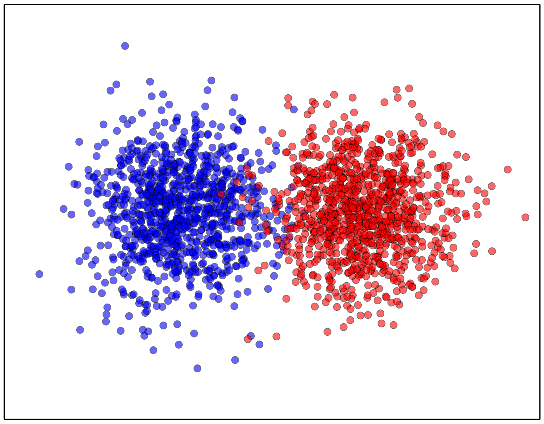
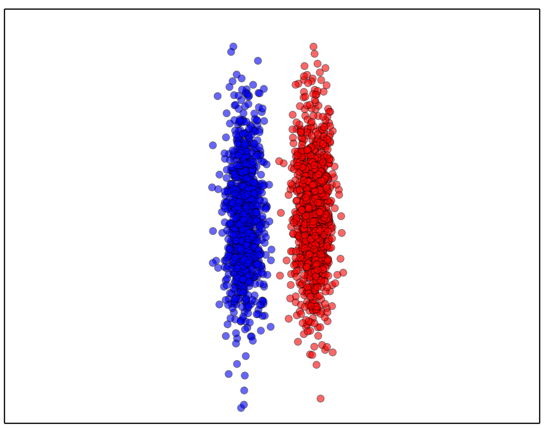


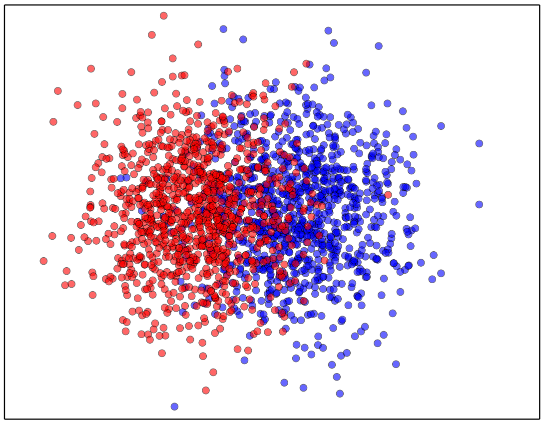
n	k-means	PCA k-means	RAN k-means
1	0.9735	0.9735	0.9745
2	0.982	0.9815	0.9825
3	0.9785	0.9785	0.982

FIG. 1. We have $x \sim \frac{1}{2}\left(\mathcal{N}(\mu_1, I) + \mathcal{N}(\mu_2, I)\right)$ where $\mu_1 = (0,0)^T$ and $\mu_2 = (4,0)^T$, and 1000 points on each cluster.



n	k-means	PCA k-means	RAN k-means
1	0.5265	0.5215	1.0
2	0.5285	0.5285	1.0
3	0.5285	0.513	1.0

FIG. 2. We have $x \sim \frac{1}{2}\left(\mathcal{N}(\mu_1, \Sigma) + \mathcal{N}(\mu_2, \Sigma)\right)$ where $\mu_1 = (0,0)^T$, $\mu_2 = (5,0)^T$, and $\Sigma = \begin{pmatrix} 1/2 & 0 \\ 0 & 15 \end{pmatrix}$, and 1000 points on each cluster.



D	k-means	PCA k-means	RAN k-means
5	0.84	0.8415	0.841
10	0.844	0.846	0.7985
15	0.8325	0.8365	0.7465
20	0.846	0.85	0.764
25	0.8555	0.8505	0.714
30	0.825	0.8225	0.728
50	0.8485	0.8465	0.6775
100	0.832	0.8325	0.644
200	0.8085	0.8145	0.592
300	0.7645	0.794	0.5755
500	0.6915	0.756	0.5615
1000	0.5075	0.6965	0.562
2000	0.5495	0.662	0.543
5000	0.531	0.5135	0.539

FIG. 3. High dimensions. We have $x \sim \frac{1}{2}\left(\mathcal{N}(\mu_1, I_D) + \mathcal{N}(\mu_2, I_D)\right)$ where $\mu_1 = (0, 0, \ldots, 0)^T$, $\mu_2 = (1, 0, \ldots, 0)^T$, and 1000 points on each cluster. We show only the two principal components of the data in the plot above.