Automatic Cat Feeding And Monitoring System In Hiro Catshop Shop Based On The Internet Of Things

Nelly Khairani Daulay, Novi Lestari, Armanto, Deni Nurdiansyah, Rahmad Dani, Alfia Tiara Permatasari,
Faculty of Engineering, Bina Insan University
Corresponding email: nellykhairanidaulay@univbinainsan.ac.id

Abstract

Cat feeding is still done manually without a system and there is no monitoring system for cat food leftovers that can be accessed through the website, Build a Monitoring System and Automatic Cat Feeder at Hiro CatShop Based on the Internet Of Things (IoT) that can monitor and provide food cat automatically and can be accessed remotely via the Website. The method that the author uses in conducting this research is a qualitative research method. Qualitative research methods seek an understanding of meaning, understanding, reality, events, or life by being directly and/or indirectly involved in the environment under study. cat in place, DHT11 sensor as a temperature detector in the room around the cat food place, servo motor as a means of opening the lid for cat food that comes out according to a predetermined schedule, NodeMCU to read and send sensor data into the database With an automatic cat feeding monitoring system this will make it easier for shop owners or shop employees to monitor cat feeding through the website, shop owners don't need to be afraid anymore if it's too late to feed the cat and waste too much time to come to the cat feeding place and also don't need to be afraid of losing n data caused by lost records (human error).

Keywords : *Cat Feeder, Monitoring Cat Feeding, Nodemcu.*

1. Introduction

The development of technology lately is very rapid, as a measure of national progress, including Indonesia. During the current period of rapid growth, technology is a basic need for all human beings in various areas of life, because everyone is highly dependent on technology, today's technology offers various tools that can make human work easier and more efficient. One of them being developed in Indonesia is the Internet of Things (IoT). Internet of Things (IoT) can be implemented and used to ease human work, for example the activity of automatically feeding animals, especially cats. (Dvitasari & Kartika, 2020)

Eating is a valuable process for the body. Through eating, the body will obtain the nutrients and energy needed to sustain life. not only humans, animals also really need nutrients from food, especially pets. The main point of keeping pets, especially cats, is in the provision of food. A person who really likes pets can spend a lot of money to pay for quality pet food. But not always A person who really likes cats has a lot of free time, therefore many leave their pets at the Pet Shop. (Khair & Sabrina, 2019) Hiro CatShop is a pet shop, an independent productive economic business or self-employed which is classified as a micro and small business (UMK), which is a business engaged in the sale of cat food and special care for animals. One of the facilities provided by the Hiro CatShop store is to feed pets that are deposited, especially cats, but they face several obstacles, namely the absence of a system that can assist in automatic and scheduled feeding, which can then be monitored through the website, so employees are required to provide food. and monitoring cat food waste manually or by coming directly to the cat food place. Furthermore, the problem encountered by the pet shop is that when the number of pets being deposited increases, the pet shop must require additional employees to assist in the care and feeding of the pets that are deposited. (Khair & Sabrina, 2019)

For that we need an automatic and scheduled mechanism that can be used to help the pet shop in feeding the pets that are deposited. Because pets, especially cats, unscheduled feeding can cause bad effects for the cat. With a monitoring tool and automatic and scheduled cat feeding which can then be accessed remotely, it is desirable to be

able to solve the problems that occur in the pet shop, namely to reduce costs, as well as to streamline the feeding of pets that are entrusted, especially cats.(Khair & Sabrina, 2019)

Based on the problem above, the author takes the title **"Automatic Monitoring and Feeding System for Cats at Hiro CatShop Based on Internet Of Things (IoT)".**

1.1 Objectives

The aims of this research are as follows:

1. Build an Automatic Cat Feeding and Monitoring System at Hiro CatShop Based on Internet Of Things (IoT) that can monitor and provide cat food automatically and can be accessed remotely via the Website.
2. Adding knowledge about how to monitor the availability of cat food and cat feeding remotely through the website.
3. Has a system that is used to monitor cat food leftovers at hiro catshop through the website, so that it can provide information on cat food leftovers, and can also feed cats automatically and on a scheduled basis through the Website GUI.
4. Applying knowledge during lectures in the Computer Systems Engineering Study Program at the Bina Insan University Campus.

