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Electric Lineman Safety with Password Authentication–Protected Based Circuit Breaker

P. Prabhaker[1] and Dr. K. Kumaraswamy[2]
Asst. Professor, Dept. of Electrical & Electronics Engineering[1]
Assoc. Professor, Dept. of Electrical & Electronics Engineering[2]
Christu Jyothi Institute of Technology & Science, Jangaon, Telangana, India

Abstract: *Electrical accidents during line repair pose serious risks to maintenance staff, especially linemen. To address this safety concern, we propose a novel system that enhances lineman safety [12] by providing controlled access to circuit breakers. The system is powered by a microcontroller (from the 8051 family) that manages circuit breaker [4] operations. Amatrix keypad allows linemen to securely input a password [1]. The entered password is compared with the stored password in the microcontroller's ROM. Only if the password is correct can the circuit be turned ON/OFF. Activation and deactivation of the circuit breaker [11] are indicated by an ON/OFF. Additionally, the system can be interfaced witha GSM modem, allowing remote monitoring of circuit breaker [13] conditions via SMS. To further enhance security, we have added OTP verification using GSM. Before the circuit can be turned ON/OFF, an OTP is sent to the lineman's mobile phone. The lineman must enter this OTP into the keypad to validate the operation. This ensures that no one can operate the circuit without the lineman's permission during operation. By implementing this password-protected circuit breaker [1] with OTP verification, we aim to significantly reduce accidents, enhance lineman safety [7], and improve communication within the electrical[6] maintenance ecosystem.*

Keywords: Circuit Breaker, Matrix Keypad, Microcontroller, GSM

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