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## Abstract:

There is a constant push for automation, portability, and remote control in the management systems of all organizations. A new IoT -based multifunctional smart energy meter is presented in this paper for automated metering and billing system. Arduino Nano with GSM Short Message Service (SMS) connection provides a meter reading system with predefined automatic functions followed by ESP-8266 WiFi Module to monitor energy parameters. Proteus 8.0 was used to model the project before the hardware implementation was built. With the GSM module and embedded controller, the proposed system can transmit data such as kWh consumption and generated bills over the GSM network, which can then be fed into existing energy management systems at power companies or organizations to provide services to customers without the need for human intervention. As a result, consumer energy analysis is made considerably simpler and more manageable. This device aids in the detection of power theft as well. As a result, this smart meter facilitates wireless connection and home automation utilizing IoT, which is a significant step towards a Digital Bangladesh. Moreover, a prepaid mode is incorporated as part of billing system.

**Keywords:** Smart Energy Meter (SEM), Arduino (Microcontroller), Global System for Mobile (GSM), Short Message Service (SMS), Internet of Things (IoT), Prepaid Energy Meter, WiFi Module, Overload & Electricity Theft.