GERMAN CANCER RESEARCH CENTER
IN THE HELMHOLTZ ASSOCIATION

Research for a Life without Cancer

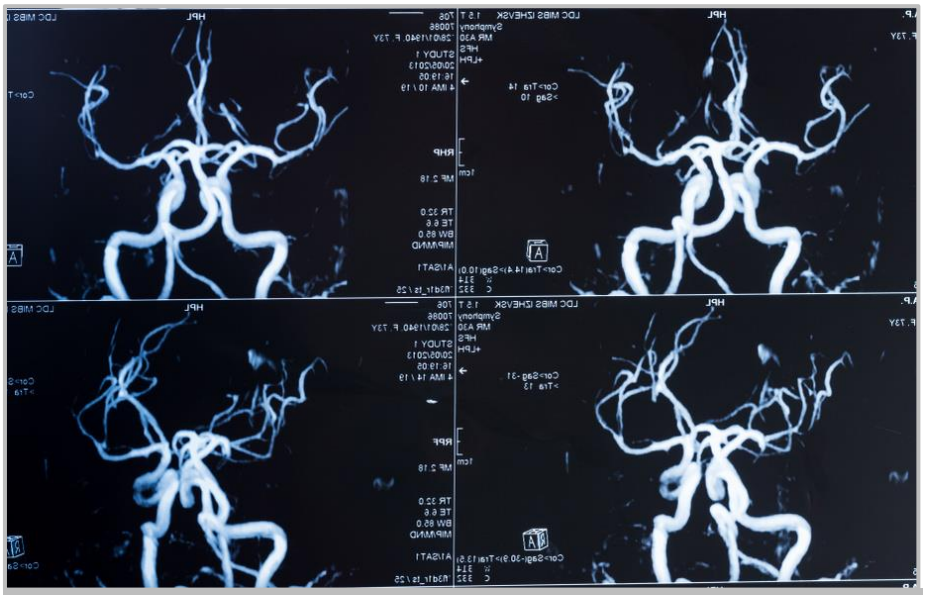
TECHNOLOGY OFFERS

Machine Learning-Based Quantitative Photoacoustic Tomography (P-1284)

Image processing for fast and accurate quantitative photoacoustic tomography

EXECUTIVE SUMMARY

Currently, the state-of-the-art in the Photoacoustic imaging 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. 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).



Category	Indication	Development stage	Seeking
Devices, Software	Tomography	Prototype	Licensing, Development partner

BENEFITS

- 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

TECHNOLOGY BACKGROUND

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.

DEVELOPMENT STAGE

The method has been successfully tested and demonstrated in silico.

APPLICATIONS

The solution that this technology offers is fast, accurate and based on machine-learning Image processing. Technology is available for in-licensing or co-development.

INTELLECTUAL PROPERTY

Patent application submitted.

- “Machine learning-based quantitative photoacoustic tomography (PAT)” priority EP 16 177 204.1 filed June 30, 2016; PCT published WO2018001702A1.
- EP3479288A1 and US20190192008A1 are pending.

PUBLICATIONS & REFERENCES

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- Kirchner, T., Gröhl, J. and Maier-Hein, L., 2018. “Context encoding enables machine learning-based quantitative photoacoustics. Journal of biomedical optics”, 23(5), p.056008.
- Gröhl, J., Kirchner, T. and Maier-Hein, L., 2018, “Confidence estimation for quantitative photoacoustic imaging.” In Photons Plus Ultrasound: Imaging and Sensing 2018 (Vol. 10494, p. 104941C). International Society for Optics and Photonics.

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ABOUT THE DKFZ INNOVATION MANAGEMENT

Working at the interface of research and industry, the Innovation Management of the German Cancer Research Center (DKFZ) helps to get new cancer medications, diagnostic tests, and research instruments onto the market as quickly as possible.

The DKFZ with its more than 3,000 employees is the largest biomedical research institution in Germany. At the Center more than 1,300 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. DKFZ is a member of the Helmholtz Association of National Research Centers, with ninety percent of its funding coming from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg