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Mobile Tower Battery Resources Monitoring System Based on Iot Using Codeigniter

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ABSTRACT

Monitoring is a condition or activity that is used to provide information about the cause of an action that is being carried out, to find out the condition of a tool or device we are required to monitor it all the time so that we can know what information is or has happened to the device. Monitoring using IoT-based technology is a solution to the problems we face. In this paper, the author makes a web using the CodeIgniter framework. The CodeIgniter is an open or open source application based on the PHP framework with the MVC model or also commonly called the Model View Controller which is used to build a dynamic website using PHP code. The conclusion that can be obtained from study of website development with codeigniter frameworks is: in developing web-based applications, designers need a framework to simplify the work process. In its development, many frameworks have been created with features that simplify the performance process of an application. The frameworks that will be analyzed in this research are Codeigniter, the test analysis uses Load Test with a file size of 3401 KB. The Codeigniter has a higher average time and speed. In the average time value, Codeigniter has a greater time. time from the first minute to the end of the test minute is set with 3 minutes of testing successful session per second 2.41 seconds, successful page per second 2.44 seconds Respontime per second 0.50.

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1. INTRODUCTION

Carry out mining operations by prioritizing quality, safety and the environment. To achieve this, several support tools are needed such as tower lamps for street lighting in production areas, fix towers for installing internet network devices in the mining area and skid towers for installing internet networks and CCTV to monitor mining activities and heavy equipment being mined (Papcun & Zolotová, 2016). To operate the skid tower and fix the tower, an electric current is needed which in the author's observation is to use a battery (accu) as a power source. Batteries are one of the energy sources that are often found and used by the community, electrical energy storage components that are portable and can withstand electrical energy in such a way through chemical processes so that electrical energy can be used at other times (Tengku Azirudin, 2019).

The power in the battery depends on how much energy can be stored, the energy stored in a battery is in Ah (Ampere hour) or power per hour, so it can find out the total current capacity with the battery's working voltage (Pangestu et al., 2019). The battery consists of several cells, the voltage of one battery cell is from 2.3 V to 2.45 Volts, the 12 Volt battery consists of 6 cells. So the battery is 12 Volts, the actual voltage is between 13.8 V – 14.7 Volts. The condition of the battery depends on the temperature. High temperatures cause the battery to deteriorate quickly (Satriady et al., 2016). When charging the battery at room temperature exceeding 30 degrees Celsius, the recommended voltage is 2.35 V/cell. At the time of charging, and the room temperature remains below 30 degrees Celsius, the charger voltage for each cell is recommended from 2.40 to 2.45 Volts (Hamid et al., 2016)

Wireless monitoring of physiological signals of large number of patients is one of the current needs in order to deploy a complete wireless sensor network in healthcare system. Such an application presents some challenges in software and hardware designs. Some of them are as follows: reliable communication by eliminating collisions of two sensor signals and interference from other external wireless devices, low-cost, low power consumption, and providing flexibility. The gateway nodes connect the sensor nodes to local area network and the Internet for global acces. Especially WLAN technologies are avoided for low power sensor nodes because of their large size and power consumption use. (Fouad, 2017)

Chargers with fluctuating temperatures must be equipped with temperature sensors to optimize float voltage. The length of time to charge this battery varies, because it really depends on the amount of current the battery has and how the charging method is carried out, both of these are important factors in determining how long it takes to charge the battery. (Teresna, 2014) In addition, the voltage for charging the battery also requires a voltage that is higher than the battery voltage, the goal is that there is a potential difference between the charging device and the battery to be charged. When there is a potential difference, electric current can flow from high voltage to low tension. For charging batteries, generally using a voltage of 13.8 V to 14 Volts, while the amount of battery current can be seen on the battery body. Equation for calculating battery charging time (Kamel et al., 2019).

