**GMM**

An expectation–maximization (EM) algorithm is an iterative method for finding maximum likelihood or maximum a posteriori (MAP) estimates of parameters in statistical models, where the model depends on unobserved latent variables. The EM iteration alternates between performing an expectation (E) step, which creates a function for the expectation of the log-likelihood evaluated using the current estimate for the parameters, and a maximization (M) step, which computes parameters maximizing the expected log-likelihood found on the E step. These parameter-estimates are then used to determine the distribution of the latent variables in the next E step.

**Dataset:**

Dataset is generated locally, by taking random mean and variance and generated by them using the distribution defined by these parameter values.

**Technical issues in implementation:**

We can not take product of probabilities because the quantity becomes very small and treated as 0 because of limited capacity of computers, so we can take sum of log values instead of product of probabilities values.

When we calculate posterior probabilities we need to initialize the initial probabilities with very small values, not 0, because we may face 1/0 problems.

**Outputs:**

We can see here black, red and purple clusters.







