

*mkaTimeSeries*  
Mathieu Lagrange  
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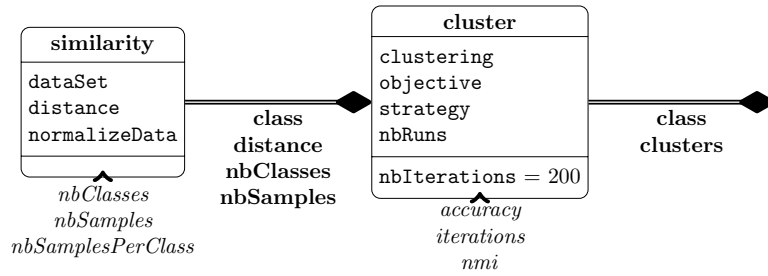


Figure 1: Factors flow graph for the experiment.

Table 1: distance: dtw, normalizeData:

|    | dataSet                | nbClasses | nbSamples | nbSamplesPerClass |
|----|------------------------|-----------|-----------|-------------------|
| 1  | 50words                | 50.00     | 905.00    | 18.10±20.56       |
| 2  | Adiac                  | 37.00     | 781.00    | 21.11±2.25        |
| 3  | Beef                   | 5.00      | 60.00     | 12.00±0.00        |
| 4  | CBF                    | 3.00      | 930.00    | 310.00±0.00       |
| 5  | ChlorineConcentration  | 3.00      | 2000.00   | 666.67±353.64     |
| 6  | CinC_ECG_torso         | 4.00      | 1420.00   | 355.00±0.00       |
| 7  | Coffee                 | 2.00      | 56.00     | 28.00±1.41        |
| 8  | Cricket_X              | 12.00     | 780.00    | 65.00±0.00        |
| 9  | Cricket_Y              | 12.00     | 780.00    | 65.00±0.00        |
| 10 | Cricket_Z              | 12.00     | 780.00    | 65.00±0.00        |
| 11 | DiatomSizeReduction    | 4.00      | 322.00    | 80.50±31.20       |
| 12 | ECG200                 | 2.00      | 200.00    | 100.00±46.67      |
| 13 | ECGFiveDays            | 2.00      | 884.00    | 442.00±0.00       |
| 14 | FaceAll                | 14.00     | 2000.00   | 142.86±59.65      |
| 15 | FaceFour               | 4.00      | 112.00    | 28.00±4.97        |
| 16 | FacesUCR               | 14.00     | 2000.00   | 142.86±65.65      |
| 17 | Gun_Point              | 2.00      | 200.00    | 100.00±0.00       |
| 18 | Haptics                | 5.00      | 463.00    | 92.60±8.99        |
| 19 | InlineSkate            | 7.00      | 650.00    | 92.86±21.97       |
| 20 | ItalyPowerDemand       | 2.00      | 1096.00   | 548.00±1.41       |
| 21 | Lighting2              | 2.00      | 121.00    | 60.50±17.68       |
| 22 | Lighting7              | 7.00      | 143.00    | 20.43±8.18        |
| 23 | MALLAT                 | 8.00      | 2000.00   | 250.00±6.41       |
| 24 | MedicalImages          | 10.00     | 1141.00   | 114.10±171.31     |
| 25 | MoteStrain             | 2.00      | 1272.00   | 636.00±69.30      |
| 26 | OSULeaf                | 6.00      | 442.00    | 73.67±20.26       |
| 27 | OliveOil               | 4.00      | 60.00     | 15.00±7.70        |
| 28 | SonyAIBORobotSurface   | 2.00      | 621.00    | 310.50±54.45      |
| 29 | SonyAIBORobotSurfaceII | 2.00      | 980.00    | 490.00±161.22     |
| 30 | StarLightCurves        | 3.00      | 2000.00   | 666.67±444.38     |
| 31 | SwedishLeaf            | 15.00     | 1125.00   | 75.00±0.00        |
| 32 | Symbols                | 6.00      | 1020.00   | 170.00±8.81       |
| 33 | Trace                  | 4.00      | 200.00    | 50.00±0.00        |
| 34 | TwoLeadECG             | 2.00      | 1162.00   | 581.00±0.00       |
| 35 | Two_Patterns           | 4.00      | 2000.00   | 500.00±34.90      |
| 36 | WordsSynonyms          | 25.00     | 905.00    | 36.20±41.31       |
| 37 | fish                   | 7.00      | 350.00    | 50.00±0.00        |
| 38 | synthetic_control      | 6.00      | 600.00    | 100.00±0.00       |
| 39 | uWaveGestureLibrary_X  | 8.00      | 2000.00   | 250.00±11.05      |
| 40 | uWaveGestureLibrary_Y  | 8.00      | 2000.00   | 250.00±11.05      |
| 41 | uWaveGestureLibrary_Z  | 8.00      | 2000.00   | 250.00±11.05      |
| 42 | wafer                  | 2.00      | 2000.00   | 1000.00±1131.37   |
| 43 | yoga                   | 2.00      | 2000.00   | 1000.00±94.75     |

Table 2: dataSet: 50words, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time           |
|------------|-----------|----------|------------------|------------------|--------------------|----------------|
| kkMeans    |           |          | 0.47±0.02        | 0.70±0.01        | 15.10±3.55         | 3.67           |
| random     |           |          | 0.11±0.00        | 0.28±0.00        | -±-                | 0.39           |
| kAverages  | object    | p        | 0.45±0.02        | 0.71±0.01        | 12.05±2.54         | 149.04         |
| kAverages  | object    | b        | 0.22±0.14        | 0.26±0.29        | 56.65±85.19        | 693.55         |
| kAverages  | raw       | p        | <b>0.51±0.02</b> | <b>0.72±0.01</b> | 59.65±83.17        | 690.65         |
| kAverages  | raw       | b        | 0.13±0.01        | 0.12±0.00        | <b>200.00±0.00</b> | <b>2358.61</b> |