To keep the battery condition in good condition, we need a technology that can monitor remotely so that we know exactly what steps we will take in the future. Internet of things is an amalgamation of words from the internet and things (Engineering, 2021). The meaning of a word from the internet is a computer network that uses a network protocol and the meaning of the word things can be interpreted as a physical object (Rahman & Ratna, 2018). These objects such as sensor data read by the sensor can be sent via the internet. To get this information, we create a web-based system so that users can monitor tools or devices wherever they are as long as they are still connected to the internet.(Patil & S, 2020)

2. RESEARCH METHOD

Planning is a basic process for deciding goals and how to achieve them, decisions must be made at various stages in the planning process.

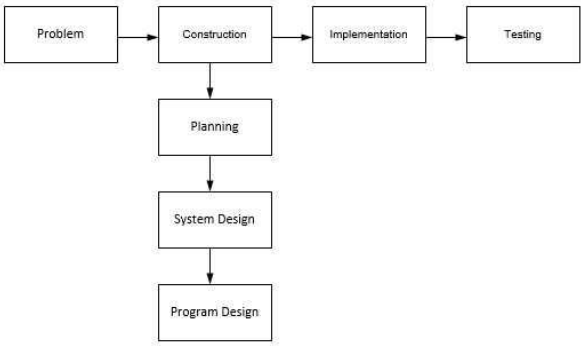

Figure 1. Research Flowchart

The following is an explanation of the framework of thought in FigureI, you can see below.

a. Problem
The battery is a component that is widely used in industrial practice to meet the need for electrical power storage, the results of the author's research reveal that mining industry companies use batteries to supply electrical power to devices such as switches, access points and CCTV in the mining area. many devices that use electrical power from the battery, the faster the power stored on the battery runs out, to keep the battery optimal, a tool is needed to monitor the condition or condition of the battery wherever we are (Ullah, 2018).
b. Construction
To create a battery resource monitoring system on an IoT-based mobile tower using codeigniter requires several stages: planning, design and system stage and programming stage. (Muhammed et al., 2020)
c. Implementation
The IoT-based mobile tower battery monitoring system using this codeigniter which will later be used can help to obtain data information presented in the form of charts on the user page, for the implementation process will be directed to create an account independently by filling in the full name and active email so that during registration the system will send an activation token to the email address registered on the system (Papcun & Kajati, 2017).
d. Testing
The battery resource monitoring system on an IoT-based mobile tower using codeigniter is tested by testing using the WAPT Pro 5.0 64bit software (Sigit, 2010).

3. RESULTS AND DISCUSSIONS

3.1 System Modeling Stage

3.1.1 Analysis Stage

a. Functional requirements for administrators
   Functional requirements for administrators are: can login to enter the system, can access the admin dashboard containing member data, can edit members and delete members, can change or edit role access on members, add menus or sub menus on the admin page, add sub menus to members, can access pages members, can access charts, change or edit profiles, and change passwords, and edit the contents of the member's homepage (Dinata & Sunanda, 2015).
b. Functional requirements for members
   Functional requirements for members are: can login to enter the system, can access charts, can access the homepage, can access edit profiles, my profile and change passwords, cannot access the administrator page (Bruce Johnson, 2019).

