2110430

Final Project

(Group project up to 3 members)

Due: May 4, 2018

1. According to the information regarding DTW algorithm's details presented in **Figure 3** and **Table 1** of the **Sakoe and Chiba (1978)'s paper**, how would the following modification affect the 1-nearest-neighbor classification accuracy of DTW?

    A. In the DTW distance matrix, we have $\gamma(i,j) = d(q_i,c_j) + \min\{ \gamma(i\text{-}1,j\text{-}1), \gamma(i\text{-}1,j), \gamma(i,j\text{-}1) \}$. What would happen in terms of classification accuracy if we give asymmetric weights to each of the three neighboring cells (currently, all three cells have symmetric weight of one)? Can you come up with optimal values of these weights?

    B. For each calculation, instead of considering the three neighboring cells, $\gamma(i\text{-}1,j\text{-}1)$, $\gamma(i\text{-}1,j)$, and $\gamma(i,j\text{-}1)$, if we are allowed to consider other cells (see some examples in Table 1 of the paper, or you can come up with any other patterns of your own), how will this affect the classification accuracy?

    Conduct some experiments on some time series data to support your answers.

2. Devise a shape averaging method for multiple time series sequences accurately. Don't forget to support your approach through experiments. The figure below compares between amplitude averaging (left) and shape averaging (right).