BREAST CANCER DETECTION USING PATCH ANTENNA

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ABSTRACT

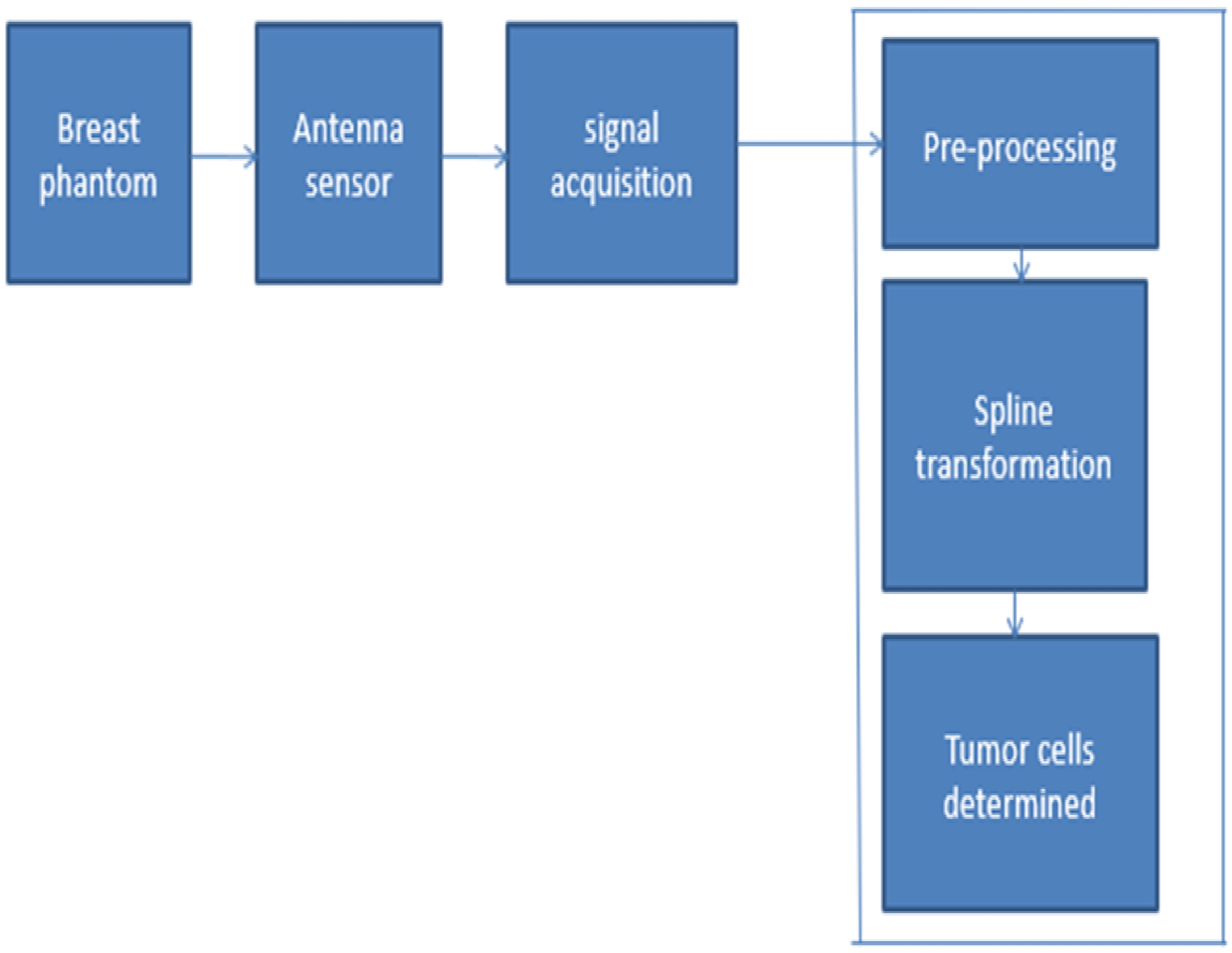
In the today's world, communication systems using wireless technology is improving a lot and is the most widely researched area. This study of communication systems is incomplete without an understanding of the operations and techniques used in the antennas. Of these, there are many techniques that have been used to feed microstrip patch antennas. Edge feeding and inset feeding are the two among those techniques. We are chosen to compare edge feed and inset feed due to the advantage that it can be easily fabricated and simplicity in modelling as well as impedance matching. The functional characteristics and output parameters like VSWR, Return loss, Radiation pattern of these Microstrip Patch Antennas varies depending upon the technique used. Comparison of above mentioned parameters have been made on the basis of feeding on Microstrip Patch Antennas with their simulated performance characteristics. Both models have been designed and simulated in Advanced Design System (ADS) which is an electronic design automation software system.