3.2 Design Stage

a. Use Case Diagram Modeling

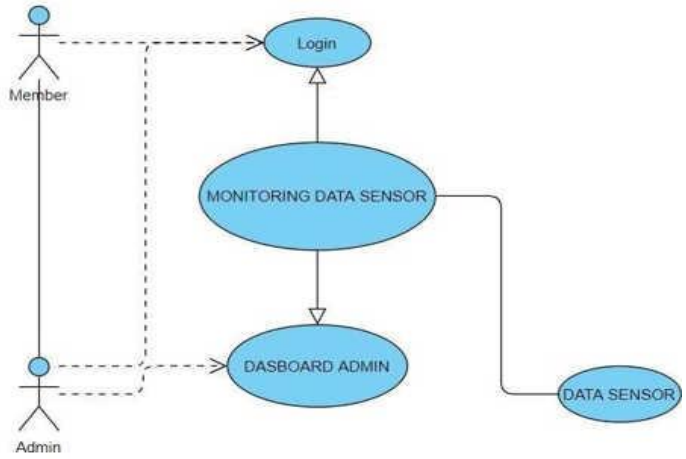

Figure 2. Activity Diagram System Monitoring

b. Activity Diagram Modeling

a) Activity Diagram Login

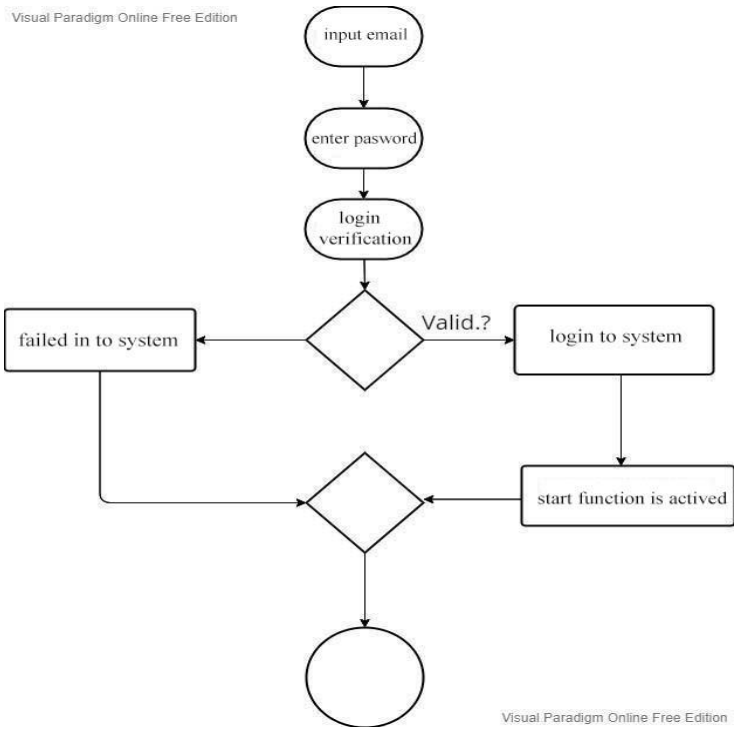

Figure 3. Activity Diagram Login

b) Activity Diagram Admin

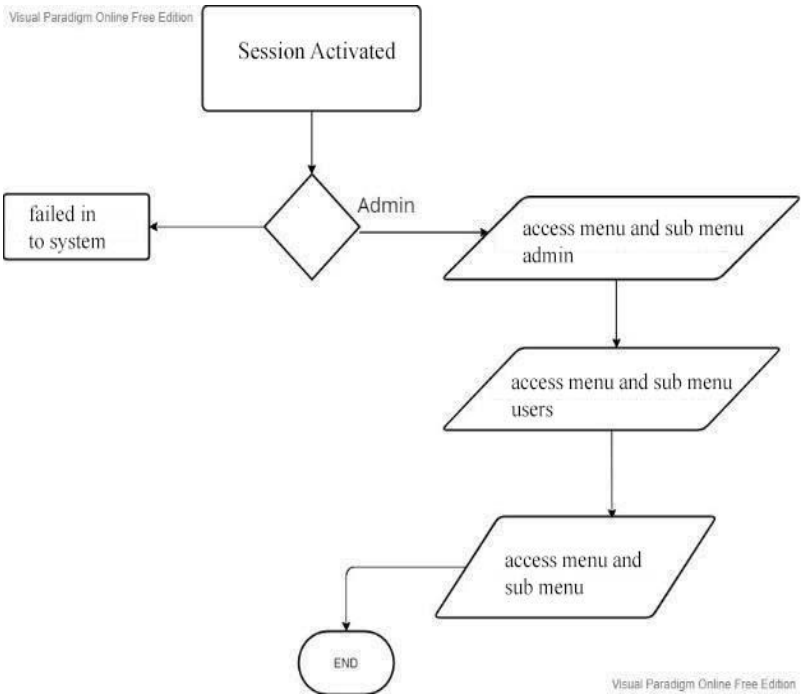

Figure 4. Activity Diagram Admin

c) Activity Diagram Member

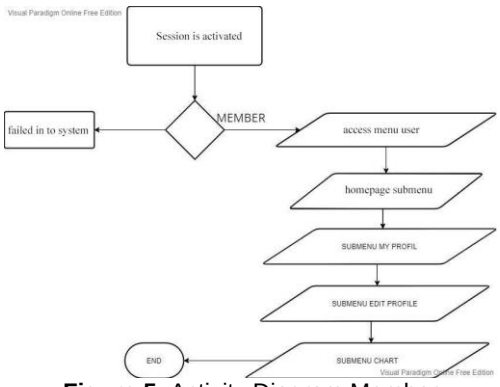

Figure 5. Activity Diagram Member

c. Database Design

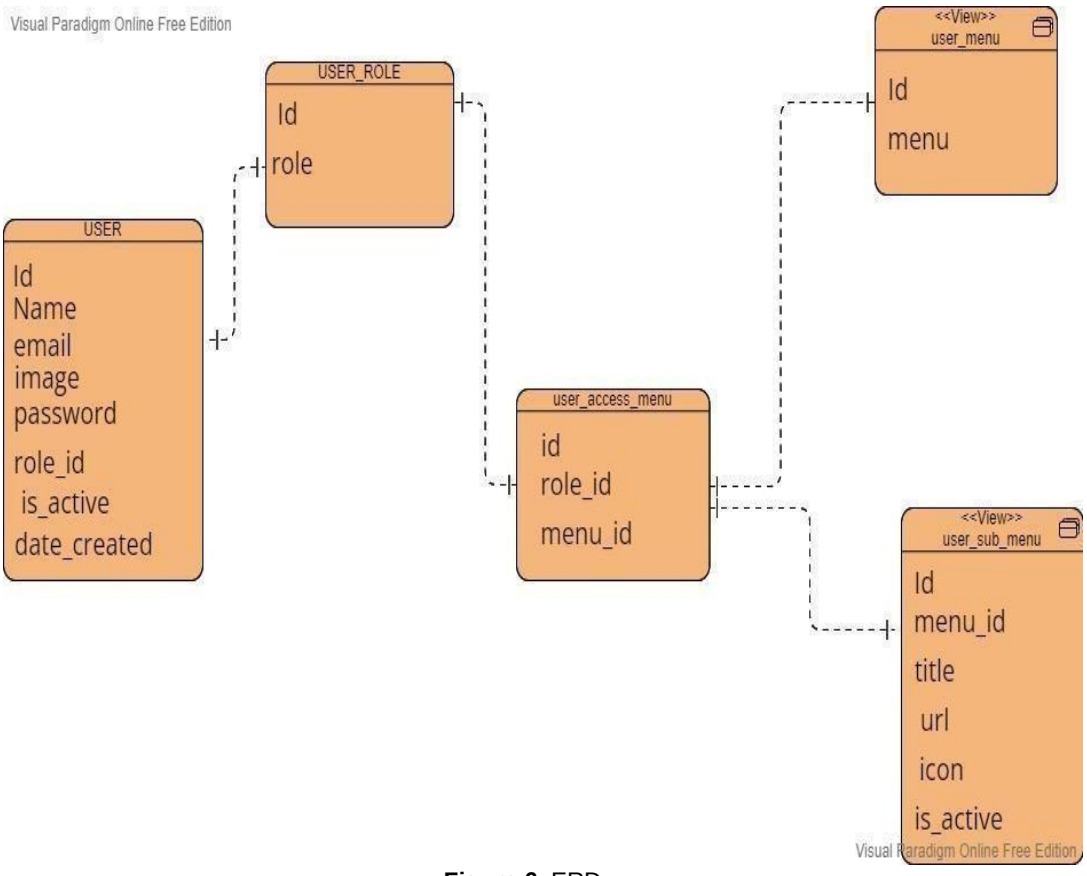

Figure 6. ERD

3.3 Programming Stages

The following is the syntax of the coding program as follows:

```
4.
5. defined('BASEPATH') OR exit('No Direct script access allowed');
6.
7. class Autentifikasi extends CI_Controller
8.                                  <?php
9. {
10.     public function __construct()
11.     {
12.         parent::__construct();
13.         $this->load->library('form_validation');
