

Creating Running Text as a Digital Information Board Based on an Android Application Using the HD-WF2 Controller

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ABSTRACT

Running text is a form of digital media that can display moving text and animations. Until now, many users still update and change text data manually using USB connections, flash drives, and computer keyboards. This means they must interact directly with the running text. This research aims to create a running text that utilizes wireless technology and Android phones using applications connected via a Wi-Fi network. By utilizing an Android application and a Wi-Fi-based HD-WF2 microcontroller as an operational control on the running text, the test results show that the created moving text can be an alternative solution to facilitate the delivery of information and can function at a distance of 20 meters without obstacles and 10 meters with obstacles.



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INTRODUCTION

Running text is a type of electronic media that can display moving text and animation effects, usually using LED lights. The LED lights used can have various colors, some of which are only one color, such as red, green, yellow, blue, and white, or they can also have a combination of several colors.[1]

For this reason, many people choose running text as a tool for displaying media information. In addition to its attractive appearance, running text also attracts the attention of people around it who see it. As we know, the human eye is very attracted to things that are bright, colorful, striking, and different from the surrounding environment.

Nowadays, many information providers rely on technology, one of which is running text or moving text. This tool is an attractive and flexible way to convey information because its position can be adjusted as desired. Running text is also a medium used to display text that moves either horizontally (from left to right) or vertically (from top to bottom) on the screen.[2] Typically, running text is used to display messages, announcements, and other important information that is shown repeatedly. Therefore, in today's modern era, information conveyed in the form of running text is very important for various purposes and can create an attractive impression in the eyes of the public.

Even today, many people still send and change running text data manually, using USB cables, flash drives, and computer keyboards[3]. This means they have to interact directly with the running text. Therefore, it is important to develop technology for running text, such as the use of wireless technology and Android smartphones connected via wireless. [4] Microcontrollers function as program control tools. Thus, to send and change text data on running text, we only need to type on an Android smartphone, which is certainly very convenient for users. [5]

P10 LED Panel

The P10 panel is a matrix-type LED screen with a pixel pitch (distance between LED lights) of approximately 10 mm.[5] This means that the screen displays images or text with a fairly large distance between LED points, making it an inexpensive and suitable choice for outdoor use where the viewing distance is not too close. This screen is commonly used for roadside videotrons, events, or digital billboards. Key characteristics: 10 mm pixel pitch: The number "10" in P10 indicates how far apart the centers of each LED light (pixel) are from each other in millimeters. Each pixel consists of red, green, and blue LED lights that can be mixed to create various colors. [6]Often referred to as outdoor LED screens because their lower pixel density makes them more comfortable to view from a distance and allows them to withstand different weather conditions. Uses technology such as SMD LED to provide a better display with more uniform colors. Designed to withstand the weather, especially for outdoor use.[7]

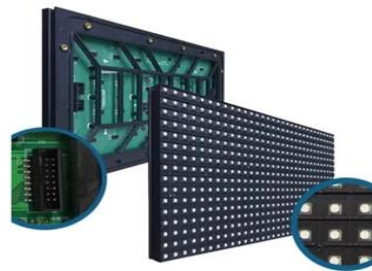


Figure 1. RGB Panel

The HD-WF2

The HD-WF2 Controller is a control card for full-color (RGB) LED displays that can be connected via Wi-Fi. (Bachter Simbolon et al. 2024) Its function is to control and display content such as text. Main Functions and Features of the HD-WF2 Controller Connectivity: Can perform software updates via Wi-Fi and also using a flash drive. Has 2 HUB75E ports for connecting display modules. Supported Content: Can display various types of content, such as: Text and word animations, and images.[8]



Figure 2. Microcontroller

Power Supply

A power supply is an electronic device that converts AC current from a power source into stable DC current, so that it can provide power to various parts of other electronic devices. [7] Main function: Converts AC electricity from a power outlet into DC electricity needed by internal components such as the motherboard, hard drive, and others.



Figure 3. Power Supply

IDC Data Cable

A 16-pin IDC data cable is a type of cable used to connect several devices at once in a single line. Typically, this cable is flat and often used for running text or videotrons. Its main purpose is to facilitate the transmission of data and signals between various components such as LED modules and microcontrollers.[6]



Figure 4. Kabel IDC

Frame Aluminium 5515

The 5515 aluminum frame is a type of aluminum frame commonly used to make running text or digital prayer schedules. The number "5515" likely refers to the profile size or specific specifications of the frame, which is available in various forms such as frame corners, casings, or bars for assembly. This frame functions as a structure to hold components such as LED modules, controllers, and other components in a running text panel or digital prayer schedule. Although the number 5515 refers to its profile, this frame is available in various types of products, including: Angle frames (for corners), Casing (for the perimeter), Bars (for straight sections).



