|  |  |  |  |
| --- | --- | --- | --- |
| **Title:** | Simulation of High intensity Focused Ultrasound Device in Healthcare Application for Non-Invasive Heat Induced Tissue Ablation | | |
| **Author(s) Name:** | A. T. Naziba, Mohammad Nasir Uddin | | |
| **Contact Email(s):** | drnasir@aiub.edu | | |
| **Published Journal Name:** | 2nd International Conference on Computing Advancements (ICCA '22) | | |
| **Type of Publication:** | Conference | | |
| **Volume:** |  | Issue |  |
| **Publisher:** | IEEE | | |
| **Publication Date:** | Published – 11th August 2022 | | |
| **ISSN:** | ISBN: 9781450397346 | | |
|  |  | | |
| **DOI:** | 10.1145/3542954.3543022 | | |
| **URL:** | https://doi.org/10.1145/3542954.3543022 | | |
| **Other Related Info.:** | pp. 473-477, Paper ID-176 | | |
|  | | | |

|  |  |
| --- | --- |
| **Abstract:** |  |
| Since the last decade, High Intensity Focused Ultrasound (HIFU) has been actively used in medical care for the treatment of various cancers. HIFU is a technique that employs a fixed ultrasonic transducer with a focusing lens, allowing the transmitted signal to reach higher intensity levels within a specific focal zone of relevance. Mechanical and thermal impacts are the main steps of HIFU ablation. In this study, experiments and simulations on tissue ablation with HIFU were carried out to see how multiple tissue ablation worked and how to improve tumor ablation while avoiding damage to surrounding healthy tissue by adjusting the ideal intensity and lens radius of curvature of the transducer. The analysis employs clinical applications to evaluate the optimum properties of the proposed model. For this experiment, several soft and hard tissues were selected from the human body. Each tissue's temperature was determined to be 310.15-degree Kelvin. At a specified acoustic power and exposure time, the tissues' optimal frequency (1.6 MHz, 2.25 MHz, 3.4 MHz, and 3.5 MHz) and power (10 W, 17 W and 20 W) were identified. By using a focal length of 60 mm, we have completed all of the computations. Numerous cancers, including the brain, heart, skull, liver, kidney and bone, have all shown positive results. This finding looks promising for HIFU tumor ablation surgery. | |