
Gaussian Process regression

GPR is performed on data pairs and the resultant function is plotted over the plot of the data points

```
theta_0 = [1;10;1];
```

Choosing a random initial value of theta

```
n = size(X,1);  
[theta fx c] = minimize(theta_0, 'll', 25, X, y, n);
```

The Likelihood is maximised using Carl Rasmussen's MATLAB function minimize.m

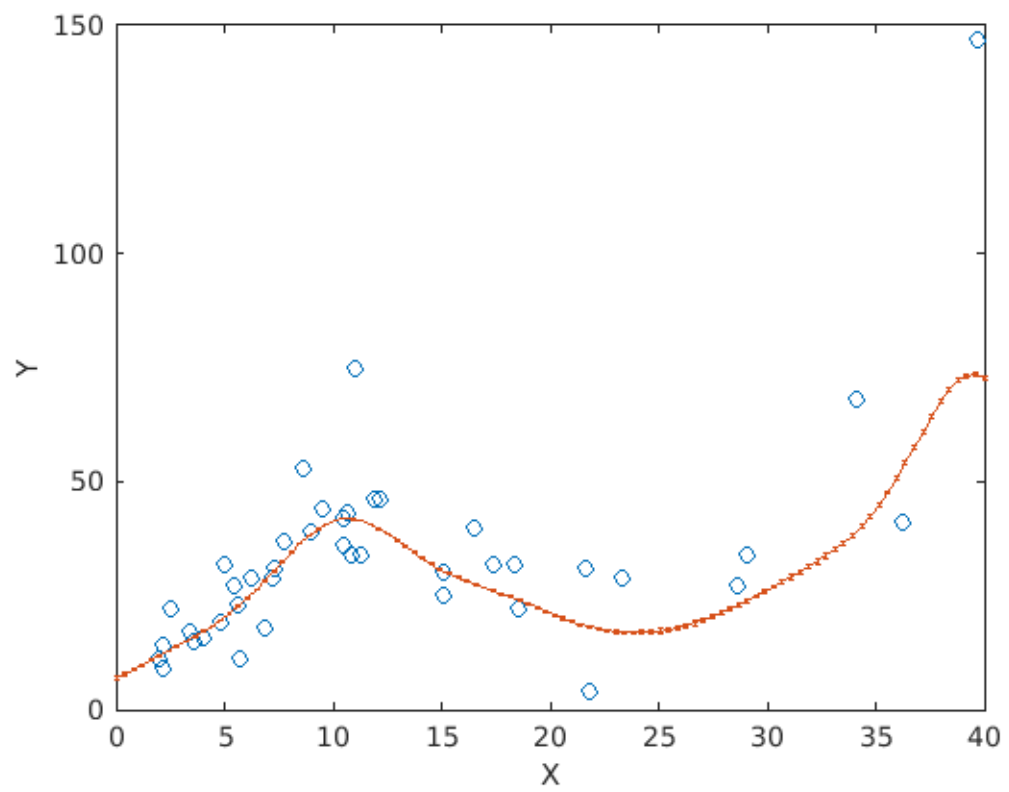
```
testdata = linspace(0,40)';  
K = exp_cov(X,X,theta);  
Ks = exp_cov(testdata,X,theta);  
Kss = exp_cov(testdata,testdata,theta);
```

Calculating the required covariance matrices K, K^*, K^{**}

```
mu = Ks*((K+theta(3)*eye(n))\y);  
cov = Kss - Ks*((K+theta(3)*eye(n))\Ks');  
sig = diag(cov);
```

mu gives the mean function evaluated at each of the points in the predictive distribution while the cov is the covariance sig gives the covariance value for each single test datapoint

```
plot(X,y,"o");  
hold on;  
errorbar(testdata, mu, sig, 'CapSize', 1);  
xlabel('X');  
ylabel('Y');  
hold off;
```



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