Table 3: dataSet: Adiac, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time           |
|------------|-----------|----------|------------------|------------------|--------------------|----------------|
| kkMeans    |           |          | <b>0.39±0.03</b> | <b>0.62±0.01</b> | 15.80±3.79         | 2.48           |
| random     |           |          | 0.12±0.01        | 0.24±0.00        | -±-                | 0.25           |
| kAverages  | object    | p        | <b>0.39±0.01</b> | 0.60±0.01        | <b>200.00±0.00</b> | 2544.79        |
| kAverages  | object    | b        | 0.11±0.09        | 0.26±0.25        | 32.80±58.72        | 296.24         |
| kAverages  | raw       | p        | 0.27±0.02        | 0.58±0.01        | 104.20±65.21       | 1675.64        |
| kAverages  | raw       | b        | 0.07±0.00        | 0.10±0.01        | <b>200.00±0.00</b> | <b>2656.36</b> |

Table 4: dataSet: Beef, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time         |
|------------|-----------|----------|------------------|------------------|---------------------|--------------|
| kkMeans    |           |          | 0.41±0.03        | 0.29±0.03        | 5.50±2.52           | 0.31         |
| random     |           |          | 0.33±0.03        | 0.09±0.03        | -±-                 | 0.03         |
| kAverages  | object    | p        | <b>0.43±0.03</b> | <b>0.32±0.02</b> | 5.45±1.10           | 2.37         |
| kAverages  | object    | b        | <b>0.41±0.06</b> | 0.29±0.08        | 25.80±59.62         | 8.28         |
| kAverages  | raw       | p        | <b>0.42±0.06</b> | <b>0.31±0.04</b> | 4.60±0.75           | 1.81         |
| kAverages  | raw       | b        | 0.34±0.03        | 0.20±0.04        | <b>180.55±59.87</b> | <b>52.17</b> |

Table 5: dataSet: CBF, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations        | time         |
|------------|-----------|----------|------------------|------------------|-------------------|--------------|
| kkMeans    |           |          | <b>0.72±0.04</b> | <b>0.51±0.04</b> | <b>11.35±4.97</b> | 0.79         |
| random     |           |          | 0.35±0.01        | 0.00±0.00        | -±-               | 0.08         |
| kAverages  | object    | p        | <b>0.71±0.05</b> | <b>0.51±0.03</b> | 6.90±1.94         | 33.26        |
| kAverages  | object    | b        | <b>0.70±0.05</b> | <b>0.52±0.03</b> | <b>12.40±3.57</b> | <b>47.70</b> |
| kAverages  | raw       | p        | 0.68±0.08        | 0.42±0.12        | 5.35±1.27         | 15.37        |
| kAverages  | raw       | b        | <b>0.70±0.08</b> | 0.44±0.12        | <b>10.00±4.04</b> | 21.94        |

Table 6: dataSet: ChlorineConcentration, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | 0.38±0.01        | 0.00±0.00        | <b>20.85±8.80</b>  | 5.99          |
| random     |           |          | 0.35±0.01        | 0.00±0.00        | -±-                | 0.23          |
| kAverages  | object    | p        | 0.37±0.01        | 0.00±0.00        | 11.60±4.41         | 119.81        |
| kAverages  | object    | b        | 0.37±0.01        | 0.00±0.00        | <b>32.05±40.79</b> | 184.31        |
| kAverages  | raw       | p        | <b>0.40±0.01</b> | <b>0.01±0.01</b> | 11.15±3.92         | 103.10        |
| kAverages  | raw       | b        | <b>0.40±0.01</b> | <b>0.01±0.01</b> | <b>22.95±11.20</b> | <b>190.66</b> |

Table 7: dataSet: CinC\_ECG\_torso, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | <b>0.52±0.03</b> | <b>0.44±0.08</b> | <b>19.95±6.98</b>  | 1.87          |
| random     |           |          | 0.27±0.01        | 0.00±0.00        | -±-                | 0.11          |
| kAverages  | object    | p        | <b>0.51±0.03</b> | 0.41±0.05        | 9.75±4.19          | 45.57         |
| kAverages  | object    | b        | 0.49±0.04        | 0.40±0.07        | <b>29.00±40.59</b> | <b>108.49</b> |
| kAverages  | raw       | p        | <b>0.52±0.00</b> | <b>0.46±0.00</b> | 7.40±1.60          | 64.06         |
| kAverages  | raw       | b        | <b>0.52±0.01</b> | <b>0.45±0.04</b> | <b>15.90±4.95</b>  | 99.74         |

Table 8: dataSet: Coffee, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations       | time        |
|------------|-----------|----------|------------------|------------------|------------------|-------------|
| kkMeans    |           |          | <b>0.83±0.16</b> | <b>0.48±0.32</b> | 3.95±1.19        | 0.04        |
| random     |           |          | 0.56±0.04        | 0.01±0.02        | -±-              | 0.02        |
| kAverages  | object    | p        | <b>0.85±0.13</b> | <b>0.54±0.26</b> | 3.65±0.88        | 0.96        |
| kAverages  | object    | b        | <b>0.82±0.14</b> | <b>0.48±0.26</b> | <b>5.60±1.79</b> | <b>1.17</b> |
| kAverages  | raw       | p        | <b>0.89±0.16</b> | <b>0.66±0.32</b> | 3.85±0.81        | 0.58        |
| kAverages  | raw       | b        | <b>0.82±0.20</b> | <b>0.51±0.37</b> | <b>6.20±1.67</b> | 0.77        |

