Title:	Measurement of elastic constant using photoacoustic technique
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Abstract:	Photoacoustic tomography has been a fast-growing biomedical imaging method for the last few years. It is an intrinsically hybrid biomedical diagnostic modality which is based on light excitation and ultrasound detection. In photo-acoustics (PA), short- pulsed laser light diffusively penetrates into tissue and is selectively absorbed by spe- cific chromophores, such as Haemoglobin, causing ultrasound waves to be generated by thermoelastic expansion. These are then detected by broadband ultrasound detec- tors at the surface of tissue. Since ultrasound scattering is considerably lower than light scattering in biological tissue, the information carried by ultrasound waves arrive with less losses and distortion at the tissue surface than light waves would do. Domain for PA methods is both optical and acoustic, hence, it has a lot of advantages such as high penetration depth, good spatial resolution, high contrast, etc over other optical and acoustic methods independently. Also, the non-ionising property of PA gives it a wide scope in the medical field related to micro-vascular systems. This dissertation explores the measurement ability of PA method for physical prop- erties like Young's modulus and size of PA source. We have come up with our own method to measure elasticity indirectly using the photoacoustic technique. We de- termined the approximate measure of the Young's modulus of a micron sized object by analysing the parameters of detected acoustic signal from PA source. We have performed both simulation and experiment to devise the mathematical model to es- timate Young's modulus and verified the indirect results by comparing it to directly measured value. This project has huge application in medical field and microfluidics as elasticity reveals diagnostic information of ageing and health status of living beings.
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