2. Literature Review

2.1 System Definition

A system is a collection of interrelated elements that work together to process the input (input) intended for the system and process the input to produce output.

2.2 *NodeMCU*

NodeMCU means an electrical board based on the ESP8266 chip that uses the ability to run microcontroller functions as well as an internet connection (WiFi). Here are the current versions of Nodemcu:

Figure 1. Nodemcu

2.3 Sensor *LoadCell*

The LoadCell sensor is a digital weighing module, the load cell sensor consists of a strain gauge, conductor and Wheatstone bridge. Theoretically, the load cell will be active to calculate the mass of an object.

Figure 2. Loadcell

.

2.4 Sensor *DHT11*

DHT11 sensor means a digital signal calibration sensor that can communicate temperature and humidity information. This sensor is a very stable component.

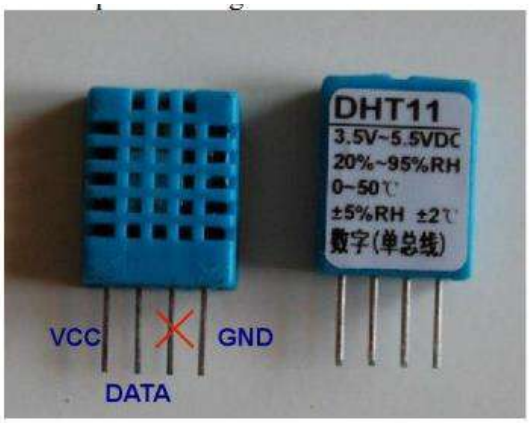

Figure 3. DHT11

2.5 *LCD*

Liquid Crystal Display is one of the electrical components used to display characters, alphabets or graphic data. LCD (liquid crystal display) is an electro screen produced using CMOS logic technology whose operating principle does not produce light, but to reflect ambient light to the headlights or transmit light from the LCD (liquid crystal display).

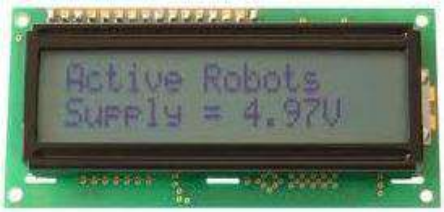

Figure 4. LCD

2.6 Motor *Servo*

A servo motor is a rotary device or actuator (motor) designed with closed loop control (servo) and can be adjusted or adjusted.

Figure 5. Servo Motor

2.7 *Website*

WWW or World Wide Web or web is a page that displays content or content that can be accessed or opened when we visit the Internet. A website has a start page, which is the first page that is displayed when we open the address on the Internet, the page is usually called the "home page".

2.8 *MySQL*

MySQL is the realization of the Anal relational database management system (RDBMS), distributed free of charge. Every user can use MySQL freely, but there are certain limitations, the Software cannot be a commercial derivative product. MySQL is actually a derivative of one of the main concepts in existing databases. SQL (Structured Query Language).(Amran, 2017) SQL is the concept of database operations, especially database

operations that are used to select or select and enter data, so that data operations can be completed easily and automatically.

2.9 *PHP*

*P*HP is a server-side scripting language designed for the following purposes: Web development. In addition, PHP can also be used as a general programming language. (Zulfikri et al., 2017)

2.10 *I2C (Inter Intergrated Circuit)*

IIC/I2C or Inter-Integrated Circuit is used to bridge the microcontroller and LCD to reduce the use of I/O pins on the microcontroller. Therefore, of the 16 pins needed, only 4 pins are used on the microcontroller, namely 5V, GND, SCL and SDA.

