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Power Message Generation in SmartGrid via Raspberry Pi

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ABSTRACT

The Smart Grid is an evolution of the existing electricity grid. It comprises of a two-way communication where electricity and information are exchanged by the consumer and utility to maximize efficiency. Advancement in technologies has made homes more convenient, efficient and even more secure.The main objective of present work is to design a power messages smart grid using various sensors which can be controlled and monitored by the Raspberry Pi via the Internet of Things (IoT). This will help the home owners to provide a simple, fast and reliable way to automate their environment.This method proposes Smart grid systems consist of digitally based sensing, communications, and control technologies and field devices that function to coordinate multiple electric grid processes.

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INTRODUCTION

The gets the units data from the Energy meter and sends the acquired data to the server (Raspberry Pi) via Zig-bee transmission. The server in the transmission system is connected to the cloud, through this we can able to monitor and control the EB lines of every consumer through Internet. This system, also serves to shut off the consumer‘s particular product which consumes more units. This system also helps the consumers to monitor their daily usage of electricity through the Internet. The transfer of electricity and information between consumer and utility would increase efficiency, reliability and security. A more intelligent grid includes the application of information technology systems to handle new data and permits utilities to more effectively and dynamically manage grid operations. The information provided by smart grid systems also enables customers to make informed choices about the way they manage energy.

OBJECTIVE:

The smart grid is an advanced platform to the way we receive electricity today. In earlier times the demand for electricity was substantial compared to that presently. The Raspberry Pi can be used to automate a smart gridat a relatively low cost. It operates on the concept as the IoT. There are numerous things that make the Raspberry Pi essential for grid automation but the one that stands out the most has to be the remarkably affordable cost. The vast amount of sensors at

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extremely low cost makes it‘ssuper for smart grid automation.The Raspberry Pi can beprogramed to be a security systemwith as many sensors.

THEORETICAL IMPORTANCE OF STUDY

The overcurrent (OC) protection strategy depends on the accurate measurement of the fault current magnitude and its relative value compared to the predefined threshold. If a fault has occurred, then the protection devices must respond in a coordinated manner for fast and selective isolation of the fault anywhere along the feeder and laterals. The design and implementation of this strategy is effective in radial distribution network with uni-directional current flow.However, integration of distributed energy resources (DER) sources in the radial feeders alter the topology of the distribution network making it a multi-source dynamic network with bi-directional current. distributed generation (DG) is leading to important changes in the operation of distribution networks. In this context, the protection schemes are experiencing major transformations. Traditionally, fault detection together with the associated relaying schemes and fault location1 functionalities have been considered as separate processes since the latter usually requires computational efforts that do not fit the time latencies needed by the protections.The majority of them are based on impedance measurements, travelling waves or phasor measurements. However, to the

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best of the authors' knowledge, the existing literature has marginally discussed the possibility of merging the detection and location functionalities.

Electric transmission and distribution utilities have been increasingly asked to minimize power outage times and operating costs due to short-circuits. In this context, the development of fast and reliable techniques able to diagnose faults in both transmission and distribution grids is an issue that has been widely studied worldwide for decades.In distribution networks (DN), a special class of faults called high impedance faults (HIF) is difficult to deal with, since it is usually not detected by conventional over current-based protection devices. In fact, HIF current levels are normally similar to those obseErved during the steady-state, what jeopardizes the operation of conventional protection and fault location devices.

RESULT

Effective power outage cause identification can help expedite the restoration procedure and improve the distribution system reliability and availability. Investigations confirmed the robustness of the approach under communication failures, different fault inception angles, and the presence of CTsaturation. Use IOT communications and relay-to-relay control to create new protection schemes and to combine traditional schemes to reduce costs and fast identification of line fault

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