**Dibujo en blanco y negro

Descripción generada automáticamente con confianza bajaINSTITUTO POLITÉCNICO NACIONAL**

ESCUELA SUPERIOR DE CÓMPUTO

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**GRUPO:**

4BM1

**TRABAJO:**

Practica 8

"Algoritmo K-Means"

**MATERIA:**

Fundamentos de Inteligencia Artificial

**FECHA**

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Logotipo

Descripción generada automáticamente

**PRACTICA 9. Algoritmo K-Means**

**RESUMEN**

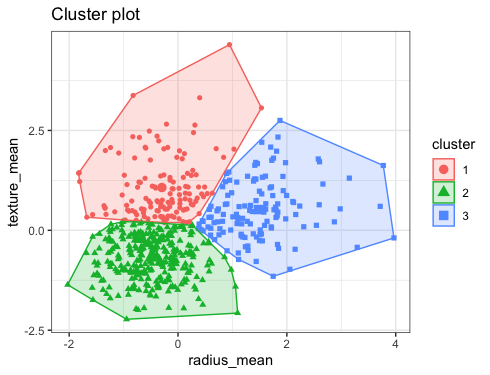
El presente informe tuvo como objetivo aplicar el algoritmo de clustering K-Means a un conjunto de datos de equipos de fútbol, con el fin de agruparlos en categorías según sus calificaciones ofensivas y defensivas. El análisis se realizará utilizando el módulo scikit-learn en Python y se presentarán gráficas de codo y dispersión para evaluar la calidad de los clusters.

**INTRODUCCIÓN**

El algoritmo K-Means es un método de agrupamiento no supervisado que busca dividir un conjunto de instancias en K grupos, donde cada instancia pertenece al grupo cuyo valor medio es más cercano.

El módulo scikit-learn es un módulo para aprendizaje de máquina en Python que incluye una implementación de K-Means, el cual puede ser utilizado para aplicar este algoritmo en conjuntos de datos. La implementación de K-Means en scikit-learn se encuentra en la clase sklearn. clúster. KMeans, la cual permite ajustar el modelo a los datos y predecir las etiquetas de los clústeres

Para obtener el valor óptimo de K, se pueden utilizar técnicas como la "gráfica del codo" (elbow method), que consiste en graficar la inercia (una métrica basada en la distancia) en función del número de clústeres y elegir el punto en el que la inercia comienza a disminuir de forma lineal, lo que indica el número óptimo de clústeres.

La implementación de K-Means en Python es relativamente sencilla, lo que lo hace popular para el análisis de agrupamiento, y scikit-learn proporciona una forma robusta de aplicar este algoritmo en conjuntos de datos.

**DESARROLLO**

Para realizar el clustering de los equipos de fútbol según sus calificaciones ofensivas y defensivas, se empleó el algoritmo de K-Means utilizando el módulo scikit-learn en Python. A continuación, se detalla el proceso paso a paso:

Carga de Datos:

Se cargaron los datos desde el archivo CSV proporcionado ('global\_rankings.csv') utilizando la biblioteca panda.

Código

**Texto

Descripción generada automáticamente**

Selección de Atributos:

Se seleccionaron los atributos relevantes para el clustering, que son la calificación ofensiva ('Cal Ofensiva') y la calificación defensiva ('Cal Defensiva').

Código

Texto

Descripción generada automáticamente

Definición de Colores y Listas:

Se definieron colores para visualizar los clusters y se inicializó una lista para almacenar las inercias.

Código



Iteración sobre Diferentes Valores de K:

Se realizó un bucle para iterar sobre diferentes valores de k (número de clusters) desde 1 hasta 10.

Se creó un modelo K-Means con el valor actual de k y se ajustó a los datos.

Código

Texto

Descripción generada automáticamente

Asignación de Etiquetas y Guardado del Resultado:

Se asignaron las etiquetas de clúster a cada instancia en el conjunto de datos y se guardaron en un nuevo archivo CSV llamado 'rankingEtiquetado.csv'.

Código

Texto

Descripción generada automáticamente

Visualización de Clusters:

Se crearon gráficas de dispersión para visualizar cómo los equipos se distribuyen en el espacio definido por las calificaciones ofensivas y defensivas.

Código:

Texto

Descripción generada automáticamente

Creación de gráfica de Codo:

Se generó una gráfica de codo para evaluar la inercia del modelo en función del número de clusters. La inercia representa la suma de las distancias al cuadrado entre las instancias y los centroides de sus clusters.

Texto

Descripción generada automáticamente

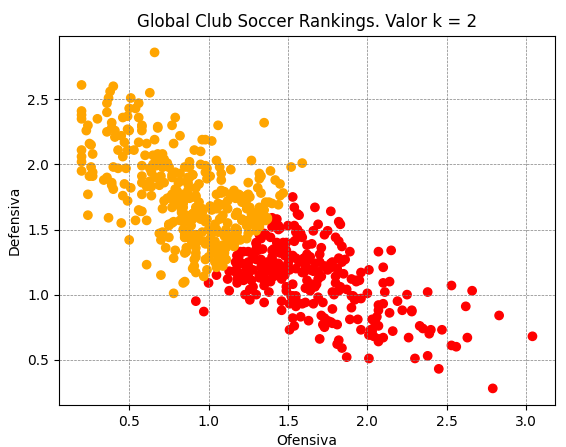
Datos de entrada

|  |  |  |  |
| --- | --- | --- | --- |
| rank | name | off | def |
| 1 | Manchester City | 2.79 | 0.28 |
| 2 | Bayern Munich | 3.04 | 0.68 |
| 3 | Barcelona | 2.45 | 0.43 |
| 4 | Real Madrid | 2.56 | 0.6 |
| 5 | Liverpool | 2.63 | 0.67 |
| 6 | Arsenal | 2.53 | 0.61 |
| 7 | Newcastle | 2.38 | 0.53 |
| 8 | Napoli | 2.3 | 0.51 |
| 9 | Borussia Dortmund | 2.83 | 0.84 |
| 10 | Brighton and Hove Albion | 2.47 | 0.73 |
| 11 | RB Leipzig | 2.39 | 0.7 |
| 12 | Benfica | 2.4 | 0.73 |
| 13 | Aston Villa | 2.01 | 0.51 |
| 14 | Atletico Madrid | 2.26 | 0.67 |
| 15 | Paris Saint-Germain | 2.62 | 0.91 |
| 16 | Manchester United | 2.35 | 0.74 |
| 17 | Internazionale | 2.33 | 0.76 |
| 18 | Ajax | 2.66 | 1.03 |
| 19 | Lille | 2.07 | 0.64 |
| 20 | Brentford | 2.1 | 0.67 |
| 21 | Real Sociedad | 1.87 | 0.52 |
| 22 | Sporting CP | 2.07 | 0.66 |
| 23 | FC Porto | 2.16 | 0.72 |
| 24 | Chelsea | 2.04 | 0.68 |
| 25 | Feyenoord | 2.28 | 0.87 |
| 26 | Lyon | 2.28 | 0.88 |
| 27 | Stade Rennes | 2.01 | 0.69 |
| 28 | Bayer Leverkusen | 2.03 | 0.72 |
| 29 | Athletic Bilbao | 1.84 | 0.59 |
| 30 | Celtic | 2.53 | 1.07 |
| 31 | Zenit St Petersburg | 2.02 | 0.73 |
| 32 | Fiorentina | 2.07 | 0.76 |
| 33 | FC Twente | 2.22 | 0.88 |
| 34 | Marseille | 2.05 | 0.77 |
| 35 | PSV | 2.38 | 1.02 |
| 36 | Crystal Palace | 1.81 | 0.62 |
| 37 | Villarreal | 2.14 | 0.86 |
| 38 | Lens | 1.96 | 0.73 |
| 39 | AC Milan | 2.05 | 0.8 |
| 40 | AS Roma | 1.82 | 0.65 |
| 41 | FC Salzburg | 2.06 | 0.83 |
| 42 | FC Cologne | 2.03 | 0.81 |
| 43 | Tottenham Hotspur | 2.19 | 0.95 |
| 44 | Rangers | 2.25 | 1 |
| 45 | Eintracht Frankfurt | 2.07 | 0.88 |
| 46 | West Ham United | 1.94 | 0.81 |
| 47 | Atalanta | 2.1 | 0.93 |
| 48 | VfL Wolfsburg | 2.07 | 0.92 |
| 49 | Juventus | 1.89 | 0.81 |
| 50 | Torino | 1.7 | 0.66 |
| 51 | Sevilla FC | 1.81 | 0.77 |
| 52 | Mainz | 2.11 | 1.02 |
| 53 | Palmeiras | 1.78 | 0.78 |
| 54 | Valencia | 1.73 | 0.75 |
| 55 | Lazio | 1.77 | 0.79 |
| 56 | Fulham | 1.9 | 0.9 |
| 57 | Besiktas | 2.14 | 1.1 |
| 58 | Celta Vigo | 1.72 | 0.77 |
| 59 | Nice | 1.75 | 0.8 |
| 60 | VfB Stuttgart | 1.96 | 0.97 |
| 61 | Borussia Monchengladbach | 2.1 | 1.09 |
| 62 | Galatasaray | 2 | 1.01 |
| 63 | AZ | 1.92 | 0.96 |
| 64 | Girona FC | 1.93 | 0.97 |
| 65 | Real Betis | 1.73 | 0.82 |
| 66 | SC Freiburg | 1.91 | 0.99 |
| 67 | Flamengo | 1.9 | 0.99 |
| 68 | Strasbourg | 1.78 | 0.89 |
| 69 | 1. FC Union Berlin | 1.71 | 0.84 |
| 70 | Osasuna | 1.63 | 0.8 |
| 71 | Young Boys | 2.1 | 1.21 |
| 72 | Atletico Mineiro | 1.54 | 0.76 |
| 73 | Getafe | 1.51 | 0.73 |
| 74 | AS Monaco | 1.95 | 1.11 |
| 75 | Leicester City | 1.87 | 1.04 |
| 76 | KAA Gent | 1.93 | 1.1 |
| 77 | Reims | 1.72 | 0.94 |
| 78 | Bologna | 1.79 | 1 |
| 79 | Werder Bremen | 1.93 | 1.11 |
| 80 | Fenerbahce | 2.01 | 1.19 |
| 81 | Monterrey | 1.58 | 0.83 |
| 82 | Everton | 1.82 | 1.03 |
| 83 | TSG Hoffenheim | 1.96 | 1.17 |
| 84 | Sassuolo | 1.9 | 1.12 |
| 85 | Slavia Prague | 1.83 | 1.06 |
| 86 | Braga | 1.78 | 1.02 |
| 87 | Bodo/Glimt | 2.15 | 1.34 |
| 88 | Burnley | 1.53 | 0.82 |
| 89 | Rayo Vallecano | 1.66 | 0.93 |
| 90 | Olympiacos | 1.69 | 0.98 |
| 91 | Dinamo Zagreb | 1.8 | 1.09 |
| 92 | Genk | 2.07 | 1.33 |
| 93 | Clermont Foot | 1.61 | 0.94 |
| 94 | AEK Athens | 1.59 | 0.93 |
| 95 | Club Brugge | 1.85 | 1.16 |
| 96 | Tigres UANL | 1.55 | 0.91 |
| 97 | Club AmÃ©rica | 1.8 | 1.14 |
| 98 | Toulouse | 1.64 | 1.03 |
| 99 | Udinese | 1.67 | 1.06 |
| 100 | Lecce | 1.46 | 0.88 |
| 101 | Mallorca | 1.51 | 0.93 |
| 102 | Antwerp | 1.55 | 0.96 |
| 103 | AFC Bournemouth | 1.68 | 1.08 |
| 104 | Schalke 04 | 1.81 | 1.2 |
| 105 | CSKA Moscow | 1.54 | 0.96 |
| 106 | Wolverhampton | 1.55 | 0.99 |
| 107 | Leeds United | 1.84 | 1.25 |
| 108 | SK Sturm Graz | 1.71 | 1.14 |
| 109 | River Plate | 1.61 | 1.05 |
| 110 | Espanyol | 1.86 | 1.27 |
| 111 | Monza | 1.69 | 1.12 |
| 112 | Vitesse | 1.65 | 1.08 |
| 113 | SÃ£o Paulo | 1.53 | 0.99 |
| 114 | Montpellier | 1.77 | 1.21 |
| 115 | SlovÃ¡cko | 1.77 | 1.21 |
| 116 | Red Star Belgrade | 1.75 | 1.19 |
| 117 | Cadiz | 1.52 | 0.99 |
| 118 | Adana Demirspor | 1.89 | 1.33 |
| 119 | FC Copenhagen | 1.75 | 1.2 |
| 120 | Union Saint Gilloise | 1.82 | 1.28 |
| 121 | Botafogo | 1.46 | 0.95 |
| 122 | FC Utrecht | 1.78 | 1.25 |
| 123 | Shakhtar Donetsk | 1.77 | 1.24 |
| 124 | Elche | 1.62 | 1.11 |
| 125 | Almeria | 1.69 | 1.18 |
| 126 | FC Augsburg | 1.73 | 1.22 |
| 127 | Southampton | 1.66 | 1.18 |
| 128 | Sheffield United | 1.49 | 1.03 |
| 129 | VfL Bochum | 1.84 | 1.37 |
| 130 | Fluminense | 1.53 | 1.08 |
| 131 | Nottingham Forest | 1.64 | 1.19 |
| 132 | Sparta | 1.7 | 1.25 |
| 133 | Middlesbrough | 1.6 | 1.17 |
| 134 | Brest | 1.49 | 1.06 |
| 135 | FC Midtjylland | 1.67 | 1.24 |
| 136 | Luton Town | 1.35 | 0.94 |
| 137 | Pachuca | 1.59 | 1.17 |
| 138 | Viktoria Plzen | 1.82 | 1.41 |
| 139 | FC Krasnodar | 1.7 | 1.31 |
| 140 | Ferencvaros | 1.61 | 1.22 |
| 141 | Internacional | 1.38 | 1.02 |
| 142 | Lokomotiv Moscow | 1.62 | 1.26 |
| 143 | Trabzonspor | 1.8 | 1.44 |
| 144 | Real Valladolid | 1.55 | 1.2 |
| 145 | Hertha Berlin | 1.71 | 1.36 |
| 146 | Philadelphia Union | 1.64 | 1.29 |
| 147 | Lorient | 1.46 | 1.12 |
| 148 | Bragantino | 1.48 | 1.15 |
| 149 | Empoli | 1.57 | 1.25 |
| 150 | Los Angeles FC | 1.6 | 1.28 |
| 151 | Spartak Moscow | 1.58 | 1.26 |
| 152 | Dynamo Kiev | 1.51 | 1.19 |
| 153 | Fortaleza | 1.3 | 1 |
| 154 | Ipswich Town | 1.62 | 1.31 |
| 155 | Guimaraes | 1.26 | 0.96 |
| 156 | Istanbul Basaksehir | 1.39 | 1.1 |
| 157 | Molde | 1.83 | 1.54 |
| 158 | Anderlecht | 1.46 | 1.18 |
| 159 | LeÃ³n | 1.35 | 1.07 |
| 160 | AtlÃ©tico Paranaense | 1.38 | 1.11 |
| 161 | SC Dnipro-1 | 1.55 | 1.28 |
| 162 | Atlas | 1.41 | 1.14 |
| 163 | Lech Poznan | 1.42 | 1.15 |
| 164 | Swansea City | 1.5 | 1.23 |
| 165 | FK Austria Vienna | 1.73 | 1.46 |
| 166 | Steaua Bucuresti | 1.5 | 1.24 |
| 167 | Fatih KaragÃ¼mrÃ¼k | 1.82 | 1.56 |
| 168 | Terek Grozny | 1.46 | 1.2 |
| 169 | Go Ahead Eagles | 1.65 | 1.39 |
| 170 | Yokohama F. Marinos | 1.75 | 1.49 |
| 171 | Cercle Brugge | 1.62 | 1.38 |
| 172 | FC Sheriff Tiraspol | 1.51 | 1.27 |
| 173 | FK Partizan Belgrade | 1.41 | 1.17 |
| 174 | Nantes | 1.35 | 1.11 |
| 175 | LASK Linz | 1.53 | 1.3 |
| 176 | Vasco da Gama | 1.44 | 1.21 |
| 177 | Corinthians | 1.23 | 1 |
| 178 | Coventry City | 1.28 | 1.06 |
| 179 | PAOK Salonika | 1.4 | 1.18 |
| 180 | Guadalajara | 1.35 | 1.13 |
| 181 | Santos | 1.26 | 1.04 |
| 182 | Famalicao | 1.44 | 1.24 |
| 183 | Verona | 1.37 | 1.18 |
| 184 | Cruz Azul | 1.32 | 1.13 |
| 185 | Vissel Kobe | 1.48 | 1.3 |
| 186 | Konyaspor | 1.42 | 1.24 |
| 187 | Metz | 1.32 | 1.15 |
| 188 | Boavista | 1.39 | 1.22 |
| 189 | Frosinone | 1.37 | 1.19 |
| 190 | Heerenveen | 1.66 | 1.49 |
| 191 | Cruzeiro | 1.36 | 1.19 |
| 192 | Talleres de CÃ³rdoba | 1.34 | 1.17 |
| 193 | Argentinos Juniors | 1.27 | 1.11 |
| 194 | FK Qarabag | 1.41 | 1.25 |
| 195 | Maccabi Haifa | 1.69 | 1.54 |
| 196 | Malmo FF | 1.59 | 1.44 |
| 197 | Hapoel Be'er | 1.49 | 1.34 |
| 198 | BK Hacken | 1.77 | 1.64 |
| 199 | Spezia | 1.45 | 1.32 |
| 200 | NEC | 1.54 | 1.41 |
| 201 | Toluca | 1.56 | 1.44 |
| 202 | Salernitana | 1.48 | 1.36 |
| 203 | West Bromwich Albion | 1.37 | 1.25 |
| 204 | Gil Vicente | 1.36 | 1.24 |
| 205 | Rapid Vienna | 1.58 | 1.47 |
| 206 | Chaves | 1.4 | 1.29 |
| 207 | Auxerre | 1.33 | 1.21 |
| 208 | Cagliari | 1.22 | 1.11 |
| 209 | FC Cincinnati | 1.49 | 1.4 |
| 210 | Vizela | 1.23 | 1.12 |
| 211 | Santos Laguna | 1.43 | 1.35 |
| 212 | Stoke City | 1.25 | 1.15 |
| 213 | AGF Aarhus | 1.28 | 1.19 |
| 214 | Cremonese | 1.47 | 1.4 |
| 215 | FC Arouca | 1.18 | 1.09 |
| 216 | Gazovik Orenburg | 1.55 | 1.48 |
| 217 | Boca Juniors | 1.13 | 1.03 |
| 218 | Atlanta United FC | 1.56 | 1.5 |
| 219 | Panathinaikos | 0.97 | 0.87 |
| 220 | Millwall | 1.33 | 1.25 |
| 221 | Genoa | 1.24 | 1.16 |
| 222 | Aris Salonika | 1.4 | 1.34 |
| 223 | GrÃªmio | 1.41 | 1.35 |
| 224 | Angers | 1.33 | 1.27 |
| 225 | Estudiantes | 1.18 | 1.12 |
| 226 | Dinamo Moscow | 1.43 | 1.4 |
| 227 | Nashville SC | 1.3 | 1.27 |
| 228 | St Gallen | 1.67 | 1.67 |
| 229 | Casa Pia | 1.24 | 1.2 |
| 230 | St Etienne | 1.54 | 1.53 |
| 231 | Rio Ave | 1.25 | 1.22 |
| 232 | Urawa Red Diamonds | 1.19 | 1.17 |
| 233 | Sunderland | 1.34 | 1.35 |
| 234 | BahÃ­a | 1.25 | 1.25 |
| 235 | Norwich City | 1.23 | 1.23 |
| 236 | Brondby | 1.57 | 1.61 |
| 237 | Watford | 1.28 | 1.29 |
| 238 | IF Elfsborg | 1.5 | 1.53 |
| 239 | Bordeaux | 1.12 | 1.12 |
| 240 | AmÃ©rica Mineiro | 1.31 | 1.34 |
| 241 | KVC Westerlo | 1.56 | 1.62 |
| 242 | Kawasaki Frontale | 1.39 | 1.44 |
| 243 | AEK Larnaca | 1.16 | 1.18 |
| 244 | Apollon Limassol | 1.21 | 1.24 |
| 245 | Columbus Crew | 1.44 | 1.5 |
| 246 | Seattle Sounders FC | 1.31 | 1.35 |
| 247 | FC Lugano | 1.45 | 1.51 |
| 248 | New York City FC | 1.3 | 1.35 |
| 249 | OH Leuven | 1.44 | 1.53 |
| 250 | New York Red Bulls | 1.13 | 1.18 |
| 251 | San Lorenzo | 0.92 | 0.95 |
| 252 | Blackburn | 1.18 | 1.23 |
| 253 | Santa Clara | 1.25 | 1.33 |
| 254 | FC St. Pauli | 1.3 | 1.39 |
| 255 | Rostov | 1.36 | 1.46 |
| 256 | Maritimo | 1.3 | 1.4 |
| 257 | Hibernian | 1.33 | 1.43 |
| 258 | Bristol City | 1.17 | 1.25 |
| 259 | Hearts | 1.4 | 1.52 |
| 260 | Rosenborg | 1.54 | 1.67 |
| 261 | FC Nordsjaelland | 1.34 | 1.46 |
| 262 | Lanus | 1.19 | 1.29 |
| 263 | CFR 1907 Cluj | 1.22 | 1.33 |
| 264 | Orlando City SC | 1.35 | 1.47 |
| 265 | Wolfsberger AC | 1.43 | 1.58 |
| 266 | Levante | 1.05 | 1.15 |
| 267 | Viborg | 1.18 | 1.3 |
| 268 | DC United | 1.32 | 1.46 |
| 269 | Kashima Antlers | 1.18 | 1.3 |
| 270 | Tenerife | 1 | 1.09 |
| 271 | FC Dallas | 1.2 | 1.33 |
| 272 | New England Revolution | 1.41 | 1.57 |
| 273 | Cuiaba | 1.09 | 1.22 |
| 274 | Basel | 1.39 | 1.58 |
| 275 | Vancouver Whitecaps | 1.4 | 1.59 |
| 276 | Ludogorets | 1.3 | 1.49 |
| 277 | Nagoya Grampus Eight | 1.11 | 1.27 |
| 278 | Hamburg SV | 1.53 | 1.75 |
| 279 | Parma | 1.11 | 1.27 |
| 280 | Puebla | 1.32 | 1.52 |
| 281 | Sampdoria | 1.36 | 1.57 |
| 282 | Standard Liege | 1.37 | 1.58 |
| 283 | Motherwell | 1.24 | 1.43 |
| 284 | Silkeborg | 1.37 | 1.59 |
| 285 | FC Andorra | 1.05 | 1.21 |
| 286 | Sporting de Charleroi | 1.32 | 1.54 |
| 287 | FC Zurich | 1.35 | 1.57 |
| 288 | St. Truidense | 1.08 | 1.26 |
| 289 | Velez Sarsfield | 0.97 | 1.14 |
| 290 | Pumas Unam | 1.25 | 1.47 |
| 291 | SC Paderborn | 1.44 | 1.69 |
| 292 | Portimonense | 1.16 | 1.37 |
| 293 | Defensa y Justicia | 1.09 | 1.29 |
| 294 | Bastia | 1.2 | 1.42 |
| 295 | Estoril Praia | 1.16 | 1.38 |
| 296 | Portland Timbers | 1.29 | 1.54 |
| 297 | Granada | 0.99 | 1.19 |
| 298 | Bari | 1.1 | 1.32 |
| 299 | Mamelodi Sundowns | 1.04 | 1.25 |
| 300 | Sanfrecce Hiroshima | 1.17 | 1.41 |
| 301 | Servette | 1.33 | 1.61 |
| 302 | AtlÃ©tico San Luis | 1.18 | 1.44 |
| 303 | Los Angeles Galaxy | 1.4 | 1.7 |
| 304 | FC Volendam | 1.47 | 1.78 |
| 305 | RKC | 1.45 | 1.76 |
| 306 | Caen | 1.18 | 1.44 |
| 307 | Odense BK | 1.35 | 1.65 |
| 308 | GoiÃ¡s | 1.11 | 1.36 |
| 309 | Sivasspor | 1.25 | 1.53 |
| 310 | Kasimpasa | 1.3 | 1.59 |
| 311 | Coritiba | 1.09 | 1.35 |
| 312 | Guingamp | 1.13 | 1.4 |
| 313 | Tigre | 1.09 | 1.36 |
| 314 | Minnesota United FC | 1.28 | 1.58 |
| 315 | F.B.C Unione Venezia | 1.24 | 1.53 |
| 316 | Necaxa | 1.05 | 1.32 |
| 317 | Rosario Central | 1.11 | 1.38 |
| 318 | Hull City | 1.05 | 1.31 |
| 319 | Fortuna DÃ¼sseldorf | 1.27 | 1.58 |
| 320 | Lillestrom | 1.32 | 1.64 |
| 321 | Kayserispor | 1.38 | 1.71 |
| 322 | Aberdeen | 1.14 | 1.43 |
| 323 | Paris FC | 1.06 | 1.34 |
| 324 | Preston North End | 1.12 | 1.41 |
| 325 | SK Brann | 1.3 | 1.63 |
| 326 | Real Zaragoza | 0.92 | 1.17 |
| 327 | Omonia Nicosia | 1.25 | 1.57 |
