Marker paste for medical and industrial imaging (MRI, CT, X-Ray) and visualization of materials and external body surfaces

Technology #cu13187

Magnetic resonance imaging (MRI), CT-scans and X-Rays have become ubiquitous tools in material science and the study of body and brain structure, function, development, and pathology. However, in spite of continuing advances, it remains difficult to localize internal structures visualized on MRI/CT/X-ray images with externally identifiable landmarks. This elusive goal is critical for fully realizing the potential of these medical advances in designing materials, surgical planning, implant positioning, and stereotactic guidance applications. This technology presents a new approach to localizing the externally visible anatomy and landmarks with the imaged internal structures. The technology describes a composition that forms a paste that can be applied to any surface, including the human body directly, as well as to instruments, devices, tubes, and other items of interest to a research or medical team. This paste is visible on all types of MRI/CT/X-ray imaging and allows for precise correlation of external and internal structures.

Application of external marker paste allows localization of internal body structures with externally visible landmarks

The challenge of correlating internal and external structures on medical images lies in the way these devices detect structures. For instance, on many sequences designed to visualize internal structures such as a brain, the surface of the body including the skin or dura is either poorly defined or not imaged at all. If one were to attempt to image both the superficial structures and internal structures using existing technology, say MRI scanners, the process would require a second sequence calibrated to detect the superficial structures, increasing the cost and time of the scan. While contrast agents such as Gadolinium are on the market, these agents are only for internal use as an injection and provide no definition of superficial structures. Additionally Gadolinium and other agents do not have a uniform appearance across all sequence protocols and therefore require the clinical or technician to consider another variable when interpreting the MRI image. The composition described in this technology is visible on all types of MRI sequences, CT-scans and X-rays, allowing a single scan to visualize both the anatomy of interest (e.g. the brain), as well as the external landmarks of interest to a surgeon or researcher.

The effectiveness of this technology has been established in a series of in vivo animal studies.
**Lead Inventor:**

Mulugeta Semework Abebe

**Applications:**

- Surgical planning and precise pre-operative positioning of incision sites and instrumentation
- Biopsy localization and tumor resection planning
- Intraoperative stereotactic guidance for surgical instruments and devices
- Visualization of external implants and devices on MRI imaging
- Minimally invasive and robotic surgical planning and image based guidance

**Advantages:**

- Can be applied directly to any surface, including external body surfaces
- Does not require other adhesive or attachment to the body
- Allows precise labeling of individual landmarks, external features, or external devices
- Visible on all MRI sequence types/CT-scans and X-rays, allowing single sequence imaging
- Compound production can be scaled to meet the needs of the facility or requested study

**Patent information:**

Patent Pending

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**Inventors**

Mulugeta Semework Abebe