14.     }
15.     public function index()
16.     {
17.         if($this->session->userdata('email'))
18.         {
19.             redirect('user');
20.         }
21.         $this->form_validation-
    >set_rules('email','Email','required|trim|valid_email');
22.         $this->form_validation-
    >set_rules('password','Password','required|trim');
23.
24.         if($this->form_validation->run()==false)
25.         {
26.             $data['title']='LOGIN PAGE ';
27.             $this->load->view('templates/aute_header',$data);
28.             $this->load->view('autentifikasi/login');
29.             $this->load->view('templates/aute_footer');
30.         }
31.         else{
32.             $this->_login();
33.         }
34.
35.     }
36.
37.     private function _login()
38.     {
39.         $email = $this->input->post('email');
40.         $password = $this->input->post('password');
41.
```

Figure 6. Coding

3.4 Application Testing

As described above, the web test uses the WAPT Pro 5.0 64 bit software following the results of the Iot-Based Mobile Tower Battery Monitoring Web Test Using Codeigniter (Widodo Purbo, 2021).

a. Performance Test

Figure 7. Performance Test

Referring to Figure 7, there are 10 users involved, the response time from the first minute to the end of the test minute is set with 3 minutes of testing successful session per second 2.41 seconds, successful page per second 2.44 seconds Respontime per second 0.50.

b. Website Security Testing

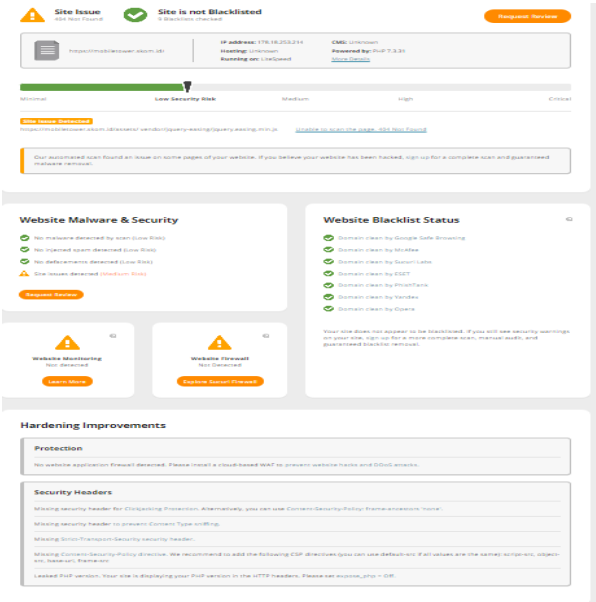

Figure 8. Performance Website Security Testing

3.5 System Implementation Stage

a. The software and hardware requirements in this implementation stage are:

Table 1. Server Hardware Requirements

Items server	Kebutuhan
Disk Space	2Gb
Storage	SSD
Bandwith	Unlimited
OS	Linux/Cloud Linux
Protokol	HTTPS/Quic Support

