ID 474

Thermography and Thermal Sensors as a Breast Cancer Early Diagnostic Technique: A Review

MKPSSA Perera[1#], MPA Karunaratne[2], WPLK Wijesinghe[1], and NMA Perera[3]

[1]Faculty of Engineering, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka
[2]Faculty of Engineering, University of Moratuwa, Katubedda, Sri Lanka
[3]Kings Hospitals, Kirulapana, Sri Lanka

[#]angeloperera@ieee.org

Abstract

Breast cancer is a widespread and devastating disease with significant global morbidity and mortality. Early detection plays a crucial role in improving outcomes and survival rates. However, current breast cancer screening methods, such as mammography, ultrasound, and magnetic resonance imaging, have limitations, including false-positive and false-negative results, high costs and radiation exposure. This literature review examines the potential of thermography and thermal sensors as a non-invasive and radiation-free screening technique for breast cancer detection. Increased metabolic activity around tumor cells leads to temperature asymmetry and alterations in blood flow, which can be detected through thermographic techniques. Research studies have shown promising results, demonstrating high sensitivity and specificity in detecting breast cancer using thermography. Recent developments in breast cancer screening involve the use of surface thermal sensors, such as flexible antennas integrated into wearable bras and thermal sensor arrays. While these advancements show potential, they require further validation and improvements. Thermography and thermal sensors hold promise as a non-invasive, radiation-free, and potentially cost-effective screening method for breast cancer detection and technological advancements are necessary to overcome current limitations to establish its efficacy as a standalone or complementary screening tool.

Keywords: *Breast cancer, Thermography, Thermal sensors, Early diagnosis*