

Technology Opportunity, Ref. No. UB-16/011

Highly efficient triage of acute ischemic stroke patients

A new, patent protected algorithm developed by experienced clinicians together with medical image analysis specialists allows for fast and accurate decisions regarding the urgency and the choice of treatment method for acute brain stroke patients. The fully automated algorithm uses data from current state-of-art MR imaging modalities. The algorithm termed "FASTER" (*Fully automated stroke tissue estimation using random forest classifiers*) has proven its clinical relevance by application to more than 100 clinical cases, in parallel to the conventional assessment by the physician.

Keywords Neurology, brain lesion, thrombus, stenosis, MRI, machine learning, occlusion, blood vessel, perfusion, diffusion, infarct.

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Reference McKinley et al.: J. Cereb. Blood Flow Metab. 2017 Aug; 37(8):2728-2741.

Background In the event of ischemic stroke speed of treatment is of the essence: "Time is Brain". Of particular interest is the region called "ischemic penumbra": the severely hypo-perfused, neurophysiologically silent brain tissue that is potentially salvageable if re-perfused early enough. Methods allowing for a fast identification of the penumbra region and the identification of the most appropriate treatment options are thus critical for a rather positive outcome of the treatment.

Invention The invention consists of a new algorithm taking advantage of the "Segmentation Forest" machine learning technique. After having been trained by experienced physicians, the inventive software allows for a fast, fully automated MR (multimodal) image/data analysis discriminating the regions of interest in the event of acute ischemic stroke: The core region (irreparable cell death), the penumbra and the essentially unaffected regions of the brain.

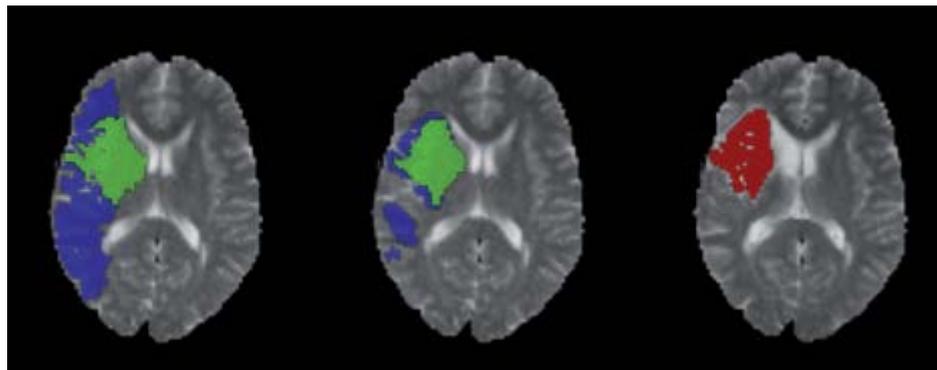


Figure: Example of application of the method: Expert segmented tissue-at-risk assessment (infarct core in green, penumbra in blue), assessment of tissue-at-risk produced by "FASTER" (favorable outcome in green, unfavorable outcome in blue), and manually segmented 90-day outcome (in red).

Field of Use Neurology, ischemic stroke severity assessment, patient triage.

Patent Status International Patent Application No. WO 2016/001825 and subsequent national applications under review in Europe, USA, Canada and Japan.

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