Abstract

An electrocardiogram (ECG) is a recording of electrical impulses generated by the electrical activity of the heart and is used as a diagnostic tool to analyze various heart diseases. For economical storage and fast transmission over low-bandwidth channels, ECG data need to be compressed. For the efficient compression of ECG signals, the topology preservation feature of self-organizing maps (SOM) is used. It is observed that a compression ratio up to 1:20 can be achieved with a very low-percentage root-mean-square difference, i.e. below 1.6, by creating templates of ECG patterns in the form of weight vectors of neurons. The templates obtained in this manner are then used to reconstruct the ECG signal. This analysis shows that the reconstructed signal is perfectly matched to the original signal.

References


Index Terms

Computer Science

Information Sciences

Keywords

Self-organizing maps; Compression; Winning neuron; Neighborhood function; Templates