Table 9: dataSet: Cricket\_X, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | 0.30±0.01        | 0.29±0.02        | 18.15±4.53          | 1.15          |
| random     |           |          | 0.14±0.01        | 0.03±0.00        | -±-                 | 0.10          |
| kAverages  | object    | p        | <b>0.31±0.01</b> | <b>0.31±0.01</b> | 17.00±5.86          | 88.08         |
| kAverages  | object    | b        | 0.29±0.05        | <b>0.29±0.07</b> | 47.00±53.43         | 299.76        |
| kAverages  | raw       | p        | 0.28±0.01        | 0.27±0.02        | 13.15±3.03          | 98.30         |
| kAverages  | raw       | b        | 0.21±0.07        | 0.19±0.09        | <b>166.50±68.81</b> | <b>919.27</b> |

Table 10: dataSet: Cricket\_Y, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | <b>0.33±0.02</b> | <b>0.35±0.02</b> | 18.25±6.70          | 1.17          |
| random     |           |          | 0.14±0.01        | 0.03±0.00        | -±-                 | 0.11          |
| kAverages  | object    | p        | <b>0.34±0.02</b> | <b>0.35±0.01</b> | 12.85±3.72          | 77.69         |
| kAverages  | object    | b        | <b>0.33±0.01</b> | <b>0.35±0.01</b> | 75.55±83.71         | 299.09        |
| kAverages  | raw       | p        | 0.32±0.02        | 0.33±0.01        | 22.30±42.05         | 88.79         |
| kAverages  | raw       | b        | 0.25±0.07        | 0.24±0.09        | <b>137.00±88.14</b> | <b>695.78</b> |

Table 11: dataSet: Cricket\_Z, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | <b>0.30±0.01</b> | 0.30±0.01        | 19.30±5.80          | 1.22          |
| random     |           |          | 0.14±0.00        | 0.03±0.00        | -±-                 | 0.14          |
| kAverages  | object    | p        | <b>0.31±0.01</b> | <b>0.31±0.01</b> | 15.70±7.09          | 114.22        |
| kAverages  | object    | b        | <b>0.30±0.05</b> | <b>0.30±0.07</b> | 69.55±77.89         | 306.15        |
| kAverages  | raw       | p        | 0.30±0.02        | 0.28±0.02        | 14.30±4.14          | 106.28        |
| kAverages  | raw       | b        | 0.23±0.07        | 0.20±0.09        | <b>165.65±70.58</b> | <b>841.76</b> |

Table 12: dataSet: DiatomSizeReduction, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | <b>0.83±0.12</b> | <b>0.81±0.10</b> | 8.95±4.75           | 0.16          |
| random     |           |          | 0.29±0.01        | 0.01±0.01        | -±-                 | 0.06          |
| kAverages  | object    | p        | <b>0.76±0.13</b> | 0.65±0.10        | <b>103.35±99.17</b> | <b>168.66</b> |
| kAverages  | object    | b        | 0.39±0.09        | 0.21±0.20        | 53.35±86.90         | 59.32         |
| kAverages  | raw       | p        | 0.54±0.12        | 0.57±0.16        | 4.80±1.74           | 9.12          |
| kAverages  | raw       | b        | 0.43±0.13        | 0.32±0.27        | <b>114.80±96.69</b> | 150.01        |

Table 13: dataSet: ECG200, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations       | time        |
|------------|-----------|----------|------------------|------------------|------------------|-------------|
| kkMeans    |           |          | <b>0.75±0.03</b> | 0.14±0.03        | 5.55±1.10        | 0.09        |
| random     |           |          | 0.53±0.02        | 0.00±0.01        | -±-              | 0.05        |
| kAverages  | object    | p        | <b>0.76±0.00</b> | <b>0.15±0.00</b> | 4.15±0.37        | 3.71        |
| kAverages  | object    | b        | <b>0.76±0.00</b> | <b>0.15±0.00</b> | <b>6.55±1.73</b> | <b>4.59</b> |
| kAverages  | raw       | p        | 0.72±0.03        | 0.10±0.05        | 3.50±0.69        | 3.17        |
| kAverages  | raw       | b        | 0.72±0.03        | 0.10±0.05        | 5.55±1.00        | 3.88        |

Table 14: dataSet: ECGFiveDays, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time         |
|------------|-----------|----------|------------------|------------------|--------------------|--------------|
| kkMeans    |           |          | 0.58±0.03        | 0.02±0.02        | 15.25±5.86         | 0.79         |
| random     |           |          | 0.51±0.01        | 0.00±0.00        | -±-                | 0.07         |
| kAverages  | object    | p        | <b>0.59±0.05</b> | <b>0.04±0.06</b> | 7.05±1.57          | 16.22        |
| kAverages  | object    | b        | <b>0.61±0.07</b> | <b>0.09±0.12</b> | 12.70±3.88         | 38.03        |
| kAverages  | raw       | p        | <b>0.61±0.02</b> | <b>0.05±0.02</b> | 10.70±6.16         | 30.59        |
| kAverages  | raw       | b        | <b>0.61±0.01</b> | <b>0.05±0.02</b> | <b>23.75±11.44</b> | <b>54.62</b> |

Table 15: dataSet: FaceAll, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time           |
|------------|-----------|----------|------------------|------------------|---------------------|----------------|
| kkMeans    |           |          | <b>0.74±0.05</b> | <b>0.79±0.02</b> | 18.55±6.93          | 8.05           |
| random     |           |          | 0.11±0.00        | 0.02±0.00        | -±-                 | 0.25           |
| kAverages  | object    | p        | 0.66±0.04        | 0.75±0.01        | 10.80±4.01          | 133.83         |
| kAverages  | object    | b        | 0.66±0.04        | 0.75±0.02        | 37.05±56.10         | 399.95         |
| kAverages  | raw       | p        | 0.65±0.04        | 0.72±0.02        | 15.10±4.85          | 304.63         |
| kAverages  | raw       | b        | 0.46±0.16        | 0.52±0.20        | <b>132.50±85.20</b> | <b>2481.79</b> |

Table 16: dataSet: FaceFour, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time        |
|------------|-----------|----------|------------------|------------------|--------------------|-------------|
| kkMeans    |           |          | <b>0.74±0.09</b> | 0.67±0.09        | <b>5.10±1.33</b>   | 0.08        |
| random     |           |          | 0.33±0.02        | 0.03±0.01        | -±-                | 0.05        |
| kAverages  | object    | p        | <b>0.79±0.14</b> | <b>0.72±0.10</b> | <b>4.70±1.84</b>   | 1.84        |
| kAverages  | object    | b        | <b>0.80±0.12</b> | <b>0.73±0.07</b> | <b>16.20±43.29</b> | <b>4.85</b> |
| kAverages  | raw       | p        | 0.68±0.01        | 0.63±0.03        | <b>4.05±1.19</b>   | 1.47        |
| kAverages  | raw       | b        | 0.70±0.06        | 0.65±0.07        | <b>6.55±2.86</b>   | 1.93        |

Table 17: dataSet: FacesUCR, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time           |
|------------|-----------|----------|------------------|------------------|---------------------|----------------|
| kkMeans    |           |          | <b>0.70±0.05</b> | <b>0.78±0.03</b> | 17.55±6.57          | 7.13           |
| random     |           |          | 0.11±0.00        | 0.02±0.00        | -±-                 | 0.18           |
| kAverages  | object    | p        | <b>0.69±0.04</b> | <b>0.77±0.01</b> | 10.10±4.63          | 217.44         |
| kAverages  | object    | b        | 0.66±0.05        | 0.76±0.02        | 64.55±80.36         | 835.69         |
| kAverages  | raw       | p        | 0.60±0.04        | 0.70±0.03        | 11.15±3.48          | 147.16         |
| kAverages  | raw       | b        | 0.45±0.15        | 0.52±0.19        | <b>156.65±77.58</b> | <b>2707.12</b> |

Table 18: dataSet: Gun\_Point, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations       | time        |
|------------|-----------|----------|------------------|------------------|------------------|-------------|
| kkMeans    |           |          | 0.50±0.00        | 0.00±0.00        | 3.80±1.61        | 0.07        |
| random     |           |          | 0.53±0.02        | 0.00±0.00        | -±-              | 0.06        |
| kAverages  | object    | p        | 0.50±0.00        | 0.00±0.00        | 2.40±0.50        | 2.29        |
| kAverages  | object    | b        | 0.50±0.00        | 0.00±0.00        | 2.95±0.83        | 2.19        |
| kAverages  | raw       | p        | <b>0.57±0.00</b> | <b>0.01±0.00</b> | 4.70±0.66        | 3.89        |
| kAverages  | raw       | b        | <b>0.57±0.00</b> | <b>0.01±0.00</b> | <b>6.75±1.12</b> | <b>4.88</b> |

Table 19: dataSet: Haptics, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time         |
|------------|-----------|----------|------------------|------------------|--------------------|--------------|
| kkMeans    |           |          | <b>0.35±0.01</b> | <b>0.09±0.01</b> | <b>17.45±7.33</b>  | 0.42         |
| random     |           |          | 0.24±0.01        | 0.01±0.00        | -±-                | 0.07         |
| kAverages  | object    | p        | <b>0.35±0.03</b> | <b>0.10±0.01</b> | 9.05±3.94          | 25.07        |
| kAverages  | object    | b        | <b>0.34±0.03</b> | <b>0.09±0.02</b> | <b>23.85±41.81</b> | 31.63        |
| kAverages  | raw       | p        | 0.33±0.01        | 0.08±0.01        | <b>11.30±3.59</b>  | 30.90        |
| kAverages  | raw       | b        | 0.33±0.01        | 0.08±0.01        | <b>28.65±40.78</b> | <b>48.17</b> |

Table 20: dataSet: InlineSkate, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | <b>0.21±0.01</b> | <b>0.05±0.01</b> | 18.05±8.15         | 0.80          |
| random     |           |          | 0.19±0.01        | 0.01±0.00        | -±-                | 0.08          |
| kAverages  | object    | p        | <b>0.21±0.01</b> | <b>0.05±0.00</b> | 9.85±2.89          | 34.97         |
| kAverages  | object    | b        | <b>0.21±0.00</b> | <b>0.05±0.00</b> | 34.05±39.80        | 79.13         |
| kAverages  | raw       | p        | <b>0.21±0.01</b> | <b>0.05±0.01</b> | 10.20±3.38         | 46.75         |
| kAverages  | raw       | b        | <b>0.21±0.01</b> | 0.05±0.01        | <b>90.80±91.66</b> | <b>276.64</b> |

Table 21: dataSet: ItalyPowerDemand, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations        | time         |
|------------|-----------|----------|------------------|------------------|-------------------|--------------|
| kkMeans    |           |          | <b>0.54±0.00</b> | <b>0.01±0.00</b> | <b>10.20±1.32</b> | 0.81         |
| random     |           |          | 0.51±0.01        | <b>0.00±0.00</b> | -±-               | 0.10         |
| kAverages  | object    | p        | 0.53±0.00        | <b>0.00±0.00</b> | 5.00±0.56         | 25.61        |
| kAverages  | object    | b        | <b>0.53±0.03</b> | <b>0.01±0.05</b> | <b>10.20±4.32</b> | <b>40.01</b> |
| kAverages  | raw       | p        | 0.53±0.00        | <b>0.01±0.00</b> | 3.35±0.49         | 17.08        |
| kAverages  | raw       | b        | 0.53±0.00        | <b>0.01±0.00</b> | 4.90±0.55         | 19.30        |

Table 22: dataSet: Lighting2, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations       | time        |
|------------|-----------|----------|------------------|------------------|------------------|-------------|
| kkMeans    |           |          | 0.55±0.00        | 0.01±0.00        | <b>7.90±4.20</b> | 0.10        |
| random     |           |          | 0.53±0.02        | 0.00±0.01        | -±-              | 0.05        |
| kAverages  | object    | p        | 0.53±0.00        | 0.01±0.00        | 4.60±0.88        | 2.47        |
| kAverages  | object    | b        | 0.53±0.00        | 0.01±0.00        | <b>8.10±3.08</b> | <b>3.54</b> |
| kAverages  | raw       | p        | <b>0.59±0.07</b> | <b>0.03±0.04</b> | 4.40±1.35        | 1.36        |
| kAverages  | raw       | b        | <b>0.61±0.08</b> | <b>0.04±0.04</b> | <b>6.95±3.55</b> | 1.77        |

Table 23: dataSet: Lighting7, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | 0.52±0.05        | 0.51±0.04        | 8.05±2.39           | 0.13          |
| random     |           |          | 0.24±0.02        | 0.07±0.02        | -±-                 | 0.06          |
| kAverages  | object    | p        | 0.50±0.02        | 0.50±0.02        | 5.60±1.43           | 6.04          |
| kAverages  | object    | b        | 0.47±0.08        | 0.44±0.15        | 37.60±70.06         | 32.22         |
| kAverages  | raw       | p        | <b>0.57±0.04</b> | <b>0.54±0.01</b> | 6.00±1.34           | 6.21          |
| kAverages  | raw       | b        | 0.44±0.11        | 0.37±0.15        | <b>142.50±90.12</b> | <b>107.72</b> |



Table 24: dataSet: MALLAT, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time           |
|------------|-----------|----------|------------------|------------------|---------------------|----------------|
| kkMeans    |           |          | <b>0.78±0.12</b> | <b>0.90±0.04</b> | 10.00±3.54          | 3.22           |
| random     |           |          | 0.15±0.00        | 0.01±0.00        | -±-                 | 0.23           |
| kAverages  | object    | p        | <b>0.83±0.07</b> | <b>0.91±0.03</b> | 5.95±1.39           | 111.72         |
| kAverages  | object    | b        | <b>0.79±0.12</b> | <b>0.90±0.04</b> | 10.70±3.91          | 82.17          |
| kAverages  | raw       | p        | 0.78±0.08        | <b>0.90±0.04</b> | 8.75±2.84           | 112.62         |
| kAverages  | raw       | b        | 0.49±0.19        | 0.53±0.23        | <b>173.05±65.99</b> | <b>1452.37</b> |

Table 25: dataSet: MedicalImages, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | 0.34±0.01        | <b>0.32±0.01</b> | 25.00±11.22         | 3.10          |
| random     |           |          | 0.14±0.00        | 0.02±0.00        | -±-                 | 0.13          |
| kAverages  | object    | p        | 0.31±0.02        | 0.30±0.02        | 17.70±6.05          | 172.96        |
| kAverages  | object    | b        | 0.32±0.05        | 0.28±0.07        | <b>62.10±61.84</b>  | 532.10        |
| kAverages  | raw       | p        | <b>0.38±0.02</b> | 0.31±0.02        | 14.25±5.86          | 77.03         |
| kAverages  | raw       | b        | <b>0.37±0.02</b> | 0.25±0.08        | <b>100.15±84.17</b> | <b>607.20</b> |

Table 26: dataSet: MoteStrain, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations        | time         |
|------------|-----------|----------|------------------|------------------|-------------------|--------------|
| kkMeans    |           |          | <b>0.89±0.00</b> | <b>0.52±0.00</b> | 11.15±3.22        | 0.71         |
| random     |           |          | 0.51±0.01        | 0.00±0.00        | -±-               | 0.08         |
| kAverages  | object    | p        | 0.81±0.00        | 0.41±0.00        | 7.65±1.09         | 43.31        |
| kAverages  | object    | b        | 0.81±0.00        | 0.41±0.00        | 13.00±2.85        | 59.42        |
| kAverages  | raw       | p        | 0.80±0.00        | 0.36±0.01        | 12.30±4.71        | 38.45        |
| kAverages  | raw       | b        | 0.81±0.00        | 0.36±0.01        | <b>22.05±8.19</b> | <b>66.36</b> |