Table 2. Server Software Requirements

Items server	Kebutuhan
Framework	*Codeigniter*
Intepreter	PHP *Interpreter*
Database	Mysql
Database Management	Php *My Admin*
Script Language	PHP 7.3.3

b. Information System Architecture

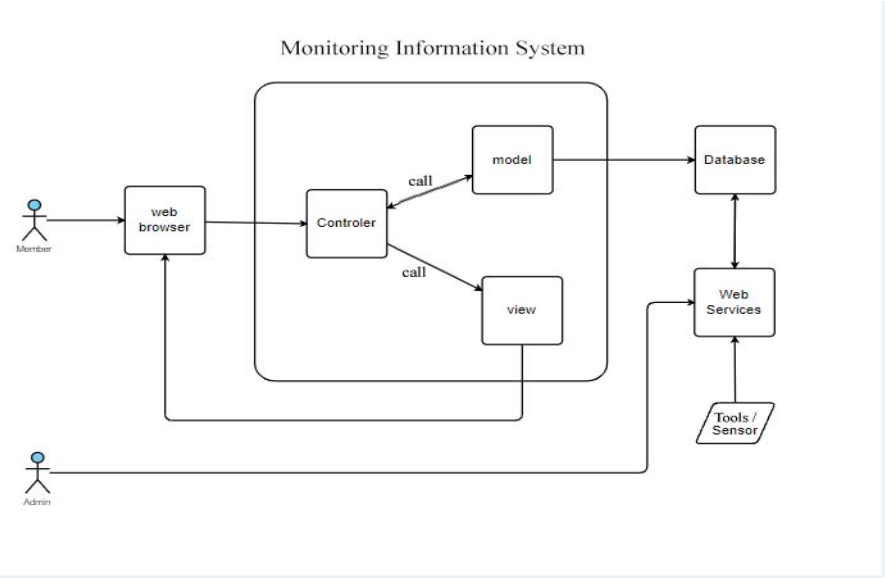

Figure 9. Information System Architecture

In Figure 9 the system is given access by members and admins through a web browser. The system is built by applying the codeigniter framework, in which the framework applies the model-view-controller (MVC) design pattern. The system provides a web service for exchanging data with other systems by implementing a REST API. The web service that is shown on another system is the monitoring system.

3.6 Aplication Result Form

a. Login Form Display

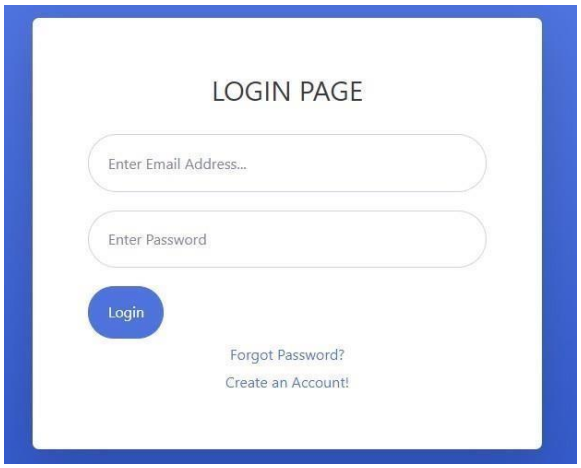

Figure 10. Login Form

In Figure 10 above is the login page to validate the user whether it is registered or not. If there is already an account, please fill in the email address and password. If not, click Create an Account to create a new account.

b. Main Page

Figure 11. Main Page Form

In Figure 11 above is the main page on the member login on this page displayed components that contain menus and submenus to access features on the system. The potential and opportunities of this monitoring system are still great, it is hoped that later this monitoring system can be used globally to assist in the maintenance process of a tool or system in various sectors, both automotive, electrical, plantation, livestock and security systems, both homes and buildings.

4. CONCLUSION

The conclusion that can be obtained from study of website development with codeigniter frameworks is: in developing web-based applications, designers need a framework to simplify the work process. In its development, many frameworks have been created with features that simplify the performance process of an application. The frameworks that will be analyzed in this research are Codeigniter, the test analysis uses Load Test with a file size of 3401 KB. The Codeigniter has a higher average time and speed. In the average time value, Codeigniter has a greater time. time from the first minute to the end of the test minute is set with 3 minutes of testing successful session per second 2.41 seconds, successful page per second 2.44 seconds Respontime per second 0.50. With the increasingly advanced developments in the world of technology in general and IoT in particular, maintenance of electrical equipment would be better if monitoring or monitoring was carried out periodically if necessary in real time so that you could know the condition or performance of the device and then take action to repair or replace the equipment. tool. There are several systems in the IoT field, one of which is a monitoring system, which functions to monitor resources in the form of current, voltage and battery power on the mobile tower, besides that the use of a good monitoring system is expected to reduce damage to electrical equipment.

