Abstract

Air temperature and velocity measurements are important parameters in many applications. A transmitter module is powered by a dc tachogenerator scavenging energy from the airflow has been designed. It transmits the measured air temperature and velocity to a receiving unit. The system consists of a self-powered wireless sensor and the receiver unit. The self-powered sensor has a section for energy harvesting. The self-powered sensor consists of integrated devices, including microcontroller, an integrated temperature sensor, and a transmitter in low-power technology. The data transmission is realized with amplitude-shift-keying modulation, in Manchester encoding, covering a distance between the sensor and the reader up
to 4–5 m, which depends on the power supplied in transmission. The velocity of air is measured using the rotor frequency of the dc tachogenerator, whereas, a commercial low power sensor is used for the temperature measurement. A system has been designed experimentally and fabricated, which demonstrates that the airflow harvester can power the self-powered wireless sensor permitting measurements of air temperature and velocity. The system is used for real-time monitoring of temperature and velocity of air. The sensor module placed into the common environment with continuous flow of air does not require any batteries.

References

Keywords
Energy Harvesting  Dc Tachogenerator  Arduino  Zigbee

Index Terms
Computer Science  Applied Sciences