Tye Zasacky

Collaborators: None

Ideal number of clusters found: 3

Reasoning: Despite there being 5 categories, using k = 5 often ended up with one or more one element cluster. This could likely be fixed by choosing initial centroids intelligently or by increasing feature dimensionality to include more data.

Output with k=3 is below. As you can see, it almost always creates a cluster for huge, one combined one for tiny & small, and one for medium & large. The exception here was the 5th attempt, which did poorly for some reason.

**1st Attempt**

The solution converged in 6 iteration(s).

Resulting clusters:

Centroid: (0.410, 0.570) - Large

(55, 22) - Poodle (Large)

(65, 30) - Labrador Retriever (Large)

(60, 20) - Golden Cocker Retriever (Large)

(30, 20) - Border Collie (Medium)

(36, 22) - Siberian Husky (Medium)

Centroid: (0.115, 0.235) - Small

(7, 6) - Yorkshire Terrier (Tiny)

(4, 5) - Chihuahua (Tiny)

(14, 12) - Minituare Poodle (Small)

(20, 13) - Beagle (Small)

(24, 11) - Pembroke Welsh Corgi (Small)

Centroid: (0.969, 0.813) - Huge

(120, 35) - Saint Bernard (Huge)

(115, 28) - Great Pyrenese (Huge)

(110, 27) - Bernese Mountain Dog (Huge)

(120, 40) - Great Dane (Huge)

Classified "(31, 16) - Cocker Spaniel (Medium)" as "Small"

**2nd Attempt**

The solution converged in 3 iteration(s).

Resulting clusters:

Centroid: (0.410, 0.570) - Large

(55, 22) - Poodle (Large)

(60, 20) - Golden Cocker Retriever (Large)

(36, 22) - Siberian Husky (Medium)

(65, 30) - Labrador Retriever (Large)

(30, 20) - Border Collie (Medium)

Centroid: (0.115, 0.235) - Small

(7, 6) - Yorkshire Terrier (Tiny)

(20, 13) - Beagle (Small)

(4, 5) - Chihuahua (Tiny)

(14, 12) - Minituare Poodle (Small)

(24, 11) - Pembroke Welsh Corgi (Small)

Centroid: (0.969, 0.813) - Huge

(120, 35) - Saint Bernard (Huge)

(115, 28) - Great Pyrenese (Huge)

(120, 40) - Great Dane (Huge)

(110, 27) - Bernese Mountain Dog (Huge)

Classified "(31, 16) - Cocker Spaniel (Medium)" as "Small"

**3rd Attempt**

The solution converged in 7 iteration(s).

Resulting clusters:

Centroid: (0.969, 0.813) - Huge

(120, 35) - Saint Bernard (Huge)

(110, 27) - Bernese Mountain Dog (Huge)

(115, 28) - Great Pyrenese (Huge)

(120, 40) - Great Dane (Huge)

Centroid: (0.115, 0.235) - Small

(20, 13) - Beagle (Small)

(7, 6) - Yorkshire Terrier (Tiny)

(14, 12) - Minituare Poodle (Small)

(24, 11) - Pembroke Welsh Corgi (Small)

(4, 5) - Chihuahua (Tiny)

Centroid: (0.410, 0.570) - Large

(36, 22) - Siberian Husky (Medium)

(55, 22) - Poodle (Large)

(30, 20) - Border Collie (Medium)

(60, 20) - Golden Cocker Retriever (Large)

(65, 30) - Labrador Retriever (Large)

Classified "(31, 16) - Cocker Spaniel (Medium)" as "Small"

**4th Attempt**

The solution converged in 4 iteration(s).

Resulting clusters:

Centroid: (0.969, 0.813) - Huge

(115, 28) - Great Pyrenese (Huge)

(110, 27) - Bernese Mountain Dog (Huge)

(120, 35) - Saint Bernard (Huge)

(120, 40) - Great Dane (Huge)

Centroid: (0.410, 0.570) - Large

(36, 22) - Siberian Husky (Medium)

(60, 20) - Golden Cocker Retriever (Large)

(30, 20) - Border Collie (Medium)

(65, 30) - Labrador Retriever (Large)

(55, 22) - Poodle (Large)

Centroid: (0.115, 0.235) - Small

(20, 13) - Beagle (Small)

(7, 6) - Yorkshire Terrier (Tiny)

(24, 11) - Pembroke Welsh Corgi (Small)

(14, 12) - Minituare Poodle (Small)

(4, 5) - Chihuahua (Tiny)

Classified "(31, 16) - Cocker Spaniel (Medium)" as "Small"

**5th Attempt**

The solution converged in 3 iteration(s).

Resulting clusters:

Centroid: (0.806, 0.708) - Huge

(115, 28) - Great Pyrenese (Huge)

(110, 27) - Bernese Mountain Dog (Huge)

(65, 30) - Labrador Retriever (Large)

Centroid: (0.231, 0.364) - Small

(60, 20) - Golden Cocker Retriever (Large)

(55, 22) - Poodle (Large)

(14, 12) - Minituare Poodle (Small)

(36, 22) - Siberian Husky (Medium)

(7, 6) - Yorkshire Terrier (Tiny)

(24, 11) - Pembroke Welsh Corgi (Small)

(20, 13) - Beagle (Small)

(30, 20) - Border Collie (Medium)

(4, 5) - Chihuahua (Tiny)

Centroid: (1.000, 0.938) - Huge

(120, 35) - Saint Bernard (Huge)

(120, 40) - Great Dane (Huge)

Classified "(31, 16) - Cocker Spaniel (Medium)" as "Small"