2.11 *Arduino* IDE (*Integrated Development Environment*)

Arduino IDE is an editor for writing programs, compiling and uploading to Arduino development boards. The Arduino integrated development environment includes a text editor for writing code, a message area, a text console, a toolbar with buttons for commonly used functions, and a set of menus. Software written with Arduino is called sketches. These sketches are written in a text editor and saved as files with the extension ino. The text editor has cut/paste and search/replace functions. The message area contains feedback on saving and uploading files, and shows any errors.

2.12 Basis Data (*Database*)

A database is a collection of related data that is organized in a way that is easy for the user to store and manipulate. The database is where the information is placed. Not only can databases be located, they can also be used to simplify the process of managing and revisiting data.

2.13 *Flowchart*

Flowchart is a systematic representation of the process and logic of information processing activities, or a graphical representation of the steps and sequences of a program.(Salamah & Purnomo, 2020) The benefits that you will get when using flowcharts to solve calculation problems are:

1). Get used to thinking systematically and structured
2). It's easy to check and find invalid parts of the program.
3). Programs are easy to develop.

2.14 *UML* (*Unifed Modeling Language*)

The Unified Modeling Language is a visual language used to model and communicate systems through the use of diagrams and supporting text.

3. Methods

The method that the author uses in conducting this research is a qualitative research method. Qualitative research methods seek an understanding of meaning, understanding, reality, events, or life by engaging directly and/or indirectly in the environment under study. The researcher does not collect and process data all at once, but the whole process from beginning to end of an activity is step by step and closed-minded, basically and completely narrative. Qualitative research seeks to understand the meaning of an event or events by trying to interact with real situations or people. (Kusnaedi & Amir, 2021)

4. Data Collection

4.1 Observation Method

At this stage, the author collects data by making direct observations to the research site at the Hiro Catshop store to obtain information, data and other important things that will be used in this study. Interview

4.2 Metode Wawancara

Method is a technique of collecting data and information by way of direct question and answer. At this stage the author conducted interviews with the shop owner hiro catshop about the tools to be made and to get additional references so that the tools made were as desired.

4.3 Metode Dokumentasi

The documentation method is a method that qualitative researchers can use to obtain photos from the subject's point of view through written media or other documents created or made directly by stakeholders.

4.4 Studi Literatur

Literature study aims to obtain secondary data by collecting reference materials. Reference materials used in the form of books and scientific research journals, the data taken is data related to the title so that it can support the theoretical explanation in making this research.

5. Results and Discussion

The results of this study explain the results of the system design and testing carried out. Testing is carried out by reviewing the process of bringing tool data and data collected from each sensor into the system. (Himawan & Yanu F, 2018)

After the system is analyzed and the display design is carried out, the implementation stage of the design results is carried out. The result of the design is what the program looks like when run by the system. Chapter 4 describes a program that includes a system interface and configuration program module. (Himawan & Yanu F, 2018)

5.1 Toolkit Results

Loadcell sensor as a tool to detect the amount of cat food in its place, DHT11 sensor as a temperature detector in the room around the cat food place, servo motor as a means of opening the lid for cat food that comes out according to a predetermined schedule, NodeMCU to read and send sensor data into the database and will be displayed on the web page.

Figure 6. The results of the tool seen from the front

Figure 7. The results of the tool seen from behind

5.2 Hasil Desain Sistem

5.2.1 phpMyAdmin Database Page View

This web page will display all database tables which include temperature data, admin data and cat food which have been read by the loadcell sensor and the sensor will send the data into the database.

