Clustering

Soft clustering by MLE of a Gaussian mixture:

- Given data x and a fixed number of component Gaussian we can use maximum likelihood estimation to get a particular Gaussian mixture distribution.
- This achieves soft clustering.

$$\text{log likelihood} = \ln(p(X|\pi,\mu,\Sigma) = \sum_{n=1}^{N} \ln(\sum_{k=1}^{K} \pi_k \mathcal{N}(x_n|\mu_k,\Sigma_k))$$

- This has problems as this space will have lots of local maxima.
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