```
close all
clear all
load data.mat

% Store posterior probabilities of each data point
Posterior_probability = zeros(2,length(data));

% For storing the model parameters
phi = [0.5;0.5];
Index_mean = randi(length(data),2,1);
Allmeans = data(:,Index_mean);
Covariances = zeros(2,2,2);
Covariances(:,:,1) = [1 0; 0 1];
Covariances(:,:,2) = [1 0; 0 1];

while 1
    % Update the posterior probabilities
    for j=1:length(data)
        for m=1:2
            Posterior_probability(m,j) =
 mvnpdf(data(:,j),Allmeans(:,m),Covariances(:,:,m))*phi(m);
        end
        Posterior_probability(:,j) = Posterior_probability(:,j)/
 sum(Posterior_probability(:,j));
    end
    % Update the model parameters
    lastPhi = phi;
    phi = sum(Posterior_probability,2) / length(data);
    Allmeans(:,1) = sum(Posterior_probability(1,:).*data(:,:),2)/
 sum(Posterior_probability(1,:));
    Allmeans(:,2) = sum(Posterior_probability(2,:).*data(:,:),2)/
 sum(Posterior_probability(2,:));
    Covariances = zeros(2,2,2);
    for j=1:length(data)
       Covariances(:,:,1) = Covariances(:,:,1) +
 Posterior_probability(1,j)*(data(:,j) - Allmeans(:,1)) * (data(:,j) -
 Allmeans(:,1))';
       Covariances(:,:,2) = Covariances(:,:,2) +
 Posterior_probability(2,j)*(data(:,j) - Allmeans(:,2)) * (data(:,j) -
 Allmeans(:,2))';
    end
    Covariances(:,:,1) = Covariances(:,:,1) / sum(Posterior_probability(1,:));
    Covariances(:,:,2) = Covariances(:,:,2) / sum(Posterior_probability(2,:));
    if lastPhi == phi
        disp('The model parameters are: ')
        disp(phi)
        break;
    end
end

disp('The probability for (3,3) to belong to the upper gaussian component is
 97.14% as opposed to 2.86% for the lower component')
```

```
The model parameters are:
    0.3283
    0.6717

The probability for (3,3) to belong to the upper gaussian component is 97.14%
 as opposed to 2.86% for the lower component
```

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