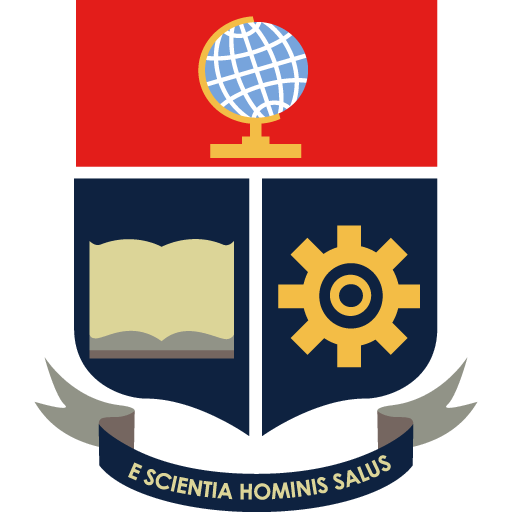
**ESCUELA POLITÉCNICA NACIONAL**

**REDES NEURONALES**

**TAREA 9**

**(PARTE 1: Datasets 6 a 8)**



David Fabián Cevallos Salas

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**APRENDIZAJE NO SUPERVISADO**

**1. Dataset Path-Based1**

**1.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 8 |
|  |
| k-medoids | k = 8 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 19  epsilon = 3,4482 |
|  |
| Clustering Jerárquico | Nro. de clusters = 10  Average linkage |
|  |
| Fuzzy c-means | c = 8 |
|  |

**1.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (2 clústeres en total más un cluster de anomalías)  (71 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**1.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 3,0668 | 3,0575 | 3,8258 | 2,8998 | 3,0472 |
| **SSB** | 8,9472 | 8,9552 | 7,3168 | 8,9096 | 8,9276 |
| **WB-index** | 2,7422 | 2,7314 | 1,0458 | 3,2547 | 2,7306 |
| **Silhouette** | 0,5409 | 0,5684 | 0,8296 | 0,5401 | 0,5356 |

**2. Dataset Aggregation**

**2.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 7 |
|  |
| k-medoids | k = 7 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 15  epsilon = 1,8200 |
|  |
| Clustering Jerárquico | Nro. de clusters = 7  Average linkage |
|  |
| Fuzzy c-means | c **=** 7 |
|  |

**2.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (7 clústeres en total más un cluster de anomalías)  (21 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**2.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 3,4442 | 3,4888 | 3,5124 | 3,6068 | 3,7040 |
| **SSB** | 11,8195 | 11,7849 | 11,6671 | 11,6411 | 11,7384 |
| **WB-index** | 2,0398 | 2,0723 | 2,1074 | 2,1688 | 2,2088 |
| **Silhouette** | 0,6613 | 0,6521 | 0,6658 | 0,6439 | 0,5632 |

**3. Dataset Path-based2**

**3.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 15 |
|  |
| k-medoids | k = 15 |
|  |
| DBSCAN | Mínimo Nro. de vecinos =12  epsilon =2,2825 |
|  |
| Clustering Jerárquico | Nro. de clusters = 15  Average linkage |
|  |
| Fuzzy c-means | c **=** 15 |
|  |

**3.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (3 clústeres en total más un cluster de anomalías)  (102 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**3.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 2,5454 | 2,6119 | 2,5133 | 2,6600 | 2,5221 |
| **SSB** | 9,0522 | 9,0185 | 4,2708 | 8,9698 | 9,0251 |
| **WB-index** | 4,2179 | 4,3442 | 1,7655 | 4,4482 | 4,1917 |
| **Silhouette** | 0,5150 | 0,4589 | 0,6579 | 0,4907 | 0,4904 |

**4. Dataset S3**

**4.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 12 |
|  |
| k-medoids | k = 12 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 19  epsilon = 3,0029 e4 |
|  |
| Clustering Jerárquico | Nro. de clusters = 8  Average linkage |
|  |
| Fuzzy c-means | c **=** 12 |
|  |

