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ENERGY-AWARE SELF CONFIGURATION FOR SCHEDULED IOT DEVICES BASED ON DEEP SLEEP FOR EFFECTIVE LOAD BALANCING

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Most of the devices in the modern industrial environments are interconnected and provide a wide range of services such as collecting data, taking actions and providing alerts. The Internet of Things (IoT) plays a major role in modern industrial environments that help make critical decisions based on the analysed data generated by many interconnected devices. Manufacturers and service providers always make efforts to minimise the configuration and management of devices. They want the devices to self-evolve and take decisions without involving a centralised system. The main purpose of this study is to introduce an energy-aware self-configuration for scheduled IoT devices based on deep sleep for effective load balancing. The proposed method helps IoT devices decide their deep sleep time-frequency by themselves by considering the remaining operational time, battery life, and current deep sleep time duration. Usually, self-configurable devices take actions based on the analytics provided by a centralised server. However, it requires extra energy to send an additional network call for each cycle. The proposed method can update the deep sleep frequency by skipping a one-time cycle at a time. Spanning of the time cycle improves the performance of the load balancing as well. Because it avoids the additional communication with the server for each cycle and calculates the critical values itself, the proposed method can save energy around 150 times more than a single network call over Wi-Fi. Moreover, since it skips a time cycle to save energy at a time, when necessary, the performance of the scheduling mechanism will also be improved.

Keywords: Deep sleep, Energy efficiency, Load balancing, Scheduling, Self-configurable devices