| 328 | Sporting Kansas City | 1.16 | 1.46 |
| 329 | Albacete | 1.13 | 1.43 |
| 330 | Antalyaspor | 1.18 | 1.48 |
| 331 | FC Luzern | 1.32 | 1.65 |
| 332 | Racing Club | 1.17 | 1.48 |
| 333 | Cerezo Osaka | 1.09 | 1.38 |
| 334 | Fortuna Sittard | 1.36 | 1.71 |
| 335 | AlavÃ©s | 0.85 | 1.1 |
| 336 | Newell's Old Boys | 0.84 | 1.09 |
| 337 | Karlsruher SC | 1.32 | 1.67 |
| 338 | Tijuana | 1.18 | 1.5 |
| 339 | Le Havre | 0.78 | 1.01 |
| 340 | San Jose Earthquakes | 1.27 | 1.62 |
| 341 | AC Ajaccio | 1 | 1.29 |
| 342 | Slovan Bratislava | 1.12 | 1.44 |
| 343 | Ural Sverdlovsk Oblast | 0.98 | 1.27 |
| 344 | 1. FC Heidenheim 1846 | 1.22 | 1.57 |
| 345 | Consadole Sapporo | 1.59 | 2.01 |
| 346 | Krylia Sovetov | 1.02 | 1.33 |
| 347 | Sheffield Wednesday | 1.12 | 1.45 |
| 348 | KV Mechelen | 1.45 | 1.85 |
| 349 | Toronto FC | 1.17 | 1.51 |
| 350 | Montreal Impact | 1.21 | 1.57 |
| 351 | HuracÃ¡n | 0.9 | 1.2 |
| 352 | Djurgardens IF | 1.21 | 1.58 |
| 353 | Pacos Ferreira | 1.1 | 1.45 |
| 354 | FC JuÃ¡rez | 1.02 | 1.36 |
| 355 | Eibar | 0.91 | 1.22 |
| 356 | Viking FK | 1.52 | 1.98 |
| 357 | CA Independiente | 1.04 | 1.38 |
| 358 | Colon Santa Fe | 1.04 | 1.4 |
| 359 | Barnsley | 1.26 | 1.67 |
| 360 | Sochi | 1.11 | 1.5 |
| 361 | Charlotte FC | 1.24 | 1.66 |
| 362 | Birmingham | 1.02 | 1.4 |
| 363 | Alanyaspor | 1.42 | 1.88 |
| 364 | Cardiff City | 1.04 | 1.41 |
| 365 | WSG Swarovski Wattens | 1.33 | 1.78 |
| 366 | Las Palmas | 0.91 | 1.27 |
| 367 | Godoy Cruz | 1 | 1.39 |
| 368 | Banfield | 0.92 | 1.29 |
| 369 | Randers FC | 1.18 | 1.63 |
| 370 | SpVgg Greuther FÃ¼rth | 1.12 | 1.55 |
| 371 | Ankaragucu | 1.06 | 1.48 |
| 372 | Istanbulspor | 1.17 | 1.61 |
| 373 | Chicago Fire | 1.18 | 1.63 |
| 374 | QuerÃ©taro | 0.98 | 1.39 |
| 375 | Troyes | 1.23 | 1.7 |
| 376 | Fakel Voronezh | 1.01 | 1.43 |
| 377 | Wigan | 0.92 | 1.32 |
| 378 | FC Groningen | 1.24 | 1.73 |
| 379 | Excelsior | 1.26 | 1.75 |
| 380 | Austria Lustenau | 1.31 | 1.82 |
| 381 | Austin FC | 1.24 | 1.73 |
| 382 | Como | 1.05 | 1.5 |
| 383 | Sochaux | 1.02 | 1.47 |
| 384 | Houston Dynamo | 1.21 | 1.71 |
| 385 | Huddersfield Town | 0.97 | 1.41 |
| 386 | Emmen | 1.25 | 1.77 |
| 387 | Grasshoppers ZÃ¼rich | 1.39 | 1.95 |
| 388 | Valerenga | 1.24 | 1.76 |
| 389 | FK Nizhny Novgorod | 0.92 | 1.36 |
| 390 | SK Austria Klagenfurt | 1.32 | 1.89 |
| 391 | Colorado Rapids | 1.08 | 1.59 |
| 392 | Queens Park Rangers | 1.04 | 1.54 |
| 393 | Hammarby | 1.21 | 1.75 |
| 394 | Holstein Kiel | 1.33 | 1.91 |
| 395 | SV Darmstadt 98 | 1.07 | 1.58 |
| 396 | Real Salt Lake | 1.09 | 1.61 |
| 397 | MazatlÃ¡n FC | 1.12 | 1.66 |
| 398 | Instituto | 1 | 1.5 |
| 399 | AtlÃ©tico TucumÃ¡n | 0.93 | 1.41 |
| 400 | Ballkani | 1.2 | 1.76 |
| 401 | Melbourne City | 1.32 | 1.93 |
| 402 | Leganes | 0.86 | 1.33 |
| 403 | FC Tokyo | 1.17 | 1.74 |
| 404 | Sarmiento | 0.93 | 1.43 |
| 405 | Platense | 0.85 | 1.32 |
| 406 | Hartberg | 1.19 | 1.77 |
| 407 | Pisa | 0.93 | 1.44 |
| 408 | Belgrano Cordoba | 0.9 | 1.4 |
| 409 | Cambuur Leeuwarden | 1.25 | 1.86 |
| 410 | Rotherham United | 0.96 | 1.48 |
| 411 | Gimnasia La Plata | 0.86 | 1.36 |
| 412 | Sudtirol | 0.7 | 1.15 |
| 413 | St. Louis CITY SC | 1.12 | 1.72 |
| 414 | Sagan Tosu | 0.92 | 1.46 |
| 415 | Bolton | 0.89 | 1.42 |
| 416 | Real Oviedo | 0.78 | 1.28 |
| 417 | Sarpsborg | 1.14 | 1.76 |
| 418 | Tromso | 1.08 | 1.69 |
| 419 | Umraniyespor | 1.14 | 1.77 |
| 420 | Palermo | 1.05 | 1.66 |
| 421 | Rigas Futbola Skola | 1.16 | 1.8 |
| 422 | AaB | 0.99 | 1.58 |
| 423 | Villarreal B | 0.98 | 1.56 |
| 424 | Giresunspor | 1.06 | 1.68 |
| 425 | 1. FC Kaiserslautern | 1.02 | 1.65 |
| 426 | MÃ¡laga | 0.79 | 1.34 |
| 427 | Blackpool | 1.06 | 1.7 |
| 428 | Plymouth Argyle | 1.02 | 1.66 |
| 429 | Racing Santander | 0.85 | 1.44 |
| 430 | Dijon FCO | 0.85 | 1.44 |
| 431 | Central CÃ³rdoba Santiago del Estero | 0.87 | 1.47 |
| 432 | Barracas Central | 0.87 | 1.48 |
| 433 | Zalgiris Vilnius | 1.1 | 1.79 |
| 434 | St Mirren | 0.95 | 1.58 |
| 435 | Central Coast Mariners | 1.27 | 2.03 |
| 436 | Union Santa Fe | 0.85 | 1.46 |
| 437 | Peterborough United | 1.01 | 1.68 |
| 438 | IFK Norrkoping | 1.08 | 1.78 |
| 439 | Derby County | 0.94 | 1.6 |
| 440 | FC Cartagena | 0.89 | 1.53 |
| 441 | FC Vaduz | 0.96 | 1.63 |
| 442 | Sporting GijÃ³n | 0.85 | 1.48 |
| 443 | KV Kortrijk | 1.08 | 1.8 |
| 444 | Inter Miami CF | 1.05 | 1.77 |
| 445 | Kalmar FF | 0.96 | 1.64 |
| 446 | Reading | 0.9 | 1.58 |
| 447 | US Quevilly | 0.96 | 1.66 |
| 448 | Ascoli | 0.84 | 1.5 |
| 449 | SD Huesca | 0.73 | 1.36 |
| 450 | Odd BK | 0.91 | 1.62 |
| 451 | Kilmarnock | 0.91 | 1.63 |
| 452 | St Johnstone | 0.88 | 1.58 |
| 453 | OFI Crete | 0.9 | 1.62 |
| 454 | Mirandes | 0.86 | 1.56 |
| 455 | Valenciennes | 0.9 | 1.62 |
| 456 | Arminia Bielefeld | 1.14 | 1.96 |
| 457 | 1. FC Magdeburg | 1.08 | 1.88 |
| 458 | Modena | 0.92 | 1.67 |
| 459 | Reggina | 0.84 | 1.56 |
| 460 | Rodez | 0.75 | 1.44 |
| 461 | HJK Helsinki | 0.94 | 1.71 |
| 462 | Grenoble | 0.61 | 1.23 |
| 463 | Lyngby | 0.86 | 1.61 |
| 464 | Guangzhou Evergrande | 1.08 | 1.93 |
| 465 | Portsmouth | 0.82 | 1.57 |
| 466 | SV Zulte Waregem | 1.35 | 2.32 |
| 467 | Pau | 0.92 | 1.75 |
| 468 | Cittadella | 0.7 | 1.42 |
| 469 | Avispa Fukuoka | 0.78 | 1.56 |
| 470 | Hannover 96 | 1.07 | 1.98 |
| 471 | Kashiwa Reysol | 0.91 | 1.75 |
| 472 | Ross County | 0.92 | 1.76 |
| 473 | Amiens | 0.83 | 1.63 |
| 474 | Orlando Pirates | 0.75 | 1.53 |
| 475 | Spal | 0.83 | 1.65 |
| 476 | SD Ponferradina | 0.77 | 1.55 |
| 477 | Perugia | 0.84 | 1.67 |
| 478 | Nimes | 1.01 | 1.91 |
| 479 | Atromitos | 0.71 | 1.48 |
| 480 | Arsenal Sarandi | 0.75 | 1.54 |
| 481 | Stromsgodset | 0.99 | 1.89 |
| 482 | San Antonio FC | 0.88 | 1.74 |
| 483 | Kyoto Purple Sanga | 0.83 | 1.68 |
| 484 | Burgos | 0.69 | 1.47 |
| 485 | AIK | 0.84 | 1.7 |
| 486 | Gamba Osaka | 0.92 | 1.82 |
| 487 | Stabaek | 0.94 | 1.85 |
| 488 | Livingston | 0.83 | 1.69 |
| 489 | Cashpoint SC Rheindorf Altach | 0.82 | 1.68 |
| 490 | Sydney FC | 1.05 | 2.03 |
| 491 | Ternana | 0.85 | 1.74 |
| 492 | Charlton Athletic | 0.98 | 1.94 |
| 493 | SV Ried | 0.87 | 1.8 |
| 494 | Western Sydney FC | 0.99 | 1.97 |
| 495 | Shonan Bellmare | 0.83 | 1.74 |
| 496 | Laval | 0.83 | 1.75 |
| 497 | Benevento | 0.77 | 1.67 |
| 498 | Beijing Guoan | 0.98 | 1.99 |
| 499 | 1. FC NÃ¼rnberg | 0.8 | 1.72 |
| 500 | Louisville City FC | 0.83 | 1.77 |
| 501 | Dundee Utd | 0.87 | 1.85 |
| 502 | Wycombe Wanderers | 0.78 | 1.72 |
| 503 | Haugesund | 0.87 | 1.86 |
| 504 | Annecy | 0.79 | 1.75 |
| 505 | Shanghai SIPG | 0.9 | 1.92 |
| 506 | Jahn Regensburg | 0.9 | 1.92 |
| 507 | San Diego Loyal SC | 0.95 | 2 |
| 508 | Tampa Bay Rowdies | 0.88 | 1.9 |
| 509 | Pyunik Yerevan | 0.87 | 1.9 |
| 510 | IFK Goteborg | 0.8 | 1.8 |
| 511 | UD Ibiza | 0.71 | 1.66 |
| 512 | Fleetwood Town | 0.76 | 1.75 |
| 513 | Hansa Rostock | 0.77 | 1.77 |
| 514 | Sacramento Republic FC | 0.79 | 1.81 |
| 515 | FC Khimki | 0.82 | 1.87 |
| 516 | KV Oostende | 1.02 | 2.18 |
| 517 | Winterthur | 0.81 | 1.86 |
| 518 | Brescia | 0.74 | 1.74 |
| 519 | Giannina | 0.72 | 1.72 |
| 520 | AC Horsens | 0.88 | 1.98 |
| 521 | Arizona United | 0.87 | 1.98 |
| 522 | Memphis 901 FC | 0.95 | 2.1 |
| 523 | Lincoln City | 0.61 | 1.57 |
| 524 | Eintracht Braunschweig | 0.88 | 2.02 |
| 525 | Adelaide United | 1.06 | 2.3 |
| 526 | Albirex Niigata | 0.82 | 1.93 |
| 527 | Eupen | 0.98 | 2.19 |
| 528 | Exeter City | 0.85 | 1.98 |
| 529 | Asteras Tripolis | 0.5 | 1.42 |
| 530 | Sandefjord | 0.91 | 2.11 |
| 531 | Melbourne Victory | 0.77 | 1.9 |
| 532 | FC Sion | 0.96 | 2.19 |
| 533 | IK Sirius | 0.79 | 1.94 |
| 534 | Colorado Springs Switchbacks FC | 0.77 | 1.92 |
| 535 | Torpedo Moskow | 0.72 | 1.86 |
| 536 | Lugo | 0.58 | 1.64 |
| 537 | Cosenza | 0.54 | 1.57 |
| 538 | Shamrock Rovers | 0.69 | 1.84 |
| 539 | Mjallby | 0.57 | 1.64 |
| 540 | Oxford United | 0.64 | 1.76 |
| 541 | Black Aces | 0.56 | 1.65 |
| 542 | RFC Seraing | 0.75 | 1.98 |
| 543 | Oakland Roots | 0.75 | 1.98 |
| 544 | Brommapojkarna | 0.7 | 1.91 |
| 545 | Stellenbosch FC | 0.64 | 1.83 |
| 546 | Volos NFC | 0.67 | 1.9 |
| 547 | Burton Albion | 0.74 | 2.01 |
| 548 | Aalesund | 0.71 | 1.98 |
| 549 | El Paso Locomotive FC | 0.72 | 2 |
| 550 | Niort | 0.71 | 1.98 |
| 551 | Ionikos FC | 0.58 | 1.77 |
| 552 | Levadiakos | 0.61 | 1.83 |
| 553 | Shrewsbury Town | 0.63 | 1.87 |
| 554 | SuperSport United | 0.45 | 1.55 |
| 555 | SV Sandhausen | 0.72 | 2.04 |
| 556 | Shandong Luneng | 0.82 | 2.22 |
| 557 | Salford City | 0.78 | 2.16 |
| 558 | Jiangsu Suning FC | 0.71 | 2.04 |
| 559 | Cheltenham Town | 0.67 | 1.99 |
| 560 | Gazisehir Gaziantep | 0.71 | 2.05 |
| 561 | Halmstads BK | 0.64 | 1.94 |
| 562 | Mansfield Town | 0.71 | 2.08 |
| 563 | Milton Keynes Dons | 0.58 | 1.86 |
| 564 | Panetolikos | 0.63 | 1.97 |
| 565 | New Mexico United | 0.67 | 2.04 |
| 566 | Yokohama FC | 0.65 | 2 |
| 567 | Stockport County | 0.49 | 1.72 |
| 568 | Hamarkamaratene | 0.68 | 2.08 |
| 569 | IFK VÃ¤rnamo | 0.58 | 1.91 |
| 570 | Pittsburgh Riverhounds | 0.51 | 1.82 |
| 571 | Bristol Rovers | 0.65 | 2.07 |
| 572 | Western United | 0.77 | 2.3 |
| 573 | Wellington Phoenix | 0.79 | 2.36 |
| 574 | Orange County SC | 0.58 | 1.99 |
| 575 | TS Galaxy | 0.37 | 1.59 |
| 576 | Kaizer Chiefs | 0.46 | 1.76 |
| 577 | Birmingham Legion FC | 0.66 | 2.19 |
| 578 | Brisbane Roar | 0.6 | 2.07 |
| 579 | Lamia | 0.47 | 1.85 |
| 580 | Newcastle Jets | 0.68 | 2.28 |
| 581 | Degerfors IF | 0.68 | 2.29 |
| 582 | Port Vale | 0.61 | 2.16 |
| 583 | AmaZulu | 0.4 | 1.81 |
| 584 | Bradford City | 0.48 | 1.97 |
| 585 | Swindon Town | 0.56 | 2.17 |
| 586 | Miami FC | 0.53 | 2.11 |
| 587 | Leyton Orient | 0.39 | 1.84 |
| 588 | Carlisle United | 0.39 | 1.86 |
| 589 | Morecambe | 0.58 | 2.26 |
| 590 | Golden Arrows | 0.43 | 1.97 |
| 591 | Newport County | 0.49 | 2.11 |
| 592 | Hatayspor | 0.58 | 2.29 |
| 593 | Royal AM | 0.46 | 2.06 |
| 594 | Perth Glory | 0.58 | 2.3 |
| 595 | Sekhukhune United | 0.24 | 1.61 |
| 596 | Cambridge United | 0.4 | 1.98 |
| 597 | Stevenage | 0.36 | 1.9 |
| 598 | Northampton Town | 0.34 | 1.88 |
| 599 | Hartford Athletic | 0.56 | 2.36 |
| 600 | Monterey Bay | 0.47 | 2.17 |
| 601 | Indy Eleven | 0.43 | 2.11 |
| 602 | Tianjin Teda | 0.5 | 2.26 |
| 603 | Macarthur FC | 0.63 | 2.55 |
| 604 | Varbergs BoIS FC | 0.49 | 2.27 |
| 605 | Charleston Battery | 0.45 | 2.22 |
| 606 | Shanghai Greenland | 0.56 | 2.47 |
| 607 | Harrogate Town | 0.54 | 2.43 |
| 608 | Moroka Swallows | 0.24 | 1.77 |
| 609 | Tulsa Roughnecks | 0.49 | 2.37 |
| 610 | Rio Grande Valley FC Toros | 0.41 | 2.21 |
| 611 | Hebei China Fortune FC | 0.5 | 2.43 |
| 612 | Colchester United | 0.27 | 1.91 |
| 613 | Henan Jianye | 0.46 | 2.36 |
| 614 | Las Vegas Lights FC | 0.41 | 2.26 |
| 615 | Gillingham | 0.27 | 1.94 |
| 616 | Dalian Aerbin | 0.51 | 2.51 |
| 617 | Tshakhuma Tsha Madzivhandila | 0.25 | 1.91 |
| 618 | Guangzhou RF | 0.66 | 2.86 |
| 619 | Maritzburg Utd | 0.26 | 1.98 |
| 620 | Accrington Stanley | 0.39 | 2.28 |
| 621 | Wuhan Zall | 0.39 | 2.32 |
| 622 | Crewe Alexandra | 0.36 | 2.25 |
| 623 | Detroit City FC | 0.27 | 2.08 |
| 624 | Richards Bay | 0.2 | 1.95 |
| 625 | Rochdale | 0.36 | 2.4 |
| 626 | Grimsby Town | 0.26 | 2.15 |
| 627 | Chippa United | 0.25 | 2.16 |
| 628 | Tranmere Rovers | 0.2 | 2.02 |
| 629 | Loudoun United FC | 0.36 | 2.47 |
| 630 | Tianjin Quanujian | 0.37 | 2.51 |
| 631 | Barrow | 0.2 | 2.06 |
| 632 | Shenzhen FC | 0.4 | 2.6 |
| 633 | Chongqing Lifan | 0.3 | 2.35 |
| 634 | Hartlepool | 0.38 | 2.56 |
| 635 | Walsall | 0.2 | 2.11 |
| 636 | Sutton United | 0.23 | 2.26 |
| 637 | AFC Wimbledon | 0.24 | 2.3 |
| 638 | Doncaster Rovers | 0.2 | 2.35 |
| 639 | Forest Green Rovers | 0.2 | 2.38 |
| 640 | Crawley Town | 0.2 | 2.41 |
| 641 | Guizhou Renhe | 0.2 | 2.61 |

