

# Soft computing based brain MR angiography image analysis for preventing cerebellar stroke

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## Abstract

A rupture of intracranial aneurysms may cause serious cerebral diseases such as cerebral stroke. Since it is hard to recover completely from stroke, finding unruptured aneurysms and medical and/or surgical treatment before rupture are efficient to patients. Magnetic resonance angiography (MRA), an imaging protocol using magnetic resonance imaging (MRI), can provide detailed section images of cerebral arteries noninvasively. However, image diagnosis using MRA is very time-consuming and labor-intensive for radiologists because few hundreds sectional images per subject are acquired to take the whole cerebrum. In addition, many people take MRA test on their health examination in Japan. Thus, computer-aided diagnosis (CAD) system for MRA images is desired in order to increase the quality of diagnosis and to automate the examination. This lecture introduces a fully automated aneurysm extraction method from MRA images. Principal components of the method are identification of aneurysm candidates (= ROIs; regions of interest) from MRA images and estimation of a fuzzy degree for each aneurysm candidate based on a case-based reasoning (CBR). The fuzzy degree indicates whether a candidate is true aneurysm. The method is applied to 15 subjects with 19 aneurysms. The experimental results indicate that this CAD system detected all aneurysms except a fusiform aneurysm, and gave high fuzzy degrees and high priorities for the detected aneurysms.

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## Short Bio.

*Syoji Kobashi* received his B.E. in electronics (1995), M.E. (1997) and D.E. (2000) all from the Himeji Institute of Technology, Japan. He is currently an associate professor in Graduate School of Engineering at the University of Hyogo, Japan, a Guest Associate Professor in WPI Immunology Frontier Research Center at Osaka University, Japan, and a Visiting Scholar in Department of Radiology at University of Pennsylvania, USA. His research interests include soft computing aided medical signal/image processing. He published 6 book chapters, 53 Journal papers, and 250+ conference proceeding papers. He received the Joseph F. Engelberger Best Paper Award at the 2nd World Automation

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