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## Framework for estimating tumour parameters using thermal imaging.

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### Abstract

#### BACKGROUND & OBJECTIVES:

Non-invasive and non-ionizing medical imaging techniques are safe as these can be repeatedly used on as individual and are applicable across all age groups. Breast thermography is a non-invasive and non-ionizing medical imaging that can be potentially used in breast cancer detection and diagnosis. In this study, we used breast thermography to estimate the tumour contour from the breast skin surface temperature.

#### METHODS:

We proposed a framework called infrared thermography based image construction (ITBIC) to estimate tumour parameters such as size and depth from cancerous breast skin surface temperature data. Markov Chain Monte Carlo method was used to enhance the accuracy of estimation in order to reflect clearly realistic situation.

#### RESULTS:

We validated our method experimentally using Watermelon and Agar models. For the Watermelon experiment error in estimation of size and depth parameters was 1.5 and 3.8 per cent respectively. For the Agar model it was 0 and 8 per cent respectively. Further, thermal breast screening was done on female volunteers and compared it with the magnetic resonance imaging. The results were positive and encouraging.

#### INTERPRETATION & CONCLUSIONS:

ITBIC is computationally fast thermal imaging system and is perhaps affordable. Such a system will be useful for doctors or radiologists for breast cancer diagnosis.

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