Machine learning-based quantitative photoacoustic tomography (P-1284)

Key facts

- Image processing for fast and accurate quantitative photoacoustic tomography (PAT)
- Machine learning method to estimate optical property of tissue
- Fully-integrated apparatus and software for medical photoacoustic imaging analysis

Abstract
Photoacoustic imaging allows viewing various metabolic, anatomical, histologic properties of tissues and other physiological phenomena. It has many advantages over conventional scanning methods (such as MRI) since it is high resolution, real-time and in particular non-ionizing. Furthermore it can be used to acquire functional information. In clinical practice and animal research it can be applied to cancer diagnosis and therapy amongst others.
One of the current challenges in the PAT market is that not a single image processing-based method for fast and accurate quantitative photoacoustic imaging tomography has been developed. The state-of-the-art relies on overly complex hardware set-ups, time-consuming computations and retrospective image analysis. Our technology offers the solution with fast, accurate and machine-learning image processing.

Development Stage
The method has been successfully tested and demonstrated in silico.

The Technology
The proprietary technology includes a method, a computer program and an apparatus for estimating an optical property of a tissue from a photoacoustic image in a fast, simple and accurate manner allowing real-time, in vivo application. Specifying the optical properties of a tissue is vital for interpreting diagnostic measurements, designing devices and planning therapeutic protocols (e.g. photodynamic therapy).

Applications and Commercial Opportunity
Technology is available for in-licensing or co-development.

Inventors
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Intellectual Property
“Machine learning-based quantitative photoacoustic tomography (PAT)” priority EP 16 177 204.1 filed June 30, 2016; PCT published WO2018/001702.

Further Information
No other public information is currently available, but further information (speaking with the inventor) is available under a signed Confidential Disclosure Agreement (CDA).

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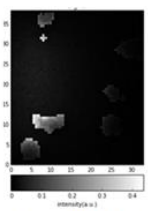
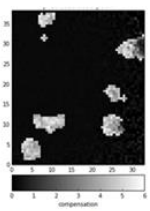
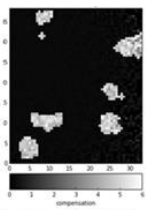
References:
Quantitative spectroscopic photoacoustic imaging: a review by Cox B, Laufer JG, Arridge SR, Beard PC. J. Biomed. Opt. 0001;17(6): 061202-1-061202-22. doi:10.1117/1.JBO.17.6.061202.


(i) Simulated PAT image


(ii) Estimated image of optical absorption


(iii) Ground truth image of optical absorption