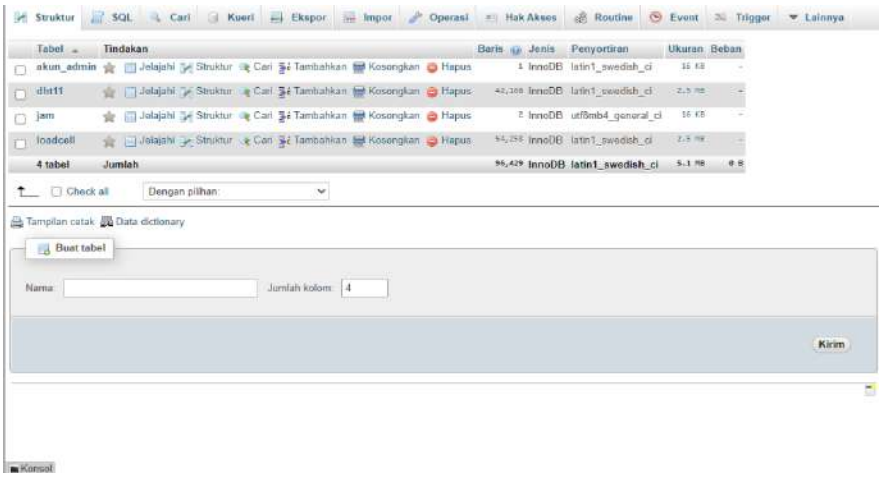

Figure 8. Screenshot Database

5.2.2 Login Page View

The following is the login page display on the website page, on this page the admin is asked to enter the username and password first before logging in.

Figure 9. Login Display

5.2.3 Home Page View

The following is a view of the home menu after logging in or referred to as an admin, who can view sensor data and graphs one by one in addition to being able to view real-time sensors and sensor data summaries.

Figure 10. Home View

5.2.4 Scheduling Data Page View

The following is a scheduling menu display, in this menu we can adjust the cat's feeding schedule according to what we want.

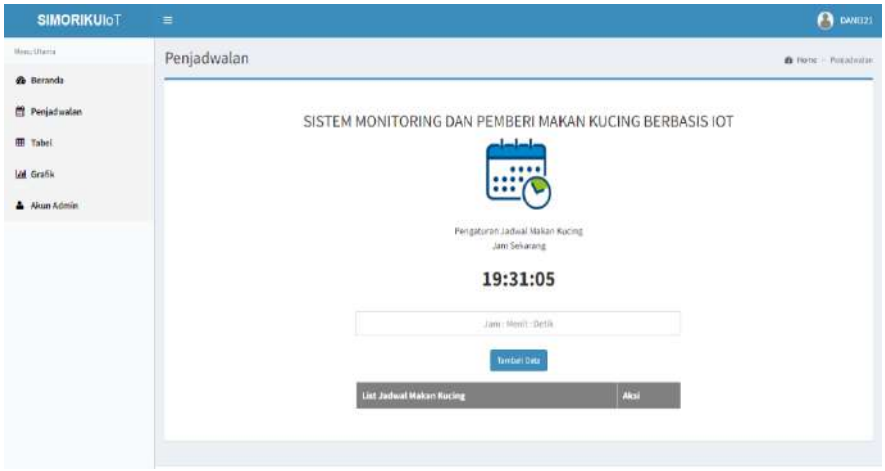

Figure 11. Scheduling Menu Display

5.2.5 Table Menu Display

In the table menu view, the admin displays cat food table data taken from the loadcell sensor, in this menu we can also export to excel or even to PDF format.

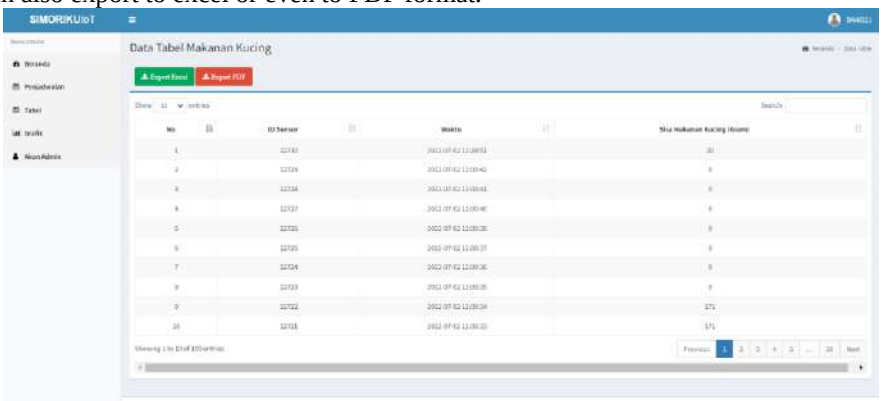

Figure 12. Table Data Menu Display

5.2.6 Graphic Menu Display

In the sensor graph menu view, the admin displays cat food graph data.

