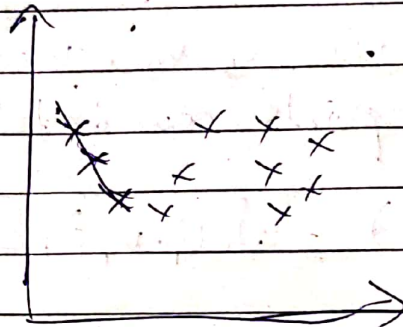


## Bias & Variance

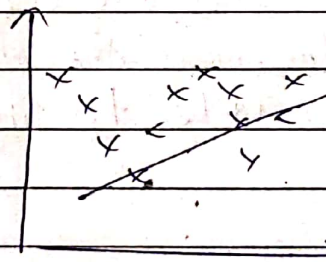
→ See After testing our data we will surely evaluate our model on unseen data. The error occurred on unseen data test's a model ability to generalize. This is called generalization error.

→ See Let's first consider a new data



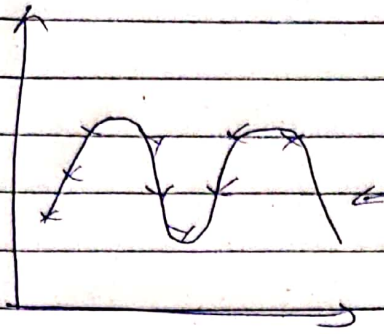
This is our data set and here we can see there can be a quadratic fit.

But what if we give a linear fit to it



→ It would look like this. By looking at it we can say this is very simple and it cannot predict data well because maximum of data points are covered. By this we can say it's underfitting the data.

→ Now let's apply a Complex fit



→ Here we can see that the model is learning too well that it is following the same path even where there is no data point.

→ By this we can say the model is overfitting which means it is overlearning.

→ Now let's get back to bias and variance. By now you already know what they mean.

→ Bias is nothing but making wrong assumptions in our model like the linear fit.

→ Variance is over learning the training data and it is very sensitive to small fluctuation of our training data.

→ Bias and variance go hand in hand. If one is changed then the other will <sup>also</sup> change.

→ So we should look and calibrate carefully to get better generalization.