Table 27: dataSet: OSULeaf, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | 0.40±0.02        | 0.23±0.03        | 17.20±6.86         | 0.37          |
| random     |           |          | 0.22±0.01        | 0.02±0.00        | -±-                | 0.07          |
| kAverages  | object    | p        | <b>0.41±0.02</b> | <b>0.25±0.02</b> | 8.95±2.74          | 14.97         |
| kAverages  | object    | b        | <b>0.41±0.03</b> | <b>0.24±0.02</b> | 27.55±40.85        | 38.10         |
| kAverages  | raw       | p        | 0.35±0.01        | 0.21±0.01        | 9.35±2.94          | 26.69         |
| kAverages  | raw       | b        | 0.35±0.02        | 0.21±0.02        | <b>72.15±85.94</b> | <b>157.54</b> |

Table 28: dataSet: OliveOil, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time        |
|------------|-----------|----------|------------------|------------------|--------------------|-------------|
| kkMeans    |           |          | 0.73±0.12        | 0.59±0.09        | <b>5.10±1.59</b>   | 0.06        |
| random     |           |          | 0.35±0.03        | 0.06±0.03        | -±-                | 0.04        |
| kAverages  | object    | p        | 0.70±0.10        | 0.61±0.07        | 4.20±1.36          | 0.84        |
| kAverages  | object    | b        | 0.68±0.13        | 0.53±0.19        | <b>16.00±43.37</b> | 4.68        |
| kAverages  | raw       | p        | <b>0.87±0.04</b> | <b>0.72±0.03</b> | <b>5.30±1.38</b>   | 1.87        |
| kAverages  | raw       | b        | <b>0.86±0.09</b> | <b>0.70±0.11</b> | <b>25.65±45.81</b> | <b>7.45</b> |

Table 29: dataSet: SonyAIBORobotSurfaceII, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time         |
|------------|-----------|----------|------------------|------------------|--------------------|--------------|
| kkMeans    |           |          | <b>0.96±0.00</b> | <b>0.78±0.00</b> | <b>6.90±2.43</b>   | 0.17         |
| random     |           |          | 0.52±0.01        | 0.00±0.00        | -±-                | 0.04         |
| kAverages  | object    | p        | 0.94±0.00        | 0.72±0.01        | 5.20±1.24          | 11.23        |
| kAverages  | object    | b        | 0.94±0.00        | 0.72±0.01        | <b>19.10±42.68</b> | 30.54        |
| kAverages  | raw       | p        | 0.64±0.00        | 0.21±0.00        | <b>7.50±2.91</b>   | 19.53        |
| kAverages  | raw       | b        | 0.64±0.00        | 0.21±0.00        | <b>24.10±41.69</b> | <b>52.09</b> |

Table 30: dataSet: SonyAIBORobotSurfaceII, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations       | time         |
|------------|-----------|----------|------------------|------------------|------------------|--------------|
| kkMeans    |           |          | 0.77±0.00        | 0.21±0.00        | 4.30±0.66        | 0.26         |
| random     |           |          | 0.52±0.01        | 0.00±0.00        | -±-              | 0.06         |
| kAverages  | object    | p        | <b>0.77±0.00</b> | <b>0.22±0.00</b> | 3.40±0.50        | 10.38        |
| kAverages  | object    | b        | <b>0.77±0.00</b> | <b>0.22±0.00</b> | <b>4.90±1.29</b> | <b>17.50</b> |
| kAverages  | raw       | p        | 0.74±0.00        | 0.15±0.00        | 3.35±0.49        | 15.99        |
| kAverages  | raw       | b        | 0.74±0.00        | 0.15±0.00        | <b>5.60±0.94</b> | 11.63        |

Table 31: dataSet: StarLightCurves, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations        | time         |
|------------|-----------|----------|------------------|------------------|-------------------|--------------|
| kkMeans    |           |          | 0.75±0.00        | <b>0.60±0.02</b> | 9.25±1.65         | 2.80         |
| random     |           |          | 0.35±0.01        | 0.00±0.00        | -±-               | 0.21         |
| kAverages  | object    | p        | 0.75±0.00        | <b>0.60±0.00</b> | 6.60±0.82         | 44.88        |
| kAverages  | object    | b        | 0.75±0.00        | <b>0.60±0.02</b> | <b>11.60±2.89</b> | 97.02        |
| kAverages  | raw       | p        | <b>0.76±0.00</b> | <b>0.60±0.00</b> | 5.40±0.60         | 61.19        |
| kAverages  | raw       | b        | <b>0.76±0.00</b> | <b>0.60±0.00</b> | <b>11.65±4.75</b> | <b>98.94</b> |

Table 32: dataSet: SwedishLeaf, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time           |
|------------|-----------|----------|------------------|------------------|--------------------|----------------|
| kkMeans    |           |          | 0.52±0.04        | <b>0.66±0.03</b> | 20.15±4.37         | 3.08           |
| random     |           |          | 0.12±0.00        | 0.03±0.00        | -±-                | 0.15           |
| kAverages  | object    | p        | <b>0.57±0.03</b> | <b>0.67±0.02</b> | 26.25±41.09        | 257.95         |
| kAverages  | object    | b        | 0.35±0.24        | 0.40±0.33        | 35.50±59.09        | 297.97         |
| kAverages  | raw       | p        | 0.33±0.02        | 0.56±0.02        | 14.15±3.63         | 97.83          |
| kAverages  | raw       | b        | 0.13±0.05        | 0.10±0.12        | <b>200.00±0.00</b> | <b>1547.75</b> |