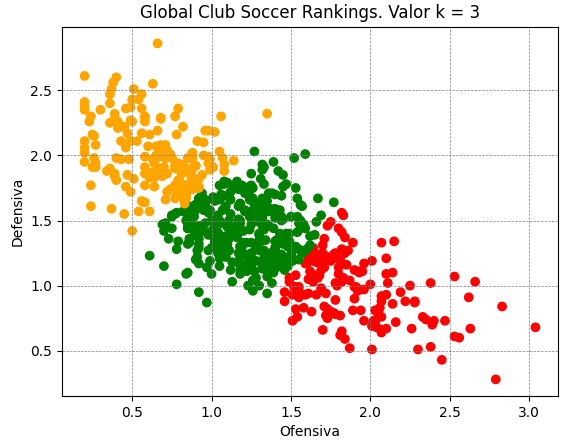
**RESULTADOS**

Se obtuvieron gráficas de dispersión para diferentes valores de k, permitiendo la visualización de cómo los equipos se agrupan en el espacio de calificaciones ofensivas y defensivas.

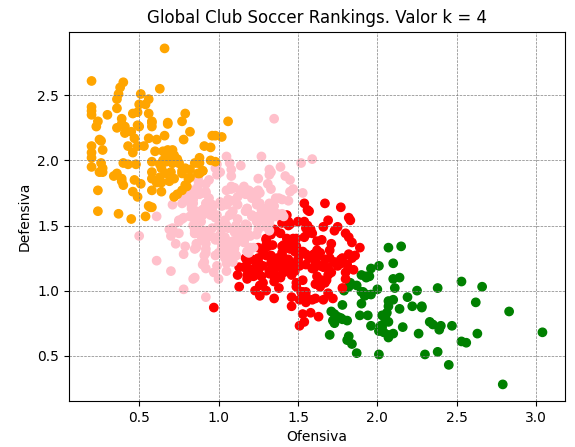
Para k = 2



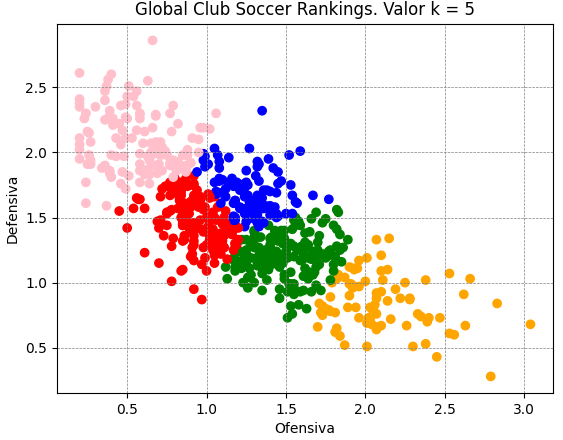
Para k = 3



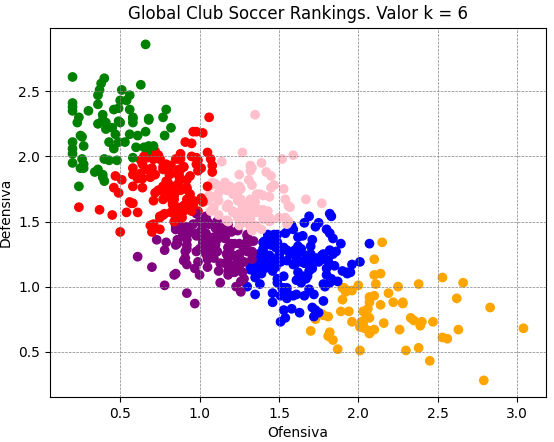
Para k = 4



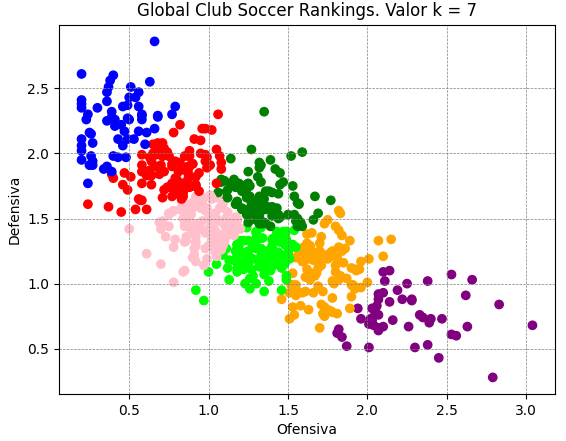
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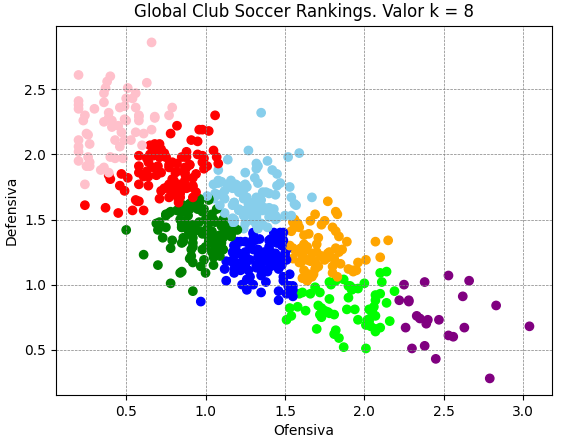
Para k = 6



