Pengembangan sistem bantu deteksi stroke iskemia berdasarkan synchrony dan variabilitas elektroensefalogram = Development aided system of ischemic stroke detection based on synchrony and variability electroencephalogram / Habbi Ananto Adhi

Habbi Ananto Adhi, author

Abstrak

ABSTRAK
Berdasarkan data WHO tahun 2012, stroke merupakan penyebab kematian pertama di Indonesia dan kedua di dunia. Hasil Riset Kesehatan Dasar tahun 2013 menunjukkan peningkatan penderita stroke dibandingkan tahun 2007. Sebagian besar kasus stroke yang terjadi merupakan kasus iskemia. Elektroensefalografi EEG memiliki keuntungan biaya yang lebih murah dan resolusi temporal yang baik. Kerusakan jaringan di otak menyebabkan perubahan synchrony dan variabilitas sinyal EEG. Analisis synchrony yang direpresentasikan phase synchronization index PSI diperoleh dengan metode phase synchronization. Sedangkan, analisis variabilitas melalui dua scaling exponent diperoleh dengan detrended fluctuation analysis DFA . Extreme learning machine digunakan sebagai pengklasifikasi stroke iskemia dan normal. Tujuan riset ini adalah mengetahui performa synchrony dan variabilitas sinyal EEG dalam deteksi stroke iskemia. Deteksi berdasarkan synchrony sinyal EEG diperoleh akurasi 84,52 , sensitivitas 76,67 dan F-score adalah 0,84. Sedangkan, deteksi berdasarkan variabilitas sinyal EEG diperoleh akurasi 89,05 , sensitivitas 95,00 dan F-score adalah 0,91. Deteksi berdasarkan gabungan dari keduanya diperoleh akurasi 80,95 , sensitivitas 75,00 dan F-score adalah 0,81. Deteksi stroke iskemia ringan, sedang, berat dan normal berdasarkan variabilitas sinyal EEG diperoleh akurasi 62,88 .
<hr>
ABSTRACT
Based on WHO rsquo s data in 2012, stroke is the first in Indonesia and the second causes of death in the world. Results of Basic Health Research in 2013 showed an increase in stroke patients compared to 2007. Ischemic stroke accounts for most of all stroke cases. Electroencephalography EEG offers cheaper cost and good temporal resolution. Tissue damage in the brain cause changes synchrony and variability of EEG signals. Synchrony analysis through the phase synchronization index PSI is obtained by phase synchronization. Whereas, Detrended fluctuation analysis DFA through two scaling exponent used to analyze variability. Extreme learning machine is used as a classifier of ischemic stroke patients and normal subjects. The aim of this research is to investigate synchrony and variability capabilities to perform ischemic stroke detection. Detection based on synchrony of EEG signal was obtained 84,52 for accuracy, 76,67 for sensitivity and 0,84 for F score. Meanwhile, detection based on variability of EEG signal was obtained 89.05 for accuracy, 95.00 for sensitivity and 0,91 for F score. Detection based synchrony and variability of signal EEG was obtained 80.95 for accuracy, 75.00 for sensitivity and 0,81 for F score. Detection of mild, moderate, severe ischemic stroke and normal based on variability of EEG signal was obtained 62.88 accuracy.