Comprehensive Clustering Algorithm Comparison - Iris Dataset Internal Validation Metrics Adjusted Rand Index (ARI) Execution Time Comparison (Color = ARI)0.6 0.25 0.6 0.85 0.5 0.80 0.5 0.20 Davies-Bouldin Index Time (seconds) ARI Score 8.0 8.0 ARI Score 0.3 0.10 0.2 0.60 0.2 0.05 0.55 0.1 0.1 0.50 0.00 0.40 0.35 0.45 0.50 0.55 0.60 0.65 Silhouette Score **Clusters vs Performance Top 5 Methods: Multi-Metric Comparison** (Color = Noise Points) **Performance vs Speed Trade-off** BIRCH Minestral C K-Means Spectral Cluste 100 Agglomerat MiniBatch K-Mea 0.6 0.6 K-Means Agglomerat Agglomerat DBSCAN (ep Agglomerative (DBSCAN (ep 0.6 - 80 0.5 0.5 0.5 DBSCAN (ep **Noise Points** ARI Score ARI Score 6.0 60 Score 0.4 0.3 0.2 0.2 0.2 - 20 0.1 0.1 0.1 OPTICS

Number of Clusters

3

Metrics

10

0.05

0.10

0.15

Execution Time (seconds)

0.25

0.20

0.00