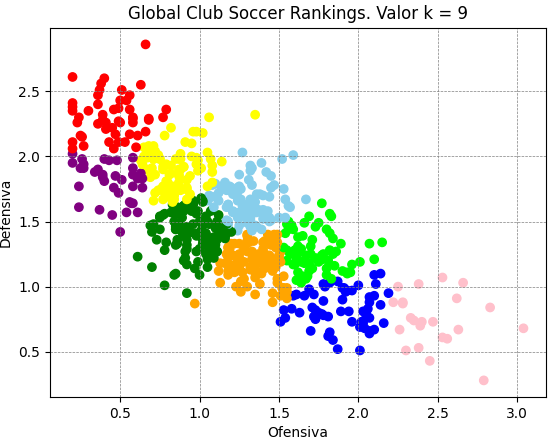
Para k = 7



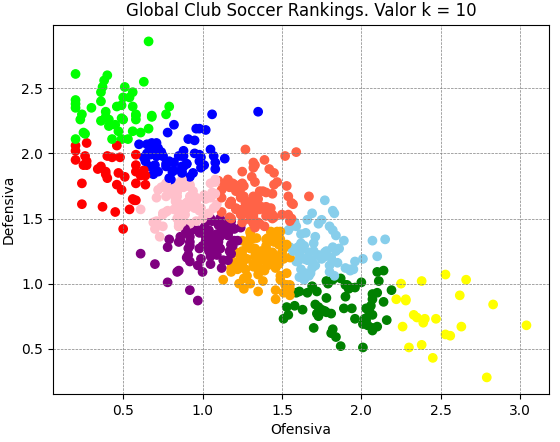
Para k = 8



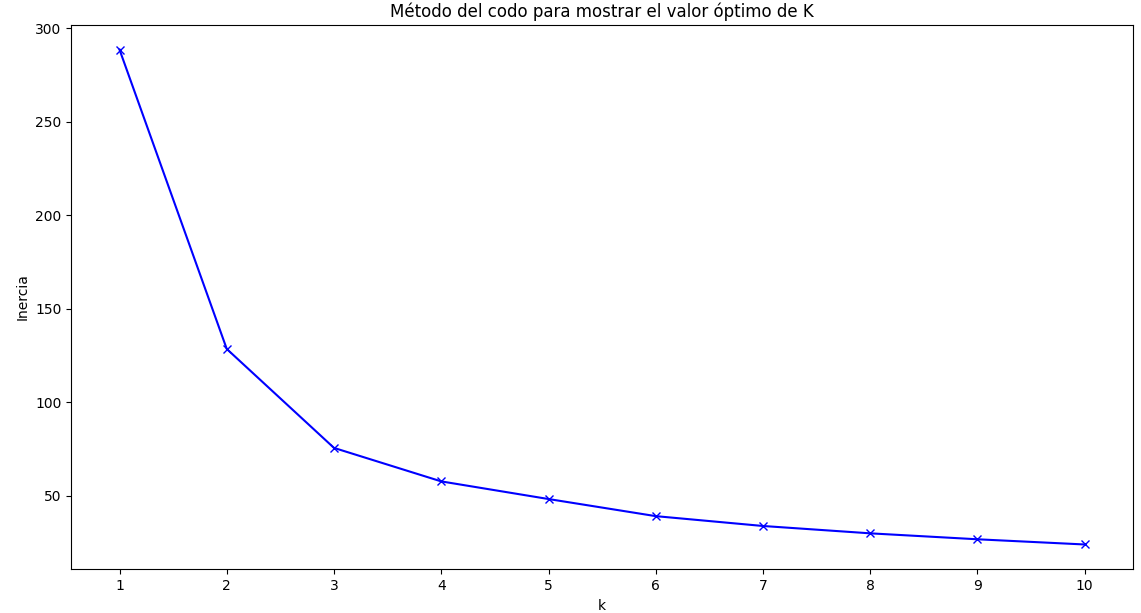
Para k = 9



Para k = 10

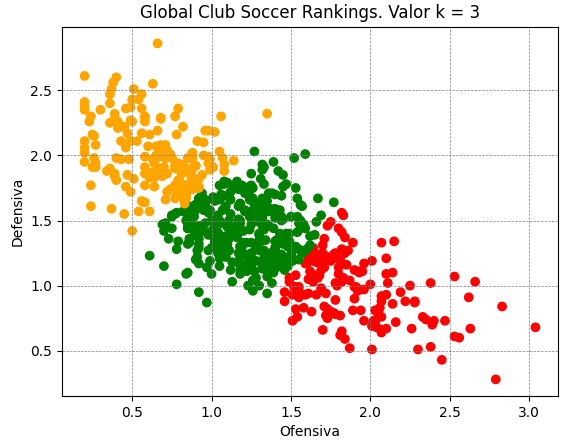


La gráfica de codo mostró la inercia en función de k, ayudando a identificar el valor óptimo de clusters para el conjunto de datos.



En la grafica de codo se puede observar que el valor optimo para el numero de clusters es 3.

Grafica de dispersión con el valor optimo k = 3:



