Summary

This is the summary of the previous lectures. The first is that linear regression is powerful. Although it appears to be a simple method, it actually has a lot of versatility. We can add parameters to it, we can add regularization terms. So, we can add more variables or fewer variables, and so, there's also a fair amount of flexibility. It's a versatile method, it's powerful, and it is quite efficient as well, computationally, because we can solve linear regression problems in our local systems. The optimizations that are involved can be solved very efficiently with today's computers.

Linear regression seems to be simple, but it's the foundation for more advanced prediction methods. More advanced prediction methods might involve completely non-linear relations and all the way to neural networks and deep neural networks which are basically non-linear methods for doing prediction. All of the concepts from linear regression, things such as confidence intervals, hypothesis tests, and assessing performance, are relevant and useful, even when you do more complicated methods.

There isn't always a good reason for trying more complicated methods, in many applications, linear aggression just delivers very good and useful results and it's used on a daily basis in all kinds of industries.

On the other hand, we have discussed things that can go wrong. So it applies to linear regression, and the same applies to any statistical method and should be used with caution. One must also be careful about how one interprets the results.

So, there's this fundamental distinction between the prediction task and the modeling task. If you can model, then you can predict. But it doesn't work the other way. If you can predict, it doesn't mean that you have a correct model of the world. And when in doubt, always try to validate and use the data to see whether whatever you think you have learned generalizes on new data sets and the new data points that had not been seen while training. So, this concludes our summary of the discussion of linear regression.