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Gesellschaft für
Technologietransfer mbH

Dynamic 3D imaging for lung monitoring

3D imaging, medical technology, lung, ARDS, pulmonology, pulmonary function diagnostics, artificial intelligence (AI), long-term diagnostic tool, treatment monitoring

DESCRIPTION OF TECHNOLOGY

The determination of lung ventilation is very important for diagnostics as well as therapy planning and monitoring in many lung diseases like Acute Respiratory Distress Syndrome (ARDS) e.g. after COVID infection. Existing methods have the disadvantage that they usually only measure statically, cannot be used on a long-term basis and are also very expensive. They are associated with high logistical and personnel costs.

The new method now allows, for the first time, dynamic 3D imaging of the ventilation of the entire lung in real time, using a combination of electrical impedance tomography (EIT) and acoustics. The method also offers the possibility of long-term 3D ECG acquisition.

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The 3D monitoring of the lung is carried out e.g. via "smart" clothing, which is equipped with electrical components and uses special software to record and transmit the data. The integration of an AI enables the user a selection of the obtained values.

As the measurement is non-invasive and free of radioactive radiation, it can be carried out continuously and directly at the patient's bedside. Mobile applications are also possible. This allows changes to be recognised directly and therapy adjustments can be made promptly.

APLICATION FIELDS

- Diagnostics and therapy (planning and monitoring)

- Long-term measurements
  esp. in pulmonology and intensive care medicine

- Outpatient diagnostics
  e.g. emergency services, care sector

AT A GLANCE …

Application Fields

- Pulmonary function diagnostics
- Diagnostics & Therapy in Pulmonology and Intensive Care Medicine
- Portable application e.g. in ambulances and long-term monitoring

Business

- Medical technology

USP

- Dynamic, 3D imaging of the complete lung
- Real-time, non-invasive, radiation free
- Combines EIT, ECG, Sound & AI
- Suitable for outpatient use

Development Status

- Laboratory setup exists
- Testing on animal lungs
- Basic feasibility has been demonstrated

Patent Status

Priority application filed on 10.10.2022 with the European Patent Office.

REFERENCE NO.: **TM 1151**

ADVANTAGES OVER THE PRIOR ART

- dynamic, real-time 3D imaging of lung ventilation

- non-invasive, radiation-free method

- application in form of a waistcoat

- combination of EIT, ECG, sound and AI

- comparatively low financial and equipment costs

- outpatient long-term monitoring possible

STATE OF THE DEVELOPMENT

A first laboratory setup, which has been tested on animal lungs, exists. Further product development is in the planning and will be continuously implemented together with the software.

MARKT POTENTIAL

Pulmonary function diagnostics and continuous monitoring are particularly necessary for patients with Acute Respiratory Distress Syndrome (ARDS), but also in general for all patients in the intensive care unit and chronic lung patients, in order to monitor their progress and to be able to adapt and improve therapies.

The Robert Koch Institute (RKI) currently estimates that there are about seven million patients with acute respiratory diseases in Germany. In view of the increasing number of patients with acute and chronic respiratory diseases, e.g. COPD, including (Long) COVID patients, there is a considerable need for diagnostic and therapeutic options to help these patients. The described device will make an important contribution in this regard. The device can be used in the diagnosis and therapy support of patients with respiratory diseases by providing an accurate and comprehensive representation of lung function. The incorporation of artificial intelligence (AI) enables more accurate diagnosis and better selection of relevant data for therapy. The potential for the use of this device is great, as it can be used in many areas of diagnosis and therapy of respiratory diseases. In addition, the device could also be used by doctors and medical staff for general monitoring of patients to detect changes in lung function in time and adjust therapy accordingly.

COOPERATION OPPORTUNITIES

On behalf of Technische Hochschule Mittelhessen and Justus-Liebig-University Gießen, TransMIT GmbH is looking for partners for further development or licensees.

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