Datos agrupados

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| rank | name | off | def | etiquetas |
| 456 | Arminia Bielefeld | 1.14 | 1.96 | 0 |
| 464 | Guangzhou Evergrande | 1.08 | 1.93 | 0 |
| 466 | SV Zulte Waregem | 1.35 | 2.32 | 0 |
| 467 | Pau | 0.92 | 1.75 | 0 |
| 470 | Hannover 96 | 1.07 | 1.98 | 0 |
| 471 | Kashiwa Reysol | 0.91 | 1.75 | 0 |
| 472 | Ross County | 0.92 | 1.76 | 0 |
| 475 | Spal | 0.83 | 1.65 | 0 |
| 477 | Perugia | 0.84 | 1.67 | 0 |
| 478 | Nimes | 1.01 | 1.91 | 0 |
| 481 | Stromsgodset | 0.99 | 1.89 | 0 |
| 482 | San Antonio FC | 0.88 | 1.74 | 0 |
| 483 | Kyoto Purple Sanga | 0.83 | 1.68 | 0 |
| 485 | AIK | 0.84 | 1.7 | 0 |
| 486 | Gamba Osaka | 0.92 | 1.82 | 0 |
| 487 | Stabaek | 0.94 | 1.85 | 0 |
| 488 | Livingston | 0.83 | 1.69 | 0 |
| 489 | Cashpoint SC Rheindorf Altach | 0.82 | 1.68 | 0 |
| 490 | Sydney FC | 1.05 | 2.03 | 0 |
| 491 | Ternana | 0.85 | 1.74 | 0 |
| 492 | Charlton Athletic | 0.98 | 1.94 | 0 |
| 493 | SV Ried | 0.87 | 1.8 | 0 |
| 494 | Western Sydney FC | 0.99 | 1.97 | 0 |
| 495 | Shonan Bellmare | 0.83 | 1.74 | 0 |
| 496 | Laval | 0.83 | 1.75 | 0 |
| 497 | Benevento | 0.77 | 1.67 | 0 |
| 498 | Beijing Guoan | 0.98 | 1.99 | 0 |
| 499 | 1. FC NÃ¼rnberg | 0.8 | 1.72 | 0 |
| 500 | Louisville City FC | 0.83 | 1.77 | 0 |
| 501 | Dundee Utd | 0.87 | 1.85 | 0 |
| 502 | Wycombe Wanderers | 0.78 | 1.72 | 0 |
| 503 | Haugesund | 0.87 | 1.86 | 0 |
| 504 | Annecy | 0.79 | 1.75 | 0 |
| 505 | Shanghai SIPG | 0.9 | 1.92 | 0 |
| 506 | Jahn Regensburg | 0.9 | 1.92 | 0 |
| 507 | San Diego Loyal SC | 0.95 | 2 | 0 |
| 508 | Tampa Bay Rowdies | 0.88 | 1.9 | 0 |
| 509 | Pyunik Yerevan | 0.87 | 1.9 | 0 |
| 510 | IFK Goteborg | 0.8 | 1.8 | 0 |
| 511 | UD Ibiza | 0.71 | 1.66 | 0 |
| 512 | Fleetwood Town | 0.76 | 1.75 | 0 |
| 513 | Hansa Rostock | 0.77 | 1.77 | 0 |
| 514 | Sacramento Republic FC | 0.79 | 1.81 | 0 |
| 515 | FC Khimki | 0.82 | 1.87 | 0 |
| 516 | KV Oostende | 1.02 | 2.18 | 0 |
| 517 | Winterthur | 0.81 | 1.86 | 0 |
| 518 | Brescia | 0.74 | 1.74 | 0 |
| 519 | Giannina | 0.72 | 1.72 | 0 |
| 520 | AC Horsens | 0.88 | 1.98 | 0 |
| 521 | Arizona United | 0.87 | 1.98 | 0 |
| 522 | Memphis 901 FC | 0.95 | 2.1 | 0 |
| 523 | Lincoln City | 0.61 | 1.57 | 0 |
| 524 | Eintracht Braunschweig | 0.88 | 2.02 | 0 |
| 525 | Adelaide United | 1.06 | 2.3 | 0 |
| 526 | Albirex Niigata | 0.82 | 1.93 | 0 |
| 527 | Eupen | 0.98 | 2.19 | 0 |
| 528 | Exeter City | 0.85 | 1.98 | 0 |
| 529 | Asteras Tripolis | 0.5 | 1.42 | 0 |
| 530 | Sandefjord | 0.91 | 2.11 | 0 |
| 531 | Melbourne Victory | 0.77 | 1.9 | 0 |
| 532 | FC Sion | 0.96 | 2.19 | 0 |
| 533 | IK Sirius | 0.79 | 1.94 | 0 |
| 534 | Colorado Springs Switchbacks FC | 0.77 | 1.92 | 0 |
| 535 | Torpedo Moskow | 0.72 | 1.86 | 0 |
| 536 | Lugo | 0.58 | 1.64 | 0 |
| 537 | Cosenza | 0.54 | 1.57 | 0 |
| 538 | Shamrock Rovers | 0.69 | 1.84 | 0 |
| 539 | Mjallby | 0.57 | 1.64 | 0 |
| 540 | Oxford United | 0.64 | 1.76 | 0 |
| 541 | Black Aces | 0.56 | 1.65 | 0 |
| 542 | RFC Seraing | 0.75 | 1.98 | 0 |
| 543 | Oakland Roots | 0.75 | 1.98 | 0 |
| 544 | Brommapojkarna | 0.7 | 1.91 | 0 |
| 545 | Stellenbosch FC | 0.64 | 1.83 | 0 |
| 546 | Volos NFC | 0.67 | 1.9 | 0 |
| 547 | Burton Albion | 0.74 | 2.01 | 0 |
| 548 | Aalesund | 0.71 | 1.98 | 0 |
| 549 | El Paso Locomotive FC | 0.72 | 2 | 0 |
| 550 | Niort | 0.71 | 1.98 | 0 |
| 551 | Ionikos FC | 0.58 | 1.77 | 0 |
| 552 | Levadiakos | 0.61 | 1.83 | 0 |
| 553 | Shrewsbury Town | 0.63 | 1.87 | 0 |
| 554 | SuperSport United | 0.45 | 1.55 | 0 |
| 555 | SV Sandhausen | 0.72 | 2.04 | 0 |
| 556 | Shandong Luneng | 0.82 | 2.22 | 0 |
| 557 | Salford City | 0.78 | 2.16 | 0 |
| 558 | Jiangsu Suning FC | 0.71 | 2.04 | 0 |
| 559 | Cheltenham Town | 0.67 | 1.99 | 0 |
| 560 | Gazisehir Gaziantep | 0.71 | 2.05 | 0 |
| 561 | Halmstads BK | 0.64 | 1.94 | 0 |
| 562 | Mansfield Town | 0.71 | 2.08 | 0 |
| 563 | Milton Keynes Dons | 0.58 | 1.86 | 0 |
| 564 | Panetolikos | 0.63 | 1.97 | 0 |
| 565 | New Mexico United | 0.67 | 2.04 | 0 |
| 566 | Yokohama FC | 0.65 | 2 | 0 |
| 567 | Stockport County | 0.49 | 1.72 | 0 |
| 568 | Hamarkamaratene | 0.68 | 2.08 | 0 |
| 569 | IFK VÃ¤rnamo | 0.58 | 1.91 | 0 |
| 570 | Pittsburgh Riverhounds | 0.51 | 1.82 | 0 |
| 571 | Bristol Rovers | 0.65 | 2.07 | 0 |
| 572 | Western United | 0.77 | 2.3 | 0 |
| 573 | Wellington Phoenix | 0.79 | 2.36 | 0 |
| 574 | Orange County SC | 0.58 | 1.99 | 0 |
| 575 | TS Galaxy | 0.37 | 1.59 | 0 |
| 576 | Kaizer Chiefs | 0.46 | 1.76 | 0 |
| 577 | Birmingham Legion FC | 0.66 | 2.19 | 0 |
| 578 | Brisbane Roar | 0.6 | 2.07 | 0 |
| 579 | Lamia | 0.47 | 1.85 | 0 |
| 580 | Newcastle Jets | 0.68 | 2.28 | 0 |
| 581 | Degerfors IF | 0.68 | 2.29 | 0 |
| 582 | Port Vale | 0.61 | 2.16 | 0 |
| 583 | AmaZulu | 0.4 | 1.81 | 0 |
| 584 | Bradford City | 0.48 | 1.97 | 0 |
| 585 | Swindon Town | 0.56 | 2.17 | 0 |
| 586 | Miami FC | 0.53 | 2.11 | 0 |
| 587 | Leyton Orient | 0.39 | 1.84 | 0 |
| 588 | Carlisle United | 0.39 | 1.86 | 0 |
| 589 | Morecambe | 0.58 | 2.26 | 0 |
| 590 | Golden Arrows | 0.43 | 1.97 | 0 |
| 591 | Newport County | 0.49 | 2.11 | 0 |
| 592 | Hatayspor | 0.58 | 2.29 | 0 |
| 593 | Royal AM | 0.46 | 2.06 | 0 |
| 594 | Perth Glory | 0.58 | 2.3 | 0 |
| 595 | Sekhukhune United | 0.24 | 1.61 | 0 |
| 596 | Cambridge United | 0.4 | 1.98 | 0 |
| 597 | Stevenage | 0.36 | 1.9 | 0 |
| 598 | Northampton Town | 0.34 | 1.88 | 0 |
| 599 | Hartford Athletic | 0.56 | 2.36 | 0 |
| 600 | Monterey Bay | 0.47 | 2.17 | 0 |
| 601 | Indy Eleven | 0.43 | 2.11 | 0 |
| 602 | Tianjin Teda | 0.5 | 2.26 | 0 |
| 603 | Macarthur FC | 0.63 | 2.55 | 0 |
| 604 | Varbergs BoIS FC | 0.49 | 2.27 | 0 |
| 605 | Charleston Battery | 0.45 | 2.22 | 0 |
| 606 | Shanghai Greenland | 0.56 | 2.47 | 0 |
| 607 | Harrogate Town | 0.54 | 2.43 | 0 |
| 608 | Moroka Swallows | 0.24 | 1.77 | 0 |
| 609 | Tulsa Roughnecks | 0.49 | 2.37 | 0 |
| 610 | Rio Grande Valley FC Toros | 0.41 | 2.21 | 0 |
| 611 | Hebei China Fortune FC | 0.5 | 2.43 | 0 |
| 612 | Colchester United | 0.27 | 1.91 | 0 |
| 613 | Henan Jianye | 0.46 | 2.36 | 0 |
| 614 | Las Vegas Lights FC | 0.41 | 2.26 | 0 |
| 615 | Gillingham | 0.27 | 1.94 | 0 |
| 616 | Dalian Aerbin | 0.51 | 2.51 | 0 |
| 617 | Tshakhuma Tsha Madzivhandila | 0.25 | 1.91 | 0 |
| 618 | Guangzhou RF | 0.66 | 2.86 | 0 |
| 619 | Maritzburg Utd | 0.26 | 1.98 | 0 |
| 620 | Accrington Stanley | 0.39 | 2.28 | 0 |
| 621 | Wuhan Zall | 0.39 | 2.32 | 0 |
| 622 | Crewe Alexandra | 0.36 | 2.25 | 0 |
| 623 | Detroit City FC | 0.27 | 2.08 | 0 |
| 624 | Richards Bay | 0.2 | 1.95 | 0 |
| 625 | Rochdale | 0.36 | 2.4 | 0 |
| 626 | Grimsby Town | 0.26 | 2.15 | 0 |
| 627 | Chippa United | 0.25 | 2.16 | 0 |
| 628 | Tranmere Rovers | 0.2 | 2.02 | 0 |
| 629 | Loudoun United FC | 0.36 | 2.47 | 0 |
| 630 | Tianjin Quanujian | 0.37 | 2.51 | 0 |
| 631 | Barrow | 0.2 | 2.06 | 0 |
| 632 | Shenzhen FC | 0.4 | 2.6 | 0 |
| 633 | Chongqing Lifan | 0.3 | 2.35 | 0 |
| 634 | Hartlepool | 0.38 | 2.56 | 0 |
| 635 | Walsall | 0.2 | 2.11 | 0 |
| 636 | Sutton United | 0.23 | 2.26 | 0 |
| 637 | AFC Wimbledon | 0.24 | 2.3 | 0 |
| 638 | Doncaster Rovers | 0.2 | 2.35 | 0 |
| 639 | Forest Green Rovers | 0.2 | 2.38 | 0 |
| 640 | Crawley Town | 0.2 | 2.41 | 0 |
| 641 | Guizhou Renhe | 0.2 | 2.61 | 0 |
| 1 | Manchester City | 2.79 | 0.28 | 1 |
| 2 | Bayern Munich | 3.04 | 0.68 | 1 |
| 3 | Barcelona | 2.45 | 0.43 | 1 |
| 4 | Real Madrid | 2.56 | 0.6 | 1 |
| 5 | Liverpool | 2.63 | 0.67 | 1 |
| 6 | Arsenal | 2.53 | 0.61 | 1 |
| 7 | Newcastle | 2.38 | 0.53 | 1 |
| 8 | Napoli | 2.3 | 0.51 | 1 |
| 9 | Borussia Dortmund | 2.83 | 0.84 | 1 |
| 10 | Brighton and Hove Albion | 2.47 | 0.73 | 1 |
| 11 | RB Leipzig | 2.39 | 0.7 | 1 |
| 12 | Benfica | 2.4 | 0.73 | 1 |
| 13 | Aston Villa | 2.01 | 0.51 | 1 |
| 14 | Atletico Madrid | 2.26 | 0.67 | 1 |
| 15 | Paris Saint-Germain | 2.62 | 0.91 | 1 |
| 16 | Manchester United | 2.35 | 0.74 | 1 |
| 17 | Internazionale | 2.33 | 0.76 | 1 |
| 18 | Ajax | 2.66 | 1.03 | 1 |
| 19 | Lille | 2.07 | 0.64 | 1 |
| 20 | Brentford | 2.1 | 0.67 | 1 |
| 21 | Real Sociedad | 1.87 | 0.52 | 1 |
| 22 | Sporting CP | 2.07 | 0.66 | 1 |
| 23 | FC Porto | 2.16 | 0.72 | 1 |
| 24 | Chelsea | 2.04 | 0.68 | 1 |
| 25 | Feyenoord | 2.28 | 0.87 | 1 |
| 26 | Lyon | 2.28 | 0.88 | 1 |
| 27 | Stade Rennes | 2.01 | 0.69 | 1 |
| 28 | Bayer Leverkusen | 2.03 | 0.72 | 1 |
| 29 | Athletic Bilbao | 1.84 | 0.59 | 1 |
| 30 | Celtic | 2.53 | 1.07 | 1 |
| 31 | Zenit St Petersburg | 2.02 | 0.73 | 1 |
| 32 | Fiorentina | 2.07 | 0.76 | 1 |
| 33 | FC Twente | 2.22 | 0.88 | 1 |
| 34 | Marseille | 2.05 | 0.77 | 1 |
| 35 | PSV | 2.38 | 1.02 | 1 |
| 36 | Crystal Palace | 1.81 | 0.62 | 1 |
| 37 | Villarreal | 2.14 | 0.86 | 1 |
| 38 | Lens | 1.96 | 0.73 | 1 |
| 39 | AC Milan | 2.05 | 0.8 | 1 |
| 40 | AS Roma | 1.82 | 0.65 | 1 |
| 41 | FC Salzburg | 2.06 | 0.83 | 1 |
| 42 | FC Cologne | 2.03 | 0.81 | 1 |
| 43 | Tottenham Hotspur | 2.19 | 0.95 | 1 |
| 44 | Rangers | 2.25 | 1 | 1 |
| 45 | Eintracht Frankfurt | 2.07 | 0.88 | 1 |
| 46 | West Ham United | 1.94 | 0.81 | 1 |
