Setup

This matlab executable has been generated with the Application Deployment tool. To run the application it is necessary to install the file *"MULTIwavediscriminantApp\for_redistribution\MyAppInstaller_web.exe*" That installs both the application and the necessary Matlab runtime.

To run the application, please open the command prompt (by selecting the start button and typing "cmd"), navigate to the folder containing the executable (by default "*C:\Program Files\URJC\MULTIwavediscriminantApp"*), and type:

"MULTIwavediscriminantApp XSeries1 XSeries2 DMethod f MaxVars outFile"

Usage

Next, we describe the routine to perform a discriminant analysis of two groups using the MOWDT wavelets variances, correlations, and both of them (variances and correlations) as discriminant variables. For valitadion purposes, the application uses the Leave One Out Cross Validation method (LOOCV).

This is a command line tool. To run it, open a terminal (by selecting the start button and typing "cmd"), navigate to the executable installation directory (by default "*C:\Program Files\URJC\MULTIwavediscriminantApp*"), and run the *MULTIwavediscriminantApp* application with its parameters as explained below (see the section Example)

Input parameters:

Note the following abbreviations: Time series dimension (nv1); time series length (nr1); sample sizes (nc1 and nc2).

XSeries1: Sample from the population 1 (nv1 x nr1 x nc1) given in json format.

XSeries2: Sample from the population 2 (nv1 x nr1 x nc2) given in json format.

DMethod: Discriminant method (linear, diaglinear, quadratic, diagquadratic).

f : wavelet filter (haar, d4, d6, d8, la8, c6)

MaxVars: Maximum variables to have into account in the StepDiscrim method.

Outfile: Path to the output file.

Output:

A CSV file containing the predicted class of each of the observations using variance, correlation and both as discriminant characteristics (Figure 1). For this process the LOOCV method is used,

one case is selected to be used as a test set and the rest of the dataset is used as a training set; this process is repeated for each of the observations.

	A	B	C
1	Variances	Correlations	All
2	1	1	1
3	1	1	1
4	1	1	1
5	1	1	1
6	1	1	1
7	1	1	1
8	1	1	1
9	1	1	1
10	1	1	1
11	1	1	1
12	2	2	2
13	2	2	2
14	2	2	2
15	2	2	2
16	2	2	2
17	2	2	2
18	2	2	2
19	2	2	2
20	2	2	2
21	2	2	2

Figure 1: Example of the CSV file generated by the application. The different columns represent the predictions using as characteristics the Variances, the correlations and both, while the cells indicate the predicted class.

Example:

To generate the input json files you can generate the matrices in Matlab and export them to json format using the jsonencode function as shown below:

```
jsonString = jsonencode(myMatrix);
file = fopen("XSeries1.json",'w');
fprintf(file,jsonString);
fclose(file);
```

With the input files generated we proceed to run the application:

MULTIwavediscriminantApp XSeries1.json XSeries2.json linear haar 20 Path\out.csv