Figure 5. Frame

METHODS

To solve the problems in this study, the author created a problem-solving framework using the following research methods : data collection, analysis and identification of research, research implementation design, and research implementation. This is illustrated in the block diagram below.

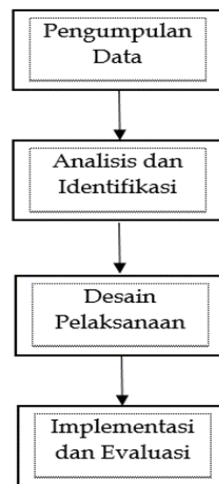


Figure 6. Flowcart

The figure above shows that this research was conducted in four steps

1. Data collection, including observation and literature study on running text
2. Analysis and identification, covering issues and requirements for implementation design
3. Covering the design concept of the running text system from hardware and software design
4. Implementation and evaluation were carried out to determine the condition of the device created, whether it was in good condition or not.

Research Hardware

The materials to be used in the creation of running text as a digital information medium based on an Android application using the HD-WF2 microcontroller are as follows:

1. P10 Running Text RGB Panel
2. HD-WF2 Microcontroller
3. Power Supply 5V 40A
4. 16-Pin IDC Flat Data Cable
5. Almunium 5515

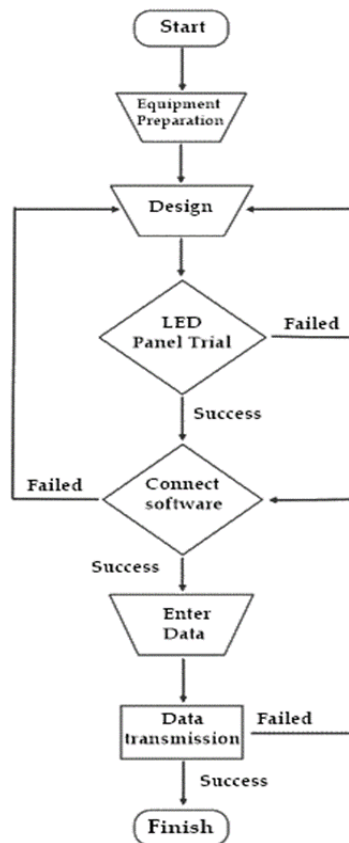


Figure 7. hardware block diagram

Requirement Analysis

The creation of running text as a digital information board using the HD-WF2 controller requires hardware and software. The creation of the hardware will be explained according to the system diagram below.

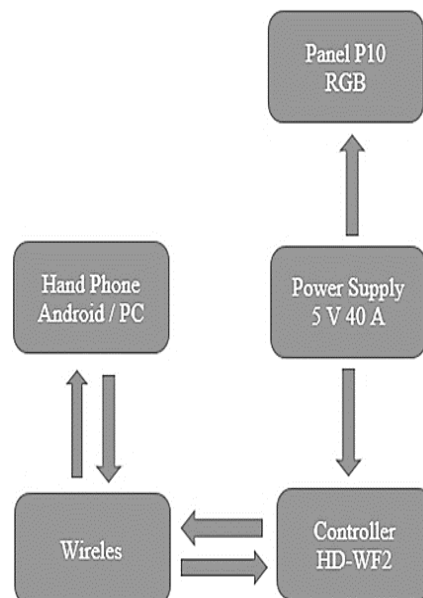


Figure 8. Hardware Block Diagram

The functions and explanations of each are as follows:

1. Android mobile phones and personal computers as controls
2. Wi-Fi as a network connection between Android mobile phones or personal computers

3. HD-WF2 microcontroller as the center of the entire circuit system
4. Power Supply as a voltage source for P10 RGB and Controller
5. P10 RGB panel as an output that displays text

The software used in creating the running text as a digital information display board based on an Android application is Led Art software. This software is used for writing, deleting, and sending programs.

RESULTS AND DISCUSSION

Assembly Process

Once the materials and tools are available, the steps required to create running text as an Android-based digital information board are as follows:

The frame must be cut to the required length and width.



Figure 9. Cutting the frame list

The connection of the frame list is done by installing a list elbow at each corner and screwing it in place. Next, a 32 cm iron bar is installed in each gap and screwed in place.



Figure 10. Installation of Elbows and Keys

Install the LED panels and arrange them in parallel, then install the power supply and secure it firmly with screws. Connect all IDC data cables according to the In to Out flow rules for all panels. Finally, install the controller.