Table 33: dataSet: Symbols, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | <b>0.69±0.08</b> | <b>0.79±0.04</b> | 13.95±4.47         | 1.21          |
| random     |           |          | 0.20±0.01        | 0.01±0.00        | -±-                | 0.10          |
| kAverages  | object    | p        | <b>0.72±0.07</b> | <b>0.80±0.01</b> | 9.55±2.68          | 62.81         |
| kAverages  | object    | b        | <b>0.69±0.14</b> | <b>0.77±0.18</b> | <b>22.50±42.13</b> | 126.58        |
| kAverages  | raw       | p        | 0.65±0.09        | 0.77±0.05        | 9.60±3.00          | 65.51         |
| kAverages  | raw       | b        | 0.59±0.14        | 0.68±0.17        | <b>62.30±81.72</b> | <b>366.36</b> |

Table 34: dataSet: Trace, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time         |
|------------|-----------|----------|------------------|------------------|---------------------|--------------|
| kkMeans    |           |          | <b>0.50±0.02</b> | <b>0.58±0.07</b> | 5.60±2.60           | 0.12         |
| random     |           |          | 0.32±0.02        | 0.02±0.01        | -±-                 | 0.04         |
| kAverages  | object    | p        | <b>0.49±0.02</b> | 0.53±0.03        | 5.15±1.09           | 5.83         |
| kAverages  | object    | b        | <b>0.50±0.02</b> | <b>0.56±0.06</b> | 7.90±4.23           | 5.06         |
| kAverages  | raw       | p        | <b>0.50±0.03</b> | 0.52±0.02        | 6.20±2.17           | 3.88         |
| kAverages  | raw       | b        | 0.46±0.05        | 0.43±0.15        | <b>103.70±98.83</b> | <b>62.57</b> |

Table 35: dataSet: TwoLeadECG, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations        | time         |
|------------|-----------|----------|------------------|------------------|-------------------|--------------|
| kkMeans    |           |          | 0.65±0.00        | 0.07±0.00        | <b>11.20±2.78</b> | 0.68         |
| random     |           |          | 0.51±0.01        | 0.00±0.00        | -±-               | 0.08         |
| kAverages  | object    | p        | 0.65±0.00        | 0.07±0.00        | 7.05±0.39         | 21.30        |
| kAverages  | object    | b        | 0.65±0.00        | 0.07±0.00        | <b>12.60±3.56</b> | <b>51.34</b> |
| kAverages  | raw       | p        | <b>0.66±0.00</b> | <b>0.08±0.00</b> | 5.75±1.07         | 18.08        |
| kAverages  | raw       | b        | <b>0.66±0.00</b> | <b>0.08±0.00</b> | <b>12.10±2.40</b> | 29.20        |

Table 36: dataSet: Two\_Patterns, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | <b>0.34±0.06</b> | <b>0.13±0.12</b> | <b>26.55±13.63</b> | 5.00          |
| random     |           |          | 0.27±0.00        | 0.00±0.00        | -±-                | 0.15          |
| kAverages  | object    | p        | <b>0.34±0.04</b> | <b>0.14±0.08</b> | 12.95±3.22         | 96.67         |
| kAverages  | object    | b        | <b>0.35±0.05</b> | <b>0.15±0.10</b> | <b>58.80±72.82</b> | <b>528.80</b> |
| kAverages  | raw       | p        | 0.29±0.04        | 0.04±0.08        | 17.50±8.32         | 111.19        |
| kAverages  | raw       | b        | 0.31±0.06        | 0.07±0.10        | <b>36.70±40.98</b> | 303.40        |

Table 37: dataSet: WordsSynonyms, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time           |
|------------|-----------|----------|------------------|------------------|---------------------|----------------|
| kkMeans    |           |          | 0.33±0.01        | <b>0.51±0.01</b> | 19.55±5.80          | 2.64           |
| random     |           |          | 0.11±0.00        | 0.12±0.01        | -±-                 | 0.17           |
| kAverages  | object    | p        | 0.32±0.01        | <b>0.51±0.01</b> | 22.45±41.93         | 332.71         |
| kAverages  | object    | b        | 0.27±0.05        | 0.30±0.25        | 44.60±68.49         | 597.70         |
| kAverages  | raw       | p        | <b>0.35±0.01</b> | 0.51±0.01        | 42.05±68.18         | 620.58         |
| kAverages  | raw       | b        | 0.21±0.06        | 0.16±0.16        | <b>183.00±52.36</b> | <b>1397.32</b> |

Table 38: dataSet: fish, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | 0.50±0.04        | <b>0.42±0.02</b> | 16.40±5.33          | 0.33          |
| random     |           |          | 0.20±0.01        | 0.03±0.01        | -±-                 | 0.07          |
| kAverages  | object    | p        | <b>0.56±0.02</b> | <b>0.42±0.02</b> | 9.90±2.92           | 24.86         |
| kAverages  | object    | b        | 0.51±0.09        | <b>0.38±0.10</b> | 56.40±74.10         | 125.12        |
| kAverages  | raw       | p        | 0.46±0.02        | 0.40±0.02        | 30.10±58.30         | 38.13         |
| kAverages  | raw       | b        | 0.29±0.05        | 0.17±0.08        | <b>190.85±40.92</b> | <b>219.74</b> |