| 47 | Atalanta | 2.1 | 0.93 | 1 |
| 48 | VfL Wolfsburg | 2.07 | 0.92 | 1 |
| 49 | Juventus | 1.89 | 0.81 | 1 |
| 50 | Torino | 1.7 | 0.66 | 1 |
| 51 | Sevilla FC | 1.81 | 0.77 | 1 |
| 52 | Mainz | 2.11 | 1.02 | 1 |
| 53 | Palmeiras | 1.78 | 0.78 | 1 |
| 54 | Valencia | 1.73 | 0.75 | 1 |
| 55 | Lazio | 1.77 | 0.79 | 1 |
| 56 | Fulham | 1.9 | 0.9 | 1 |
| 57 | Besiktas | 2.14 | 1.1 | 1 |
| 58 | Celta Vigo | 1.72 | 0.77 | 1 |
| 59 | Nice | 1.75 | 0.8 | 1 |
| 60 | VfB Stuttgart | 1.96 | 0.97 | 1 |
| 61 | Borussia Monchengladbach | 2.1 | 1.09 | 1 |
| 62 | Galatasaray | 2 | 1.01 | 1 |
| 63 | AZ | 1.92 | 0.96 | 1 |
| 64 | Girona FC | 1.93 | 0.97 | 1 |
| 65 | Real Betis | 1.73 | 0.82 | 1 |
| 66 | SC Freiburg | 1.91 | 0.99 | 1 |
| 67 | Flamengo | 1.9 | 0.99 | 1 |
| 68 | Strasbourg | 1.78 | 0.89 | 1 |
| 69 | 1. FC Union Berlin | 1.71 | 0.84 | 1 |
| 70 | Osasuna | 1.63 | 0.8 | 1 |
| 71 | Young Boys | 2.1 | 1.21 | 1 |
| 72 | Atletico Mineiro | 1.54 | 0.76 | 1 |
| 73 | Getafe | 1.51 | 0.73 | 1 |
| 74 | AS Monaco | 1.95 | 1.11 | 1 |
| 75 | Leicester City | 1.87 | 1.04 | 1 |
| 76 | KAA Gent | 1.93 | 1.1 | 1 |
| 77 | Reims | 1.72 | 0.94 | 1 |
| 78 | Bologna | 1.79 | 1 | 1 |
| 79 | Werder Bremen | 1.93 | 1.11 | 1 |
| 80 | Fenerbahce | 2.01 | 1.19 | 1 |
| 81 | Monterrey | 1.58 | 0.83 | 1 |
| 82 | Everton | 1.82 | 1.03 | 1 |
| 83 | TSG Hoffenheim | 1.96 | 1.17 | 1 |
| 84 | Sassuolo | 1.9 | 1.12 | 1 |
| 85 | Slavia Prague | 1.83 | 1.06 | 1 |
| 86 | Braga | 1.78 | 1.02 | 1 |
| 87 | Bodo/Glimt | 2.15 | 1.34 | 1 |
| 88 | Burnley | 1.53 | 0.82 | 1 |
| 89 | Rayo Vallecano | 1.66 | 0.93 | 1 |
| 90 | Olympiacos | 1.69 | 0.98 | 1 |
| 91 | Dinamo Zagreb | 1.8 | 1.09 | 1 |
| 92 | Genk | 2.07 | 1.33 | 1 |
| 93 | Clermont Foot | 1.61 | 0.94 | 1 |
| 94 | AEK Athens | 1.59 | 0.93 | 1 |
| 95 | Club Brugge | 1.85 | 1.16 | 1 |
| 96 | Tigres UANL | 1.55 | 0.91 | 1 |
| 97 | Club AmÃ©rica | 1.8 | 1.14 | 1 |
| 98 | Toulouse | 1.64 | 1.03 | 1 |
| 99 | Udinese | 1.67 | 1.06 | 1 |
| 100 | Lecce | 1.46 | 0.88 | 1 |
| 101 | Mallorca | 1.51 | 0.93 | 1 |
| 102 | Antwerp | 1.55 | 0.96 | 1 |
| 103 | AFC Bournemouth | 1.68 | 1.08 | 1 |
| 104 | Schalke 04 | 1.81 | 1.2 | 1 |
| 105 | CSKA Moscow | 1.54 | 0.96 | 1 |
| 106 | Wolverhampton | 1.55 | 0.99 | 1 |
| 107 | Leeds United | 1.84 | 1.25 | 1 |
| 108 | SK Sturm Graz | 1.71 | 1.14 | 1 |
| 109 | River Plate | 1.61 | 1.05 | 1 |
| 110 | Espanyol | 1.86 | 1.27 | 1 |
| 111 | Monza | 1.69 | 1.12 | 1 |
| 112 | Vitesse | 1.65 | 1.08 | 1 |
| 113 | SÃ£o Paulo | 1.53 | 0.99 | 1 |
| 114 | Montpellier | 1.77 | 1.21 | 1 |
| 115 | SlovÃ¡cko | 1.77 | 1.21 | 1 |
| 116 | Red Star Belgrade | 1.75 | 1.19 | 1 |
| 117 | Cadiz | 1.52 | 0.99 | 1 |
| 118 | Adana Demirspor | 1.89 | 1.33 | 1 |
| 119 | FC Copenhagen | 1.75 | 1.2 | 1 |
| 120 | Union Saint Gilloise | 1.82 | 1.28 | 1 |
| 121 | Botafogo | 1.46 | 0.95 | 1 |
| 122 | FC Utrecht | 1.78 | 1.25 | 1 |
| 123 | Shakhtar Donetsk | 1.77 | 1.24 | 1 |
| 124 | Elche | 1.62 | 1.11 | 1 |
| 125 | Almeria | 1.69 | 1.18 | 1 |
| 126 | FC Augsburg | 1.73 | 1.22 | 1 |
| 127 | Southampton | 1.66 | 1.18 | 1 |
| 128 | Sheffield United | 1.49 | 1.03 | 1 |
| 129 | VfL Bochum | 1.84 | 1.37 | 1 |
| 130 | Fluminense | 1.53 | 1.08 | 1 |
| 131 | Nottingham Forest | 1.64 | 1.19 | 1 |
| 132 | Sparta | 1.7 | 1.25 | 1 |
| 133 | Middlesbrough | 1.6 | 1.17 | 1 |
| 134 | Brest | 1.49 | 1.06 | 1 |
| 135 | FC Midtjylland | 1.67 | 1.24 | 1 |
| 137 | Pachuca | 1.59 | 1.17 | 1 |
| 138 | Viktoria Plzen | 1.82 | 1.41 | 1 |
| 139 | FC Krasnodar | 1.7 | 1.31 | 1 |
| 140 | Ferencvaros | 1.61 | 1.22 | 1 |
| 142 | Lokomotiv Moscow | 1.62 | 1.26 | 1 |
| 143 | Trabzonspor | 1.8 | 1.44 | 1 |
| 144 | Real Valladolid | 1.55 | 1.2 | 1 |
| 145 | Hertha Berlin | 1.71 | 1.36 | 1 |
| 146 | Philadelphia Union | 1.64 | 1.29 | 1 |
| 150 | Los Angeles FC | 1.6 | 1.28 | 1 |
| 154 | Ipswich Town | 1.62 | 1.31 | 1 |
| 157 | Molde | 1.83 | 1.54 | 1 |
| 165 | FK Austria Vienna | 1.73 | 1.46 | 1 |
| 167 | Fatih KaragÃ¼mrÃ¼k | 1.82 | 1.56 | 1 |
| 170 | Yokohama F. Marinos | 1.75 | 1.49 | 1 |
| 136 | Luton Town | 1.35 | 0.94 | 2 |
| 141 | Internacional | 1.38 | 1.02 | 2 |
| 147 | Lorient | 1.46 | 1.12 | 2 |
| 148 | Bragantino | 1.48 | 1.15 | 2 |
| 149 | Empoli | 1.57 | 1.25 | 2 |
| 151 | Spartak Moscow | 1.58 | 1.26 | 2 |
| 152 | Dynamo Kiev | 1.51 | 1.19 | 2 |
| 153 | Fortaleza | 1.3 | 1 | 2 |
| 155 | Guimaraes | 1.26 | 0.96 | 2 |
| 156 | Istanbul Basaksehir | 1.39 | 1.1 | 2 |
| 158 | Anderlecht | 1.46 | 1.18 | 2 |
| 159 | LeÃ³n | 1.35 | 1.07 | 2 |
| 160 | AtlÃ©tico Paranaense | 1.38 | 1.11 | 2 |
| 161 | SC Dnipro-1 | 1.55 | 1.28 | 2 |
| 162 | Atlas | 1.41 | 1.14 | 2 |
| 163 | Lech Poznan | 1.42 | 1.15 | 2 |
| 164 | Swansea City | 1.5 | 1.23 | 2 |
| 166 | Steaua Bucuresti | 1.5 | 1.24 | 2 |
| 168 | Terek Grozny | 1.46 | 1.2 | 2 |
| 169 | Go Ahead Eagles | 1.65 | 1.39 | 2 |
| 171 | Cercle Brugge | 1.62 | 1.38 | 2 |
| 172 | FC Sheriff Tiraspol | 1.51 | 1.27 | 2 |
| 173 | FK Partizan Belgrade | 1.41 | 1.17 | 2 |
| 174 | Nantes | 1.35 | 1.11 | 2 |
| 175 | LASK Linz | 1.53 | 1.3 | 2 |
| 176 | Vasco da Gama | 1.44 | 1.21 | 2 |
| 177 | Corinthians | 1.23 | 1 | 2 |
| 178 | Coventry City | 1.28 | 1.06 | 2 |
| 179 | PAOK Salonika | 1.4 | 1.18 | 2 |
| 180 | Guadalajara | 1.35 | 1.13 | 2 |
| 181 | Santos | 1.26 | 1.04 | 2 |
| 182 | Famalicao | 1.44 | 1.24 | 2 |
| 183 | Verona | 1.37 | 1.18 | 2 |
| 184 | Cruz Azul | 1.32 | 1.13 | 2 |
| 185 | Vissel Kobe | 1.48 | 1.3 | 2 |
| 186 | Konyaspor | 1.42 | 1.24 | 2 |
| 187 | Metz | 1.32 | 1.15 | 2 |
| 188 | Boavista | 1.39 | 1.22 | 2 |
| 189 | Frosinone | 1.37 | 1.19 | 2 |
| 190 | Heerenveen | 1.66 | 1.49 | 2 |
| 191 | Cruzeiro | 1.36 | 1.19 | 2 |
| 192 | Talleres de CÃ³rdoba | 1.34 | 1.17 | 2 |
| 193 | Argentinos Juniors | 1.27 | 1.11 | 2 |
| 194 | FK Qarabag | 1.41 | 1.25 | 2 |
| 195 | Maccabi Haifa | 1.69 | 1.54 | 2 |
| 196 | Malmo FF | 1.59 | 1.44 | 2 |
| 197 | Hapoel Be'er | 1.49 | 1.34 | 2 |
| 198 | BK Hacken | 1.77 | 1.64 | 2 |
| 199 | Spezia | 1.45 | 1.32 | 2 |
| 200 | NEC | 1.54 | 1.41 | 2 |
| 201 | Toluca | 1.56 | 1.44 | 2 |
| 202 | Salernitana | 1.48 | 1.36 | 2 |
| 203 | West Bromwich Albion | 1.37 | 1.25 | 2 |
| 204 | Gil Vicente | 1.36 | 1.24 | 2 |
| 205 | Rapid Vienna | 1.58 | 1.47 | 2 |
| 206 | Chaves | 1.4 | 1.29 | 2 |
| 207 | Auxerre | 1.33 | 1.21 | 2 |
| 208 | Cagliari | 1.22 | 1.11 | 2 |
| 209 | FC Cincinnati | 1.49 | 1.4 | 2 |
| 210 | Vizela | 1.23 | 1.12 | 2 |
| 211 | Santos Laguna | 1.43 | 1.35 | 2 |
| 212 | Stoke City | 1.25 | 1.15 | 2 |
| 213 | AGF Aarhus | 1.28 | 1.19 | 2 |
| 214 | Cremonese | 1.47 | 1.4 | 2 |
| 215 | FC Arouca | 1.18 | 1.09 | 2 |
| 216 | Gazovik Orenburg | 1.55 | 1.48 | 2 |
| 217 | Boca Juniors | 1.13 | 1.03 | 2 |
| 218 | Atlanta United FC | 1.56 | 1.5 | 2 |
| 219 | Panathinaikos | 0.97 | 0.87 | 2 |
| 220 | Millwall | 1.33 | 1.25 | 2 |
| 221 | Genoa | 1.24 | 1.16 | 2 |
| 222 | Aris Salonika | 1.4 | 1.34 | 2 |
| 223 | GrÃªmio | 1.41 | 1.35 | 2 |
| 224 | Angers | 1.33 | 1.27 | 2 |
| 225 | Estudiantes | 1.18 | 1.12 | 2 |
| 226 | Dinamo Moscow | 1.43 | 1.4 | 2 |
| 227 | Nashville SC | 1.3 | 1.27 | 2 |
| 228 | St Gallen | 1.67 | 1.67 | 2 |
| 229 | Casa Pia | 1.24 | 1.2 | 2 |
| 230 | St Etienne | 1.54 | 1.53 | 2 |
| 231 | Rio Ave | 1.25 | 1.22 | 2 |
| 232 | Urawa Red Diamonds | 1.19 | 1.17 | 2 |
| 233 | Sunderland | 1.34 | 1.35 | 2 |
| 234 | BahÃ­a | 1.25 | 1.25 | 2 |
| 235 | Norwich City | 1.23 | 1.23 | 2 |
| 236 | Brondby | 1.57 | 1.61 | 2 |
| 237 | Watford | 1.28 | 1.29 | 2 |
| 238 | IF Elfsborg | 1.5 | 1.53 | 2 |
| 239 | Bordeaux | 1.12 | 1.12 | 2 |
| 240 | AmÃ©rica Mineiro | 1.31 | 1.34 | 2 |
| 241 | KVC Westerlo | 1.56 | 1.62 | 2 |
| 242 | Kawasaki Frontale | 1.39 | 1.44 | 2 |
| 243 | AEK Larnaca | 1.16 | 1.18 | 2 |
| 244 | Apollon Limassol | 1.21 | 1.24 | 2 |
| 245 | Columbus Crew | 1.44 | 1.5 | 2 |
| 246 | Seattle Sounders FC | 1.31 | 1.35 | 2 |
| 247 | FC Lugano | 1.45 | 1.51 | 2 |
| 248 | New York City FC | 1.3 | 1.35 | 2 |
| 249 | OH Leuven | 1.44 | 1.53 | 2 |
| 250 | New York Red Bulls | 1.13 | 1.18 | 2 |
| 251 | San Lorenzo | 0.92 | 0.95 | 2 |
| 252 | Blackburn | 1.18 | 1.23 | 2 |
| 253 | Santa Clara | 1.25 | 1.33 | 2 |
| 254 | FC St. Pauli | 1.3 | 1.39 | 2 |
| 255 | Rostov | 1.36 | 1.46 | 2 |
| 256 | Maritimo | 1.3 | 1.4 | 2 |
| 257 | Hibernian | 1.33 | 1.43 | 2 |
| 258 | Bristol City | 1.17 | 1.25 | 2 |
| 259 | Hearts | 1.4 | 1.52 | 2 |
| 260 | Rosenborg | 1.54 | 1.67 | 2 |
| 261 | FC Nordsjaelland | 1.34 | 1.46 | 2 |
| 262 | Lanus | 1.19 | 1.29 | 2 |
| 263 | CFR 1907 Cluj | 1.22 | 1.33 | 2 |
| 264 | Orlando City SC | 1.35 | 1.47 | 2 |
| 265 | Wolfsberger AC | 1.43 | 1.58 | 2 |
| 266 | Levante | 1.05 | 1.15 | 2 |
| 267 | Viborg | 1.18 | 1.3 | 2 |
| 268 | DC United | 1.32 | 1.46 | 2 |
| 269 | Kashima Antlers | 1.18 | 1.3 | 2 |
| 270 | Tenerife | 1 | 1.09 | 2 |
| 271 | FC Dallas | 1.2 | 1.33 | 2 |
| 272 | New England Revolution | 1.41 | 1.57 | 2 |
| 273 | Cuiaba | 1.09 | 1.22 | 2 |
| 274 | Basel | 1.39 | 1.58 | 2 |
| 275 | Vancouver Whitecaps | 1.4 | 1.59 | 2 |