INTRODUCTION

Breast tumor is one of the most life-threatening diseases and hence its detection should be fast and accurate. The medical imaging techniques such MRI, CT ,micro wave are used to detect tu-mour. However, due to grayscale noise tumour region in image are not properly visible. Hence we propose a antenna based approach to detect tumour cell less than 10mm.

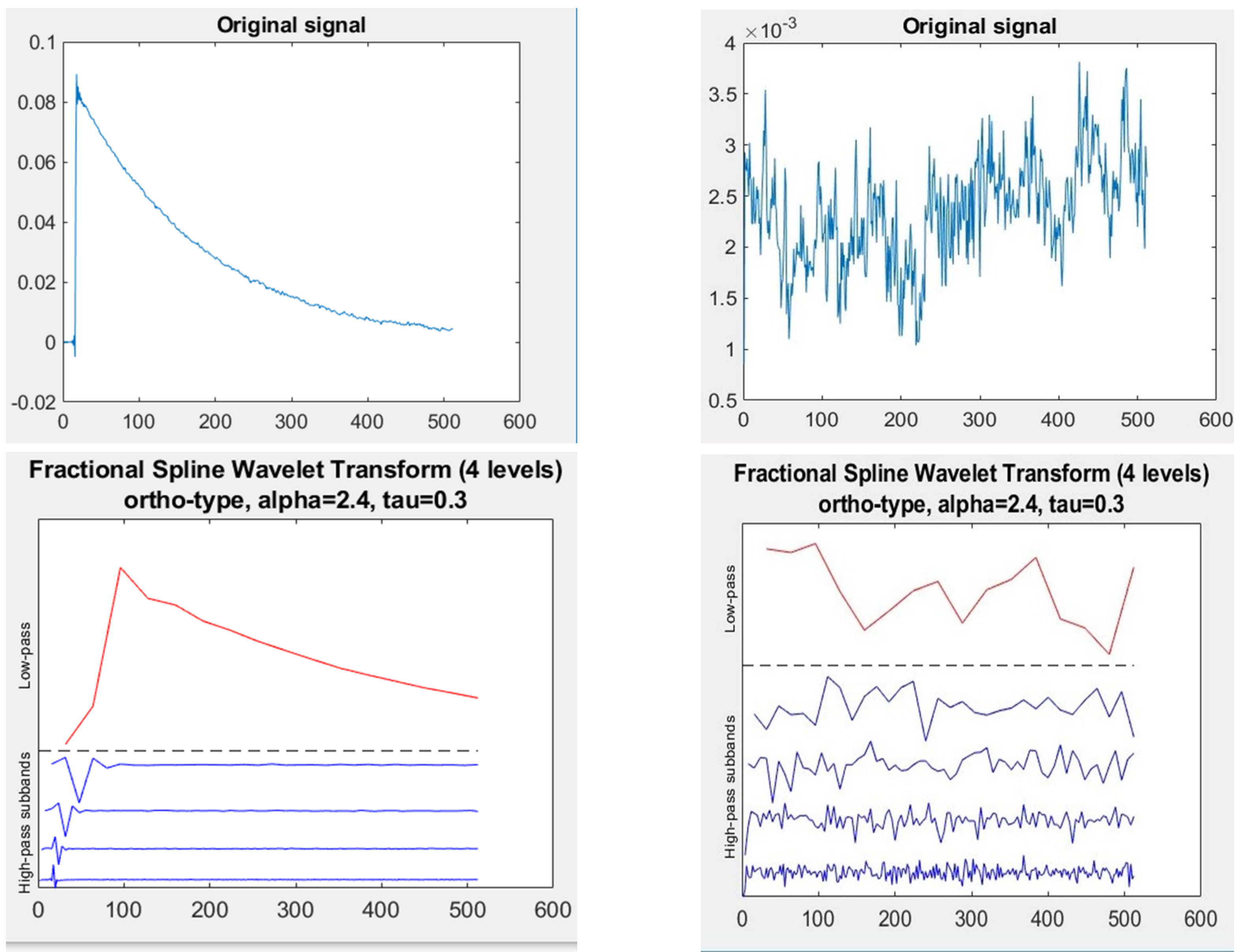
METHODOLOGY

In this chapter, the existing model and proposed model, block diagram of the project are going to be discussed along with the detailed description of proposed tools with their feature. The exiting system uses particle swarm optimization (PSO) method to detect optimal point to treat breast cancer. The antenna operates at 4.2 GHz and heat the cancer cell at 42 degree celcius to treat the cancer cell. We propose a new antenna design with different operating frequencies to detect cancer cells less than 10mm.The antenna emits minimal radiation compared to conventional systems. Earlier diagnosis of cancer enables physicians to treat cancer cell with tablets and eliminate the need for surgery and chemotherapy.