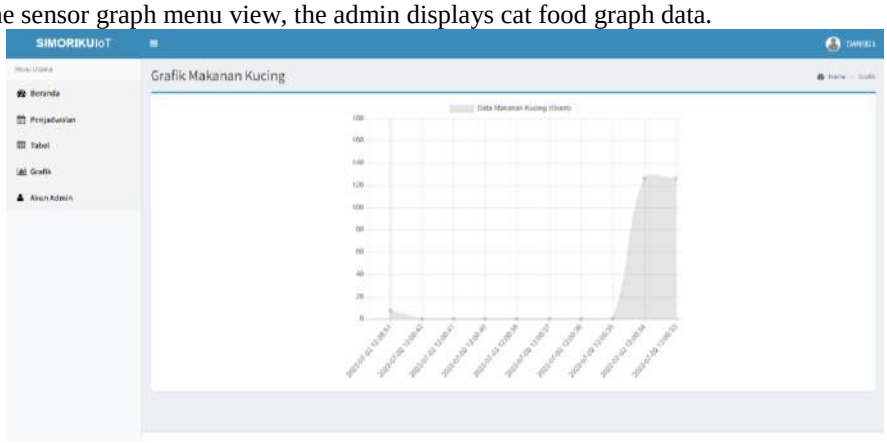

Figure 13. Graphics Data Menu Display

5.2.7 Admin Menu Display

In this menu displays admin data, in this menu we can also add admin data, edit admin data, and delete admin data.

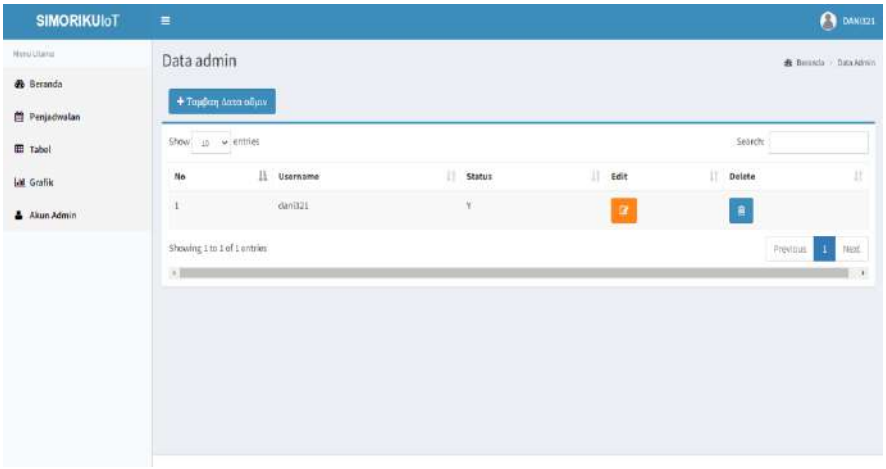

Figure 14. Admin Data Menu Display

5.2.8 Cat Food Monitoring Results

The following are the results of monitoring cat food data obtained during the monitoring process on the website.

