Report: 1305043

1.
As there are multiple ships, the data will be a mixture of these ships' positions, and as the data is continuous, it's basically a convention to use gaussian distribution to model such data. This is why GMM is used here.

2. Randomly initiate the parameters (those which we'll need to estimate)
For the training data, I used mus,cov matrix of multiple gaussian distribution to generate the data.

3. the update equations have probablity associated and the probability have weights associated. In the update equations we basically take the wieghted mean of of the parameters. In other word, the probabilty associated with each training example is used as weight of that example being member of certain group.

4. using Maximum Likelihood Equation:

likelihood = P(X | w,mu,cov)
=P(x1| w,mu,cov) *P(x2 | w,mu,cov) *P(x3 | w,mu,cov)……

taking log-→

L = SUM(ln(P(xj| w,mu,cov)))

=SUM(ln(SUM(N(xj|mui,covi)*wi)))