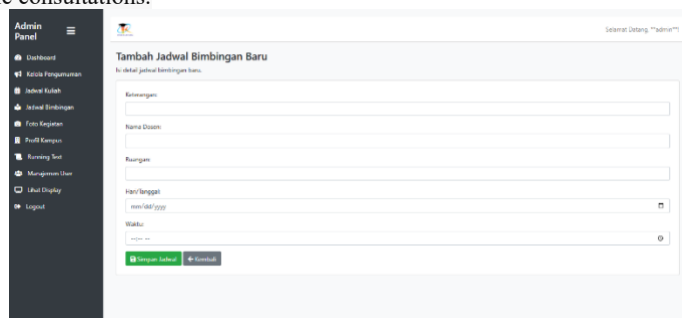


Fig.12 : Guidance Schedule Input Page

### 4.6 Running Text Input Page

Used to create a scrolling message (marquee) at the bottom of the display. This text can be in the form of greetings, general announcements, or brief information that you want to display in a moving format to make it more eye-catching and informative.

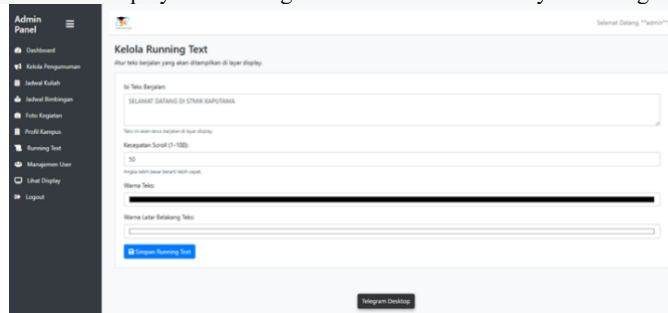


Fig.13 : Running Text Input Page

#### 4.7 User Management Page

The admin can add or edit user accounts for the system (single sign-on). This feature is used to maintain security and ensure that only authorized individuals can manage information.

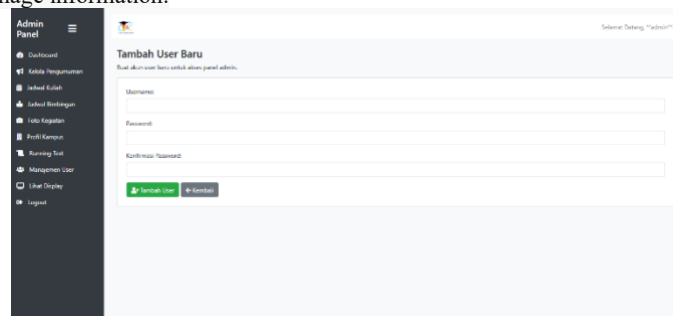


Fig. 14 : User Management Page

### 5. Conclusion

Based on the research and development results conducted on the Digital Signage Application System at STMIK Kaputama, several conclusions can be drawn as follows:

1. The digital bulletin board application system has been successfully designed to display academic information and campus announcements dynamically and in real-time, including lecture schedules, tutoring schedules, announcements, campus news, scrolling text, and photos of activities. The display is made attractive with automatic slide transitions, making information easy to access and read.
2. The system is equipped with a user-friendly web interface and a special login feature for the admin and department heads, allowing for easy, quick, and secure content management without requiring high technical skills.
3. The implementation of the Android STB as the main device has proven effective in displaying Digital Signage content on campus monitor screens. This integration allows content updates to be made anytime without needs to be re-entered by the admin.

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