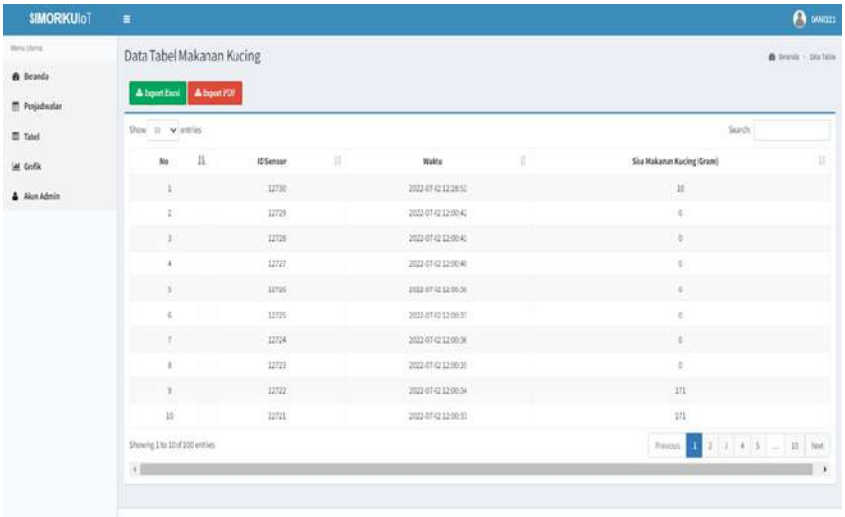

Figure 14. Admin Data Menu Display

5.3 Discussion

5.3.1 Tool Discussion

For the work of the tool from the researcher's side, the tool works according to what is desired. Nodemcu as a microcontroller can control all system activities and send DHT11 sensor data and loadcell sensors to the database then processed and then displayed to the web, from here we can monitor food waste data not only that through the web we can determine a cat's feeding schedule where data from the web is sent to the microcontroller and then forwarded to the servo motor and then the servo motor which acts as a cat food opener. work according to a predetermined schedule.(Dvitasari & Kartika, 2020)

5.3.2 Web Discussion

The web page that was created displays data on cat food leftovers and the temperature around the cat's feeding place which is obtained from each sensor and will then be stored into a database to be displayed in web

form with a printable report display, and a bar graph so that it will be easier to monitor .(Rahmanda et al., 2020)

The menus on this website include: :

1. The homepage menu is the initial display on the website.
2. The scheduling menu is in the form of a menu where the admin can set the cat's feeding schedule.
3. The table menu is a page that is used to view the remaining cat food in the dining area which is displayed in tabular form.
4. The login page menu is a page for admins to enter the system.
5. The graphic menu is a page that is used to view the remaining cat food in the dining area which is displayed in graphic form.
6. The admin menu is a page for admins to add, edit, view, and delete admin data.

5.4 System Test

To find out whether the system has been running properly, testing is carried out. (Khair & Sabrina, 2019)

5.4.1 Cat Feeding Scheduling Test

Tests carried out in the form of testing on cat food scheduling. The test is used to assess whether the cat's feeding is according to a predetermined schedule. The results of the tests carried out are shown in the following table:

Table 1. Scheduling Test Table

Number	Date	Meal Hours Setting (Website)	Open time	Successfully Open
1	26-06-2022	14:43:00	14:43:00	✓
2	26-06-2022	14:50:00	14:50:00	✓
3	26-06-2022	15:30:00	15:30:00	✓

In Table 1, test experiment number 1 dated 26-06-2022 at 14:43:00 the cat food pole was successfully opened according to the specified hour.

Figure 16. Closed Open Food Place at 14:43:00

Figure 17. Database Hours 14:43:00

Figure 18. Food Place Filled At 14:43:00

In Table 1 testing experiment number 2 dated 26-06-2022 at 14:50:00 the cat food pole was successfully opened according to the specified hour .