| 276 | Ludogorets | 1.3 | 1.49 | 2 |
| 277 | Nagoya Grampus Eight | 1.11 | 1.27 | 2 |
| 278 | Hamburg SV | 1.53 | 1.75 | 2 |
| 279 | Parma | 1.11 | 1.27 | 2 |
| 280 | Puebla | 1.32 | 1.52 | 2 |
| 281 | Sampdoria | 1.36 | 1.57 | 2 |
| 282 | Standard Liege | 1.37 | 1.58 | 2 |
| 283 | Motherwell | 1.24 | 1.43 | 2 |
| 284 | Silkeborg | 1.37 | 1.59 | 2 |
| 285 | FC Andorra | 1.05 | 1.21 | 2 |
| 286 | Sporting de Charleroi | 1.32 | 1.54 | 2 |
| 287 | FC Zurich | 1.35 | 1.57 | 2 |
| 288 | St. Truidense | 1.08 | 1.26 | 2 |
| 289 | Velez Sarsfield | 0.97 | 1.14 | 2 |
| 290 | Pumas Unam | 1.25 | 1.47 | 2 |
| 291 | SC Paderborn | 1.44 | 1.69 | 2 |
| 292 | Portimonense | 1.16 | 1.37 | 2 |
| 293 | Defensa y Justicia | 1.09 | 1.29 | 2 |
| 294 | Bastia | 1.2 | 1.42 | 2 |
| 295 | Estoril Praia | 1.16 | 1.38 | 2 |
| 296 | Portland Timbers | 1.29 | 1.54 | 2 |
| 297 | Granada | 0.99 | 1.19 | 2 |
| 298 | Bari | 1.1 | 1.32 | 2 |
| 299 | Mamelodi Sundowns | 1.04 | 1.25 | 2 |
| 300 | Sanfrecce Hiroshima | 1.17 | 1.41 | 2 |
| 301 | Servette | 1.33 | 1.61 | 2 |
| 302 | AtlÃ©tico San Luis | 1.18 | 1.44 | 2 |
| 303 | Los Angeles Galaxy | 1.4 | 1.7 | 2 |
| 304 | FC Volendam | 1.47 | 1.78 | 2 |
| 305 | RKC | 1.45 | 1.76 | 2 |
| 306 | Caen | 1.18 | 1.44 | 2 |
| 307 | Odense BK | 1.35 | 1.65 | 2 |
| 308 | GoiÃ¡s | 1.11 | 1.36 | 2 |
| 309 | Sivasspor | 1.25 | 1.53 | 2 |
| 310 | Kasimpasa | 1.3 | 1.59 | 2 |
| 311 | Coritiba | 1.09 | 1.35 | 2 |
| 312 | Guingamp | 1.13 | 1.4 | 2 |
| 313 | Tigre | 1.09 | 1.36 | 2 |
| 314 | Minnesota United FC | 1.28 | 1.58 | 2 |
| 315 | F.B.C Unione Venezia | 1.24 | 1.53 | 2 |
| 316 | Necaxa | 1.05 | 1.32 | 2 |
| 317 | Rosario Central | 1.11 | 1.38 | 2 |
| 318 | Hull City | 1.05 | 1.31 | 2 |
| 319 | Fortuna DÃ¼sseldorf | 1.27 | 1.58 | 2 |
| 320 | Lillestrom | 1.32 | 1.64 | 2 |
| 321 | Kayserispor | 1.38 | 1.71 | 2 |
| 322 | Aberdeen | 1.14 | 1.43 | 2 |
| 323 | Paris FC | 1.06 | 1.34 | 2 |
| 324 | Preston North End | 1.12 | 1.41 | 2 |
| 325 | SK Brann | 1.3 | 1.63 | 2 |
| 326 | Real Zaragoza | 0.92 | 1.17 | 2 |
| 327 | Omonia Nicosia | 1.25 | 1.57 | 2 |
| 328 | Sporting Kansas City | 1.16 | 1.46 | 2 |
| 329 | Albacete | 1.13 | 1.43 | 2 |
| 330 | Antalyaspor | 1.18 | 1.48 | 2 |
| 331 | FC Luzern | 1.32 | 1.65 | 2 |
| 332 | Racing Club | 1.17 | 1.48 | 2 |
| 333 | Cerezo Osaka | 1.09 | 1.38 | 2 |
| 334 | Fortuna Sittard | 1.36 | 1.71 | 2 |
| 335 | AlavÃ©s | 0.85 | 1.1 | 2 |
| 336 | Newell's Old Boys | 0.84 | 1.09 | 2 |
| 337 | Karlsruher SC | 1.32 | 1.67 | 2 |
| 338 | Tijuana | 1.18 | 1.5 | 2 |
| 339 | Le Havre | 0.78 | 1.01 | 2 |
| 340 | San Jose Earthquakes | 1.27 | 1.62 | 2 |
| 341 | AC Ajaccio | 1 | 1.29 | 2 |
| 342 | Slovan Bratislava | 1.12 | 1.44 | 2 |
| 343 | Ural Sverdlovsk Oblast | 0.98 | 1.27 | 2 |
| 344 | 1. FC Heidenheim 1846 | 1.22 | 1.57 | 2 |
| 345 | Consadole Sapporo | 1.59 | 2.01 | 2 |
| 346 | Krylia Sovetov | 1.02 | 1.33 | 2 |
| 347 | Sheffield Wednesday | 1.12 | 1.45 | 2 |
| 348 | KV Mechelen | 1.45 | 1.85 | 2 |
| 349 | Toronto FC | 1.17 | 1.51 | 2 |
| 350 | Montreal Impact | 1.21 | 1.57 | 2 |
| 351 | HuracÃ¡n | 0.9 | 1.2 | 2 |
| 352 | Djurgardens IF | 1.21 | 1.58 | 2 |
| 353 | Pacos Ferreira | 1.1 | 1.45 | 2 |
| 354 | FC JuÃ¡rez | 1.02 | 1.36 | 2 |
| 355 | Eibar | 0.91 | 1.22 | 2 |
| 356 | Viking FK | 1.52 | 1.98 | 2 |
| 357 | CA Independiente | 1.04 | 1.38 | 2 |
| 358 | Colon Santa Fe | 1.04 | 1.4 | 2 |
| 359 | Barnsley | 1.26 | 1.67 | 2 |
| 360 | Sochi | 1.11 | 1.5 | 2 |
| 361 | Charlotte FC | 1.24 | 1.66 | 2 |
| 362 | Birmingham | 1.02 | 1.4 | 2 |
| 363 | Alanyaspor | 1.42 | 1.88 | 2 |
| 364 | Cardiff City | 1.04 | 1.41 | 2 |
| 365 | WSG Swarovski Wattens | 1.33 | 1.78 | 2 |
| 366 | Las Palmas | 0.91 | 1.27 | 2 |
| 367 | Godoy Cruz | 1 | 1.39 | 2 |
| 368 | Banfield | 0.92 | 1.29 | 2 |
| 369 | Randers FC | 1.18 | 1.63 | 2 |
| 370 | SpVgg Greuther FÃ¼rth | 1.12 | 1.55 | 2 |
| 371 | Ankaragucu | 1.06 | 1.48 | 2 |
| 372 | Istanbulspor | 1.17 | 1.61 | 2 |
| 373 | Chicago Fire | 1.18 | 1.63 | 2 |
| 374 | QuerÃ©taro | 0.98 | 1.39 | 2 |
| 375 | Troyes | 1.23 | 1.7 | 2 |
| 376 | Fakel Voronezh | 1.01 | 1.43 | 2 |
| 377 | Wigan | 0.92 | 1.32 | 2 |
| 378 | FC Groningen | 1.24 | 1.73 | 2 |
| 379 | Excelsior | 1.26 | 1.75 | 2 |
| 380 | Austria Lustenau | 1.31 | 1.82 | 2 |
| 381 | Austin FC | 1.24 | 1.73 | 2 |
| 382 | Como | 1.05 | 1.5 | 2 |
| 383 | Sochaux | 1.02 | 1.47 | 2 |
| 384 | Houston Dynamo | 1.21 | 1.71 | 2 |
| 385 | Huddersfield Town | 0.97 | 1.41 | 2 |
| 386 | Emmen | 1.25 | 1.77 | 2 |
| 387 | Grasshoppers ZÃ¼rich | 1.39 | 1.95 | 2 |
| 388 | Valerenga | 1.24 | 1.76 | 2 |
| 389 | FK Nizhny Novgorod | 0.92 | 1.36 | 2 |
| 390 | SK Austria Klagenfurt | 1.32 | 1.89 | 2 |
| 391 | Colorado Rapids | 1.08 | 1.59 | 2 |
| 392 | Queens Park Rangers | 1.04 | 1.54 | 2 |
| 393 | Hammarby | 1.21 | 1.75 | 2 |
| 394 | Holstein Kiel | 1.33 | 1.91 | 2 |
| 395 | SV Darmstadt 98 | 1.07 | 1.58 | 2 |
| 396 | Real Salt Lake | 1.09 | 1.61 | 2 |
| 397 | MazatlÃ¡n FC | 1.12 | 1.66 | 2 |
| 398 | Instituto | 1 | 1.5 | 2 |
| 399 | AtlÃ©tico TucumÃ¡n | 0.93 | 1.41 | 2 |
| 400 | Ballkani | 1.2 | 1.76 | 2 |
| 401 | Melbourne City | 1.32 | 1.93 | 2 |
| 402 | Leganes | 0.86 | 1.33 | 2 |
| 403 | FC Tokyo | 1.17 | 1.74 | 2 |
| 404 | Sarmiento | 0.93 | 1.43 | 2 |
| 405 | Platense | 0.85 | 1.32 | 2 |
| 406 | Hartberg | 1.19 | 1.77 | 2 |
| 407 | Pisa | 0.93 | 1.44 | 2 |
| 408 | Belgrano Cordoba | 0.9 | 1.4 | 2 |
| 409 | Cambuur Leeuwarden | 1.25 | 1.86 | 2 |
| 410 | Rotherham United | 0.96 | 1.48 | 2 |
| 411 | Gimnasia La Plata | 0.86 | 1.36 | 2 |
| 412 | Sudtirol | 0.7 | 1.15 | 2 |
| 413 | St. Louis CITY SC | 1.12 | 1.72 | 2 |
| 414 | Sagan Tosu | 0.92 | 1.46 | 2 |
| 415 | Bolton | 0.89 | 1.42 | 2 |
| 416 | Real Oviedo | 0.78 | 1.28 | 2 |
| 417 | Sarpsborg | 1.14 | 1.76 | 2 |
| 418 | Tromso | 1.08 | 1.69 | 2 |
| 419 | Umraniyespor | 1.14 | 1.77 | 2 |
| 420 | Palermo | 1.05 | 1.66 | 2 |
| 421 | Rigas Futbola Skola | 1.16 | 1.8 | 2 |
| 422 | AaB | 0.99 | 1.58 | 2 |
| 423 | Villarreal B | 0.98 | 1.56 | 2 |
| 424 | Giresunspor | 1.06 | 1.68 | 2 |
| 425 | 1. FC Kaiserslautern | 1.02 | 1.65 | 2 |
| 426 | MÃ¡laga | 0.79 | 1.34 | 2 |
| 427 | Blackpool | 1.06 | 1.7 | 2 |
| 428 | Plymouth Argyle | 1.02 | 1.66 | 2 |
| 429 | Racing Santander | 0.85 | 1.44 | 2 |
| 430 | Dijon FCO | 0.85 | 1.44 | 2 |
| 431 | Central CÃ³rdoba Santiago del Estero | 0.87 | 1.47 | 2 |
| 432 | Barracas Central | 0.87 | 1.48 | 2 |
| 433 | Zalgiris Vilnius | 1.1 | 1.79 | 2 |
| 434 | St Mirren | 0.95 | 1.58 | 2 |
| 435 | Central Coast Mariners | 1.27 | 2.03 | 2 |
| 436 | Union Santa Fe | 0.85 | 1.46 | 2 |
| 437 | Peterborough United | 1.01 | 1.68 | 2 |
| 438 | IFK Norrkoping | 1.08 | 1.78 | 2 |
| 439 | Derby County | 0.94 | 1.6 | 2 |
| 440 | FC Cartagena | 0.89 | 1.53 | 2 |
| 441 | FC Vaduz | 0.96 | 1.63 | 2 |
| 442 | Sporting GijÃ³n | 0.85 | 1.48 | 2 |
| 443 | KV Kortrijk | 1.08 | 1.8 | 2 |
| 444 | Inter Miami CF | 1.05 | 1.77 | 2 |
| 445 | Kalmar FF | 0.96 | 1.64 | 2 |
| 446 | Reading | 0.9 | 1.58 | 2 |
| 447 | US Quevilly | 0.96 | 1.66 | 2 |
| 448 | Ascoli | 0.84 | 1.5 | 2 |
| 449 | SD Huesca | 0.73 | 1.36 | 2 |
| 450 | Odd BK | 0.91 | 1.62 | 2 |
| 451 | Kilmarnock | 0.91 | 1.63 | 2 |
| 452 | St Johnstone | 0.88 | 1.58 | 2 |
| 453 | OFI Crete | 0.9 | 1.62 | 2 |
| 454 | Mirandes | 0.86 | 1.56 | 2 |
| 455 | Valenciennes | 0.9 | 1.62 | 2 |
| 457 | 1. FC Magdeburg | 1.08 | 1.88 | 2 |
| 458 | Modena | 0.92 | 1.67 | 2 |
| 459 | Reggina | 0.84 | 1.56 | 2 |
| 460 | Rodez | 0.75 | 1.44 | 2 |
| 461 | HJK Helsinki | 0.94 | 1.71 | 2 |
| 462 | Grenoble | 0.61 | 1.23 | 2 |
| 463 | Lyngby | 0.86 | 1.61 | 2 |
| 465 | Portsmouth | 0.82 | 1.57 | 2 |
| 468 | Cittadella | 0.7 | 1.42 | 2 |
| 469 | Avispa Fukuoka | 0.78 | 1.56 | 2 |
| 473 | Amiens | 0.83 | 1.63 | 2 |
| 474 | Orlando Pirates | 0.75 | 1.53 | 2 |
| 476 | SD Ponferradina | 0.77 | 1.55 | 2 |
| 479 | Atromitos | 0.71 | 1.48 | 2 |
| 480 | Arsenal Sarandi | 0.75 | 1.54 | 2 |
| 484 | Burgos | 0.69 | 1.47 | 2 |

**DISCUSIONES DE RESULTADO**

La gráfica de codo proporciona información sobre la variabilidad explicada por el modelo en función de k. Se busca un equilibrio entre tener un número suficiente de clústeres para representar variaciones significativas en los datos y evitar tener demasiados clústeres, lo que podría conducir a una segmentación excesiva y poco significativa.

En este caso, se considerar el punto en la gráfica de codo donde la inercia se estabiliza: k = 3.

**CONCLUSIONES**

En conclusión, el análisis de clustering con K-Means ofrece una herramienta valiosa para entender la estructura subyacente en los datos, en este caso de los equipos de fútbol. La elección adecuada de k es esencial y puede tener un impacto significativo en la interpretación de los resultados. Además, la asignación de etiquetas a cada equipo proporciona una clasificación que puede ser útil para diversos propósitos, como análisis estratégico y toma de decisiones.

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