**4.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (2 clústeres en total más un cluster de anomalías)  (347 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**4.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 6,1708 e4 | 6,1714 e4 | 1,8648 e5 | 8,5517 e4 | 6,0830 e4 |
| **SSB** | 2,4934 e5 | 2,4925 e5 | 1,5493 e5 | 2,4655 e5 | 2,4980 e5 |
| **WB-index** | 2,9698 | 2,9712 | 2,4072 | 2,7748 | 2,9222 |
| **Silhouette** | 0,6189 | 0,6179 | 0,5512 | 0,5743 | 0,6266 |

**5. Dataset Zelnik1**

**5.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 18 |
|  |
| k-medoids | k = 18 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 3  epsilon = 0,0171 |
|  |
| Clustering Jerárquico | Nro. de clusters = 18  Average linkage |
|  |
| Fuzzy c-means | c **=** 18 |
|  |

**5.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (16 clústeres en total más un cluster de anomalías)  (91 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**5.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 0,0354 | 0,0356 | 0,0210 | 0,0392 | 0,0554 |
| **SSB** | 0,1686 | 0,1682 | 0,1034 | 0,1666 | 0,1695 |
| **WB-index** | 3,7855 | 3,8055 | 3,2480 | 4,2383 | 5,8885 |
| **Silhouette** | 0,7239 | 0,7216 | 0,5670 | 0,6621 | 0,3486 |

**6. Dataset Ds3c3sc6**

**6.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 6 |
|  |
| k-medoids | k = 6 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 12  epsilon = 0,0122 |
|  |
| Clustering Jerárquico | Nro. de clusters = 6  Average linkage |
|  |
| Fuzzy c-means | c **=** 6 |
|  |

**6.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (5 clústeres en total más un cluster de anomalías)  (182 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**6.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 0,0307 | 0,0308 | 0,0354 | 0,0320 | 0,0299 |
| **SSB** | 0,0922 | 0,0927 | 0,1014 | 0,0924 | 0,0920 |
| **WB-index** | 1,9949 | 1,9896 | 1,7432 | 2,0761 | 1,9534 |
| **Silhouette** | 0,5302 | 0,6343 | 0,5936 | 0,5851 | 0,5534 |

**7. Dataset Complex9**

**7.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 9 |
|  |
| k-medoids | k = 9 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 11  epsilon = 13,4544 |
|  |
| Clustering Jerárquico | Nro. de clusters = 9  Average linkage |
|  |
| Fuzzy c-means | c **=** 9 |
|  |

**7.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (27 clústeres en total más un cluster de anomalías)  (113 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**7.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 60,4643 | 60,5320 | 43,9858 | 62,7905 | 60,4357 |
| **SSB** | 210,8405 | 210,8772 | 213,1166 | 210,0179 | 210,4528 |
| **WB-index** | 2,5810 | 2,5834 | 5,5726 | 2,6908 | 2,5845 |
| **Silhouette** | 0,5861 | 0,5831 | 0,2452 | 0,5179 | 0,5785 |

**8. Dataset Rings**

**8.1 Estimación de parámetros**

|  |  |
| --- | --- |
| **Algoritmo** | **Estimación de parámetros** |
| k-means | k = 16 |
|  |
| k-medoids | k = 16 |
|  |
| DBSCAN | Mínimo Nro. de vecinos = 23  epsilon = 1,7702 |
|  |
| Clustering Jerárquico | Nro. de clusters = 16  Average linkage |
|  |
| Fuzzy c-means | c **=** 16 |
|  |

**8.2 Visualización de clusters**

|  |  |
| --- | --- |
| **Algoritmo** | **Visualización de clusters** |
| k-means |  |
| k-medoids |  |
| DBSCAN | (2 clústeres en total más un cluster de anomalías)  (280 observaciones anómalas) |
| Clustering Jerárquico |  |
| Fuzzy c-means |  |

**8.3 Métricas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **k-means** | **k-medoids** | **DBSCAN** | **Clustering Jerárquico** | **Fuzzy**  **c-means** |
| **SSW** | 1,5138 | 1,4227 | 2,9111 | 1,5165 | 1,4939 |
| **SSB** | 4,8630 | 4,8784 | 0,8809 | 4,8486 | 5,0273 |
| **WB-index** | 4,9807 | 4,6661 | 6,6095 | 5,0043 | 4,7546 |
| **Silhouette** | 0,6476 | 0,6948 | 0,6484 | 0,6471 | 0,5016 |