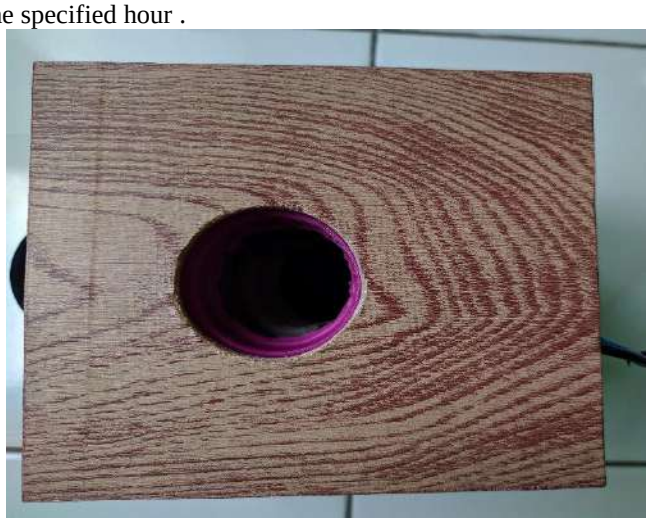

Figure 19. Closed Food Place Open at 14:50:00

Figure 20. Database Hours 14:50:00

Figure 21. Food Place Filled At 14:50:00

In Table 1 test experiment number 3 dated 26-06-2022 at 15:30:00 the cat food pole was successfully opened according to the specified hour.

Figure 22. Closed Food Place Open At 15:30:00

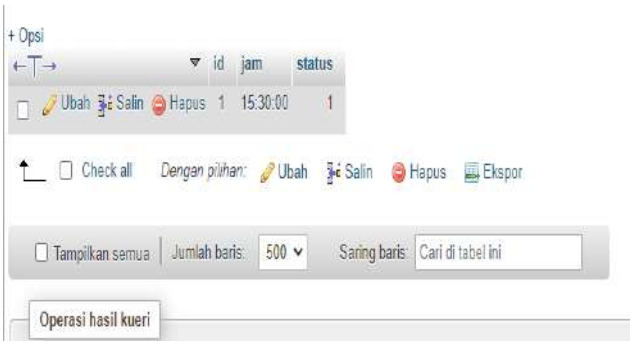

Figure 23. Database Clock 15:30:00

Figure 24. Food Place Filled Time 15:30:00

5.4.2 Testing the Menu on the Website

Testing the power supply aims to find out whether the menus on the website are working properly. The test results can be seen in the following table:

Table 2. Testing the Menu on the Website

No	Scenario	Target	Result
1	*Login*	Berhasil	Berhasil
2	*Logout*	Berhasil	Berhasil
3	Beranda	Berhasil	Berhasil
4	Penjadwalan	Berhasil	Berhasil
5	Tambah Jadwal	Berhasil	Berhasil
6	Hapus Jadwal	Berhasil	Berhasil
7	Data Tabel	Berhasil	Berhasil
8	Data Grafik	Berhasil	Berhasil
9	Akun Admin	Berhasil	Berhasil
10	Tambah Admin	Berhasil	Berhasil
11	Hapus Admin	Berhasil	Berhasil
12	Edit Admin	Berhasil	Berhasil

References

Amran, A. (2017). Analisa Dan Perancangan Sistem Informasi Data Simpan Pinjam Pada Koperasi Serba Usaha Setia Mandiri Kota Lubuk Linggau. *Jutim*, *2*(1), 1–12.

Devitasari, R., & Kartika, K. P. (2020). Rancang Bangun Alat Pemberi Pakan Kucing Otomatis Menggunakan Mikrokontroler Nodemcu Berbasis Internet of Things (Iot). *ANTIVIRUS: Jurnal Ilmiah Teknik Informatika*, *14*(2), 142–154.

Himawan, H., & Yanu F, M. (2018). Pengembangan Alat Pemberi Makan Ikan Otomatis. *Telematika*, *15*(02), 87–98.

Khair, U., & Sabrina, T. (2019). Alat Pemberi Makan Kucing Otomatis Berbasis Arduino Uno Pada Pet Shop. *Sebatik*, *23*(1), 9–14. https://doi.org/10.46984/sebatik.v23i1.437

Kusnaedi, K., & Amir, R. (2021). Peranan Kejaksaan Negeri Gowa dalam Tindakan Pengawasan dan Penuntutan Aliran Sesat Tarekat Tajul Khalwatiyah Syekh Yusuf. *Qadauna: Jurnal Ilmiah Mahasiswa Hukum Keluarga Islam*, *2*(1), 184–204. https://doi.org/10.24252/qadauna.v2i1.17230

Rahmanda, D. A., Pratomo, A. H., & Simanjuntak, O. S. (2020). *Kebencanaan Pada Goa Terintegrasi Menggunakan*. *1*(01), 64–82.