Table 39: dataSet: synthetic\_control, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations          | time          |
|------------|-----------|----------|------------------|------------------|---------------------|---------------|
| kkMeans    |           |          | <b>0.69±0.14</b> | 0.84±0.04        | 8.70±4.45           | 0.35          |
| random     |           |          | 0.21±0.01        | 0.01±0.00        | -±-                 | 0.07          |
| kAverages  | object    | p        | <b>0.75±0.11</b> | <b>0.87±0.05</b> | 7.20±2.35           | 29.17         |
| kAverages  | object    | b        | <b>0.69±0.14</b> | 0.84±0.05        | 39.55±69.22         | 74.43         |
| kAverages  | raw       | p        | <b>0.75±0.02</b> | <b>0.87±0.01</b> | 6.10±2.00           | 24.39         |
| kAverages  | raw       | b        | 0.58±0.19        | 0.65±0.26        | <b>143.60±88.41</b> | <b>328.49</b> |

Table 40: dataSet: uWaveGestureLibrary\_X, distance: dtw, normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | <b>0.57±0.01</b> | 0.45±0.01        | 31.45±12.38        | 9.30          |
| random     |           |          | 0.15±0.00        | 0.01±0.00        | -±-                | 0.23          |
| kAverages  | object    | p        | 0.56±0.02        | <b>0.46±0.01</b> | 26.60±18.00        | 238.73        |
| kAverages  | object    | b        | <b>0.57±0.03</b> | <b>0.46±0.01</b> | <b>39.00±39.15</b> | 500.59        |
| kAverages  | raw       | p        | <b>0.57±0.01</b> | <b>0.46±0.01</b> | 16.05±5.22         | 239.77        |
| kAverages  | raw       | b        | <b>0.57±0.01</b> | 0.45±0.01        | <b>60.60±61.31</b> | <b>667.37</b> |

Table 41: dataSet: uWaveGestureLi-  
brary, Y distance: dtw, normalizeData:  
1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | 0.50±0.02        | 0.45±0.01        | 33.00±17.77        | 9.81          |
| random     |           |          | 0.15±0.00        | 0.01±0.00        | -±-                | 0.23          |
| kAverages  | object    | p        | 0.49±0.02        | 0.44±0.00        | 26.40±11.16        | 219.28        |
| kAverages  | object    | b        | 0.48±0.01        | 0.44±0.00        | 46.35±20.23        | 334.64        |
| kAverages  | raw       | p        | <b>0.51±0.02</b> | <b>0.45±0.01</b> | 16.55±5.83         | 153.77        |
| kAverages  | raw       | b        | 0.48±0.08        | <b>0.41±0.09</b> | <b>86.75±76.73</b> | <b>647.90</b> |

Table 42: dataSet: uWaveGestureLi-  
brary, Z distance: dtw, normalizeData:  
1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations         | time          |
|------------|-----------|----------|------------------|------------------|--------------------|---------------|
| kkMeans    |           |          | <b>0.51±0.02</b> | 0.43±0.01        | 28.85±10.98        | 6.93          |
| random     |           |          | 0.15±0.00        | 0.01±0.00        | -±-                | 0.19          |
| kAverages  | object    | p        | 0.49±0.02        | <b>0.44±0.01</b> | 22.80±8.45         | 237.50        |
| kAverages  | object    | b        | 0.49±0.01        | <b>0.43±0.01</b> | <b>55.60±51.18</b> | <b>415.89</b> |
| kAverages  | raw       | p        | <b>0.51±0.01</b> | 0.43±0.01        | 13.30±4.43         | 116.75        |
| kAverages  | raw       | b        | <b>0.51±0.02</b> | 0.43±0.01        | <b>32.75±40.01</b> | 231.82        |

Table 43: dataSet: wafer, distance: dtw,  
normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy         | nmi              | iterations       | time         |
|------------|-----------|----------|------------------|------------------|------------------|--------------|
| kkMeans    |           |          | <b>0.64±0.00</b> | 0.00±0.00        | <b>3.70±0.86</b> | 1.13         |
| random     |           |          | 0.51±0.01        | <b>0.00±0.00</b> | -±-              | 0.20         |
| kAverages  | object    | p        | <b>0.64±0.00</b> | 0.00±0.00        | 3.00±0.00        | 20.71        |
| kAverages  | object    | b        | <b>0.64±0.00</b> | 0.00±0.00        | <b>4.35±1.18</b> | <b>22.82</b> |
| kAverages  | raw       | p        | 0.64±0.00        | 0.00±0.00        | 2.55±0.51        | 18.29        |
| kAverages  | raw       | b        | 0.64±0.00        | 0.00±0.00        | 3.40±0.68        | 19.97        |

Table 44: dataSet: yoga, distance: dtw,  
normalizeData: 1, nbRuns: 20

| clustering | objective | strategy | accuracy  | nmi       | iterations | time  |
|------------|-----------|----------|-----------|-----------|------------|-------|
| kkMeans    |           |          | 0.52±0.01 | 0.00±0.00 | 11.10±4.20 | 2.08  |
| random     |           |          | 0.51±0.01 | 0.00±0.00 | -±-        | 0.16  |
| kAverages  | object    | p        | 0.53±0.01 | 0.00±0.00 | 6.55±0.51  | 38.41 |
| kAverages  | object    | b        | 0.53±0.01 | 0.00±0.00 | 12.00±2.81 | 60.34 |
| kAverages  | raw       | p        | 0.51±0.00 | 0.00±0.00 | 3.85±0.88  | 40.31 |
| kAverages  | raw       | b        | 0.51±0.00 | 0.00±0.00 | 7.15±2.11  | 31.73 |