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REFERENCES

Bruce Johnson. (2019). *Visual Studio Code: End-to-End Editing and Debugging Tools for Web Developers*. Apress.

Dinata, I., & Sunanda, W. (2015). Implementasi Wireless Monitoring Energi Listrik Berbasis Web Database. *Jurnal Nasional Teknik Elektro*, *4*(1), 83–88. https://doi.org/10.20449/jnte.v4i1.120

Engineering, E. (2021). *Internet of Things in Power Industry : Current Scenario of Nepal IoT*. *6*, 1–10.

Fouad, H. (2017). Sensor Node Design for IoT Telemedicine Embedded System. *International Journal of Internet of Things and Web …*, *2*, 106–114. https://www.iaras.org/iaras/home/caijitws/sensor-node-design-for-iot-telemedicine-embedded-system

Hamid, R. M., Rizky, R., Amin, M., & Dharmawan, I. B. (2016). Rancang Bangun Charger Baterai Untuk Kebutuhan UMKM. *JTT (Jurnal Teknologi Terpadu)*, *4*(2), 130. https://doi.org/10.32487/jtt.v4i2.175

Kamel, K., Laid, Z., & Amar, B. (2019). PI Regulator with Tracking Anti-Windup Based Modified Power Balance Theory for SAPF under Unbalanced Grid Voltage Unbalance Non Linear Loads. *Electronics*, *23*(2), 75–80. https://doi.org/10.7251/ELS1923075K

Muhammed, T., Mehmood, R., Abozinadah, E., & Sharaf, S. (2020). Selecweb: A software tool for automatic selection of web frameworks. *EAI/Springer Innovations in Communication and Computing*, 329–346. https://doi.org/10.1007/978-3-030-13705-2_14

Pangestu, A. D., Ardianto, F., & Alfaresi, B. (2019). Sistem Monitoring Beban Listrik Berbasis Arduino Nodemcu Esp8266. *Jurnal Ampere*, *4*(1), 187. https://doi.org/10.31851/ampere.v4i1.2745

Papcun, P., & Kajati, E. (2017). *IoT and Cloud Technology in Residential and Business premises as Ubiquitous Computing*. *2*, 96–105.

Papcun, P., & Zolotová, I. (2016). *IoT Household Controlled by Cloud Technology*. *1*, 103–109.

Patil, A. S., & S, S. K. K. (2020). *Resistant Surveillance System Using Internet of Things*. *5*.

Rahman, F., & Ratna, S. (2018). Perancangan E-Learning Berbasis Web Menggunakan Framework Codeigniter. *Technologia: Jurnal Ilmiah*, *9*(2), 95. https://doi.org/10.31602/tji.v9i2.1370

Satriady, A., Alamsyah, W., Saad, H. I., & Hidayat, S. (2016). Pengujian Pengaruh Luas Elektroda Terhadap Karakteristik Baterai LiFePO4. *Jurnal Material Dan Energi Indonesia*, *6*(02), 43–48. https://jurnal.unpad.ac.id/jmei/article/view/10959

Sigit, C. (2010). *Pengantar Manajemen Proyek Berbasis Internet*. PT. Elex Media Komputindo.

Tengku Azirudin. (2019). *Mudah Membuat Website Menggunakan CodeIgniter*. Andi Publisher.

Teresna, I. (2014). Pengujian Charger Modul Simulasi Solar Cell. *Teknik Elektro*, *15*(2), 30–39.

Ullah, A. (2018). IoT: Applications of RFID and Issues. *International Journal of Internet of Things and Web Services*, *3*, 1–5.

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