Salamah, U., & Purnomo, A. (2020). Aplikasi Simpan Pinjam Koperasi Pada PT. Primantara Berbasis Mobile Menggunakan Algoritma FIFO. *Jurnal Sisfokom (Sistem Informasi Dan Komputer)*, *9*(1), 51–58. https://doi.org/10.32736/sisfokom.v9i1.711

Zulfikri, Sari, M. I., & Susanti, F. (2017). Implementation of Current Sensor and RTC (Real Time Clock) at Home Lighting Control System Using Iot (Internet of Things). *Applied Science*, *3*(3), 1762.

Add references here. Make sure to follow IEOM reference format. See details at the end. (10 font)

Rahman, M. A., Sarker, B. R. and Escobar, L. A., Peak demand forecasting for a seasonal product using Bayesian approach, *Journal of the Operational Research Society*, vol. 62, pp. 1019-1028, 2011.

Reimer, D., Entrepreneurship and Innovation, Available: http://www.ieomsociet.org/ieom/newsletters/, July 2020.

Reimer, D. and Ali, A., Engineering education and the entrepreneurial mindset at Lawrence Tech, *Proceedings of the 3rd Annual International Conference on Industrial Engineering and Operations Management*, Istanbul, Turkey, July 3 – 6, 2012, pp. xx-xx.

Reimer, D., Title of the paper, *Proceedings of the 5th North American International Conference on Industrial Engineering and Operations Management*, Detroit, Michigan, USA, August 10-14, 2020, pp. xx-xx.

Shetty, D., Ali, A. and Cummings, R., A model to assess lean thinking manufacturing initiatives, *International Journal of Lean Six Sigma*, vol. 1, no. 4, pp. 310-334, 2010.

Biography

Nelly Khairani Daulay is a Lecturer at the Faculty of Engineering, Bina Insan University, Lubuklinggau. Earned a Bachelor's degree in Computer from STMIK Musi Rawas, in 2009. Then, earned a Master's degree in Computer from Bina Darma University in 2013. He has worked as a Lecturer in the Faculty of Engineering, Bina Insan University since 2015. His field of study is Computer Systems Engineering.

Novi Lestari is a Lecturer at the Faculty of Engineering, Bina Insan University, Lubuklinggau. He earned a Bachelor's degree in Computer from STMIK Musi Rawas, in 2009. Then, he earned a Master's degree in Computer from Bina Darma University in 2011. He has worked as a Lecturer in the Faculty of Engineering, Bina Insan University since 2010. His field of study is Computer Systems Engineering.

Armanto is a Lecturer at the Faculty of Engineering, Bina Insan University, Lubuklinggau. Earned a Bachelor's degree in Computer from STMIK Musi Rawas, in 2013. Then, earned a Master's degree in Computer from Bina Darma University in 2016. Has worked as a Lecturer in the Faculty of Engineering, Bina Insan University since 2016. His field of study is Computer Systems Engineering.

Deni Nurdiansyah is a Lecturer at the Faculty of Engineering, Bina Insan University, Lubuklinggau. Earned a Bachelor's degree in Computer from STMIK Musi Rawas, in 2013. Then, earned a Master's degree in Computer from Bina Darma University in 2018. Has worked as a Lecturer in the Faculty of Engineering, Bina Insan University since 2022. His field of study is Computer Systems Engineering.

Rahmad Dani is a student of the Bachelor of Computer Science in the Computer System Engineering Study Program at the Bina Insan University, Lubuklinggau.

Alfia Tiara Permatasari is a Bachelor of Computers student in the Computer Systems Engineering Study Program at Bina Insan University, Lubuklinggau.