Figure 11. Installation of LED Panels

Next, connect all positive and negative voltages in parallel on all P10 Panels and HD-WF2 Controllers using jumpers. Then connect the IDC cable to the HUB 75E port of the first P10 panel to the HD-WF2 controller on the 75x 2 port, paying attention to the direction and available codes so that it is not reversed during installation. Also connect the IDC cable HUB 75E port between the first P10 panel and the second P10 panel and so on. Connect the HD-WF2 controller and P10 panel to a 5-volt 40-ampere power supply. To obtain a voltage source, connect the AC (alternating current) cable to the power supply, paying attention to the terminals on the power supply. The power supply consists of 2 AC (alternating current) terminals, Ground, and DC (Direct Current) terminals, both positive and negative.



Figure 12. Cable Installation

Data Transmission Process

The process of writing, deleting, or sending data using an application called Led Art is as follows. Here is a guide on how to use it.

1. Download the Huidu Led Art app.

First, download the Huidu Led Art app from the Play Store or App Store. Simply type the name of the app in the search box and install it on your device.

2. Open the Application and Select Tools. After you install the application, open it. Then, select the tools menu in the application and click the "Search for opportunities" option. You will see a list of existing wireless controllers. Click on the wireless name that appears.
3. Enter the Wi-Fi password.
After selecting wireless, the app will ask you to enter the password. To enter the password, click the number 8 eight times or type 88888888, then click Connect.
4. Keep Wi-Fi Connected
After entering the password, you will receive a notification on your device screen. Click Keep Wi-Fi Connected to ensure the connection remains active.
5. Add a New Display.
Click the add option to start setting up the scrolling text. New Display information will appear. Make sure the display size in the application matches the screen you are using. If the size is correct, press Yes and continue by pressing Add to create the scrolling text program.
6. Write Text and Adjust Settings
Now you can type in the words you want. After that, you can change the font, text speed, and animation effects according to your preferences. Before the display is applied to the screen, the app will show a preview of the display on your phone screen, so you can make sure everything is correct.
7. Adding a new program
If you want to add a new program or event, return to the initial display by pressing the left arrow. You can repeat this step every time you want to add a running text program.
8. Send the program and wait for it to finish.
After adding the desired program, click the icon on the application screen and wait until the program is sent. If there are no problems, the running text will appear on the running media that has been created. After that, click back to settings when finished.
9. Turn off Wi-Fi
10. Finally, after you have finished setting up the running text, don't forget to turn off Wi-Fi on your device to save power.

By following these steps, you can easily create and set up running text using the Huidu Led Art app on your Android device.

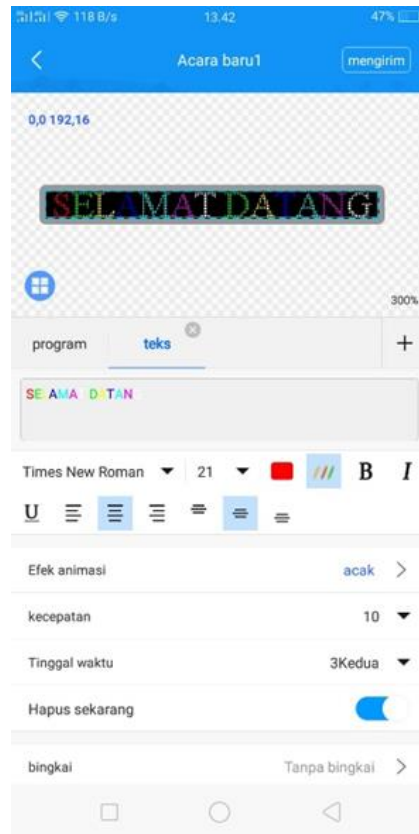


Figure 13. Led Art Application

Overall Running Text Testing

After the assembly process is complete, installation, data transfer, and testing are finished, then the next process is testing the display. Examples include entering letters and numbers into the program, as well as different distances.

Table 1. Running Text Testing

No	Character	Enter Text	Status
1	Huruf	ABCDEFGHIJL	Success
2	Angka	123456789	Success
3	Kata	SELAMAT DATANG	Success

Tabel 2. Wi-Fi range test

No	Range	Enter Text	Without Obstacle	Obstacle
1	1 meter	SELAMAT DATANG	Success	Success
2	5 meter	SELAMAT DATANG	Success	Success
3	10 meter	SELAMAT DATANG	Success	Success
4	15 meter	SELAMAT DATANG	Success	Failed
5	20 meter	SELAMAT DATANG	Success	Failed



Figure 14. Input Result Display Running Text

Based on the results shown in the image above, with various fonts and colors, and testing at different distances, this running text is declared successful and capable of being used as intended.

CONCLUSION

The Android-based running text control system has been declared successful based on display test results. It has proven to be an efficient and easy-to-use solution, suitable for controlling writing, deleting, and sending programs to running text. In addition, it can also be developed and expanded to control other electronic devices, with the addition of sensors in the future.

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