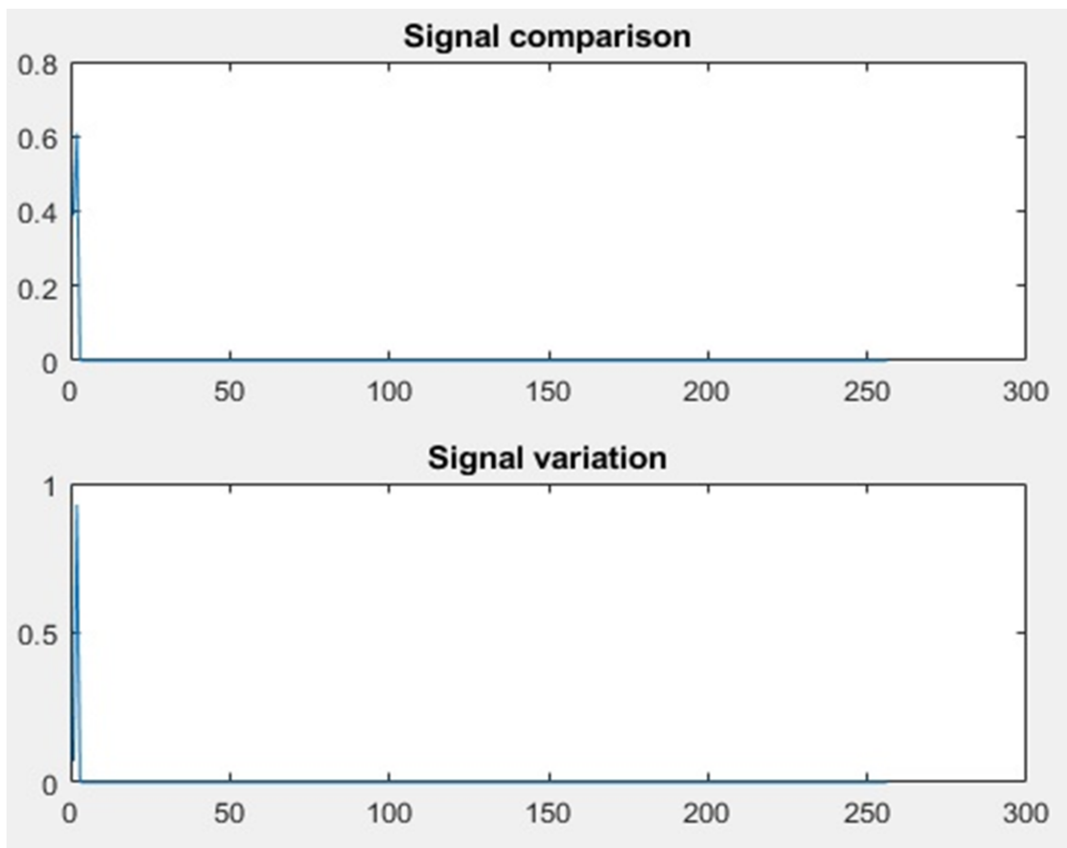
performance

The MATLAB shows us the output for the frequency range in waveform of the tumor affected and unaffected region of the breast phantom with its fractional wavelet spline transformation. And it also shows us the comparison graph for affected and unaffected region of the breast phantom with its variation.



Throughput graph and performance analysis:

The performance analysis in terms of comparison of two waveforms of the various region in the breast phantom with its variation is represented in terms of a comparison graph,



CONCLUSION

The proposed method uses a global optimization method (particle swarm optimization) to find the required excitations of 24 antenna elements surrounding the breast to focus the power at the tumor while preventing any hot spot in the healthy tissue. The optimized excitations were then applied in the experiments. To that end, an experimental platform that includes 4.2 GHz signal generator, power amplifier, power dividers and three-dimensional antenna array of 24 antenna elements was built. An anatomically realistic thermo-dielectric very dense breast phantom with 1 cm3 tumor was fabricated and used. The results using high sensitivity thermal camera confirm the validity of the proposed technique in which the temperature was raised to therapeutic values at the tumor while keeping healthy tissue at normal temperature. There are many areas in which this work will continue to be explored in the future: incorporation of the low-noise amplifiers and switches into the system; imaging of phantoms with different sized tumors and with phantoms that have more than one tumor; imaging of phantoms that have glandular tissue; more thorough investigation of imaging using two antennas that are opposite each other, beside each other, oriented along the same plane and oriented 90° apart; imaging using more than one receiving antenna (our system allows for up to 15); testing of various matching mediums.