

# MSC-BDT5002/MSC-IT 5210 Knowledge Discovery and Data Mining, Fall 2017

## Assignment 1

**Deadline: Oct 6th, 2017**

### Supplementary Instructions for the First Assignment

Every wavelet function can be derived from a scaling function. The Hair wavelet is the simplest wavelet system whose scaling function is a simple rectangle function.

In the slides of data preprocessing, slides of page 88 to page 90 give the exact functions how to calculate the average I and detailed coefs D. In the slides, we use the two coefficients  $h(0) = h(1) = 1/2$  instead of  $1/\sqrt{2}$  due to lower computation cost as following functions:

$$\begin{aligned} I_i^j &= \frac{1}{2}I_{2i}^{j+1} + \frac{1}{2}I_{2i+1}^{j+1}, \\ D^j &= \frac{1}{2}I_{2i}^{j+1} - \frac{1}{2}I_{2i+1}^{j+1}. \end{aligned} \tag{1}$$

But please compute the discrete Haar wavelet transform in the questions of first assignment with  $h(0) = h(1) = 1/\sqrt{2}$  as follows:

$$\begin{aligned} I_i^j &= \frac{1}{\sqrt{2}}I_{2i}^{j+1} + \frac{1}{\sqrt{2}}I_{2i+1}^{j+1}, \\ D^j &= \frac{1}{\sqrt{2}}I_{2i}^{j+1} - \frac{1}{\sqrt{2}}I_{2i+1}^{j+1}. \end{aligned} \tag{2}$$

As for the question 1 in the first assignment, please describe the process of calculating discrete wavelet transform based on the 88th to 90th page in the slides.

If anyone want to delve more deeper in the wavelet, I suggest you go to this reference, Burrus C S, Gopinath R A, Guo H. Introduction to wavelets and wavelet transforms: a primer[J]. 1997 and figure out the meanings of Figure 3.2 and 3.3.

Please feel free to contact us: mscbdt5002it5210@gmail.com if you have further questions.