Smart System Using Lora Technology to Connect Rural Areas Underserved by Existing Internet and Telecommunication Technologies

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LoRa, Sigfox, and Narrowband-Internet of Things (NB-IoT) are some of the long-distance, low-power wireless communication technologies developed in the recent past. The proposed system consists of mainly nodes and a gateway as the fundamental system architecture. Nodes only communicate with the gateway individually and the gateway communicates with all the nodes separately and wirelessly. System in this proposed study, uses long range low power RF wireless communication technique for primary data communication, where an Internet connection will not be required for the communication between the gateway and the nodes. Any number of nodes can be paired with the gateway, and the gateway can individually communicate with each and every node. Furthermore, gateways have the ability of storing real-time data. Due to its unique design, the proposed system in this study, can achieve addressable, bidirectional, and continuous data communication even without the Internet connection. The bidirectional communication design of this proposed system facilitates real time and uninterrupted simultaneous handling of monitoring/sensor devices and controller devices without the need of a separate controlling system. As this system consists of those unique features, it is recommended to use in the rural areas underserved by current internet and telecommunication technologies. Furthermore, with the in-built option to get connected to the Internet, this system can be further expanded to an IoT based addressable data communication, processing, and visualization systems by eliminating the major technical problems in typical IoT systems such as interrupted communication and data losses during an Internet connection failure, power concerns and customization issues. This system is highly customizable, and the nodes and the connected devices can be controlled through the gateway or remote dashboard by assigning automated or user defined custom commands. These features together improve the robustness of the system and facilitates enhanced data recovery in case of a failure in the Internet connectivity.