UNIVERSITI TEKNOLOGI MARA CAWANGAN JOHOR
KAMPUS PASIR GUDANG

FINAL YEAR PROJECT 2 (EEE368)

REPORT

SMART OVER VOLTAGE OR UNDER VOLTAGE WITH RELAY USING ARDUINO

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ABSTRACT

Overvoltage conditions in a circuit, comprising components such as capacitors, wires, switches, and light bulbs, can lead to progressive damage. Similarly, undervoltage conditions can degrade performance as components are forced to operate under more strenuous conditions. These issues are prevalent in both DC and AC circuits and can lead to significant problems over time. Given that most households globally utilize AC power for their electrical components, and considering that electrical faults were the second leading cause of home structure fires from 2015 to 2019, accounting for 13% of such incidents, the need for a solution is evident. This project, titled 'Smart Over Voltage Or Under Voltage With Relay Using Arduino', aims to mitigate these risks. The system is designed to monitor voltage levels and detect if they exceed or fall below certain thresholds. The Arduino Uno D1 R1, integrated with an ESP8266, serves as the microcontroller for this system. It not only monitors voltage stability but also controls other components, such as an LED that blinks and a buzzer that emits a continuous sound in the event of undervoltage conditions. The Arduino Uno D1 R1 also transmits data to an LCD to display the current voltage and forwards the output to an online software platform. This feature enhances user accessibility, as the software can be accessed via a smartphone. The system also enables users to interrupt the circuit remotely through the software if the voltage becomes excessively high, allowing them to seek professional assistance to rectify the issue. A prototype system has been developed as part of this project.

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Thank you,

TABLE OF CONTENT

CHAPTER 1

INTRODUCTION

1.1 Project overview

This project is about an overvoltage an undervoltage detector that will be using the concept of IoT. The things that will portray in this project is the detection of a voltage either it is in a safe limit and make the other component in the circuit work just fine. It is controlled by the voltage sensor. The voltage sensor will detect the voltage through the circuit. If the voltage is over the limit, the red LED will turn on continuously without blinking and same goes with the buzzer that will continuously create sound to alert the user that there is an overvoltage on the circuit. The yellow LED and buzzer will also turn on and blinking continuously if the voltage is under the limit. A relay is also install in this project to break the circuit from receiving any voltages from the power source that makes the component is not overload that will lead to a broken component or even worse fire explosion occur.

Besides that, the user also can monitor the voltage via smartphone since the Arduino uno is integrated with WIFI ESP8266 that helps the project to connect to the wifi available nearby. The output, that is voltage, will be shown in a form of graph, the voltage value and also an indicator is it over, under or perfect voltage. Overall, This system helps the user to quickly realize if there is a problem on the circuit and act fast to solve it.

1.2 Objective

1. To Develop a functional protype of a smart over and under voltage detector using Arduino uno D1 R1 integrated with esp8266

2.To analyze the productiveness and effectiveness of the smart voltage detector circuit