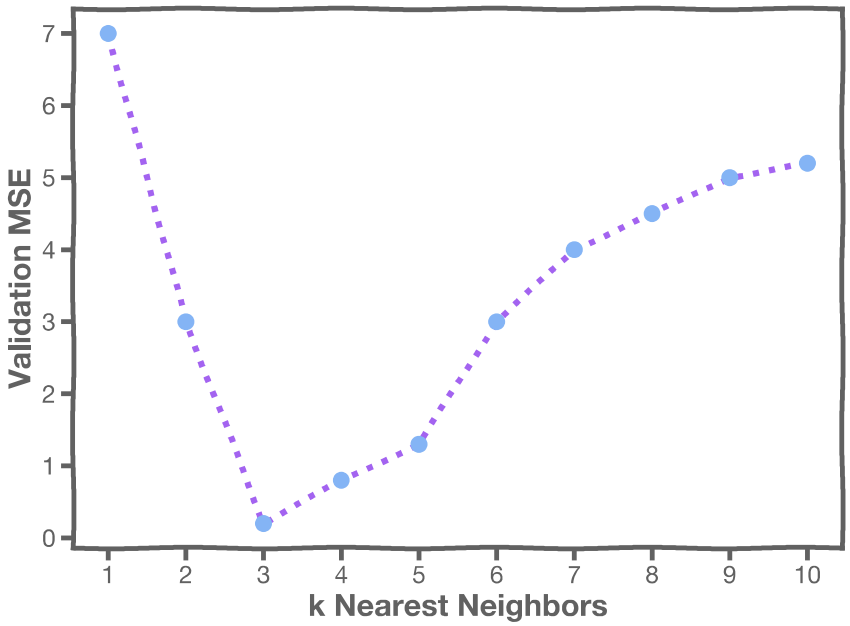
Model Comparison

Now we have a way to measure the error of the model to do model comparison. We can do the same for all k's and compare the MSE. now since we have a measure of how well our model performs.

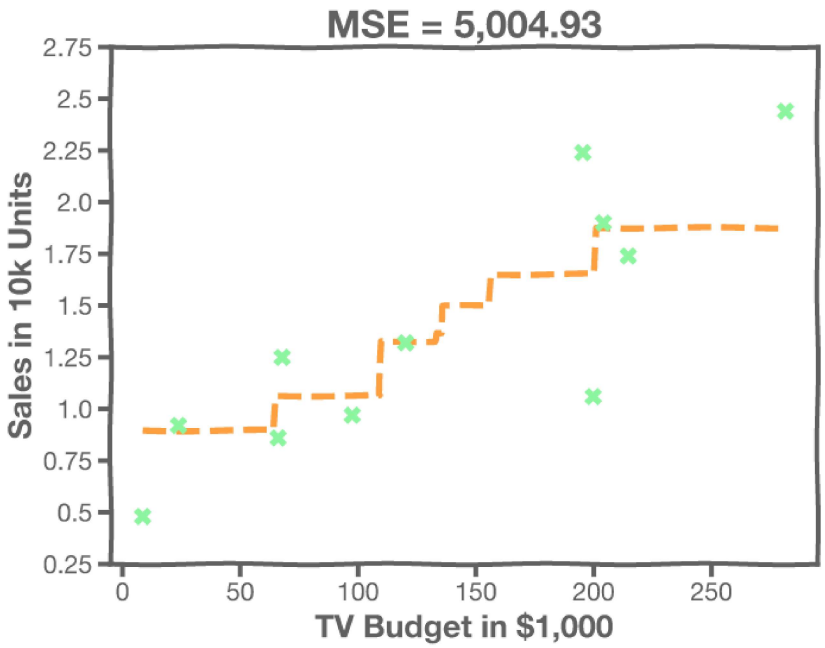
In the plot we compare the MSE for different k-nearest neighbors on the validation data. Three neighbors seems to be the best model since it has the lowest MSE. However, we should be a bit careful since it is close to `k=4`. The reason that `k=3` may be lower than `k=4` may be on the original decision how we split the data between train and validation.



Which model is the best? `k=3` seems the be the **best model**.

Model Fitness

We now have a way to compare models. But just because a model is the *best* does not mean that the model is *good*. For a subset of the data, with our best model of k=3, we calculate the MSE to be 5.0. Is that good enough? What if instead we measure sales in units of individual sales as opposed to thousand units? For k=3 the MSE is now 5,004.93. Is the MSE now good enough?



In order to answer this question we create a scale to compare our model to a very bad model and a very good model.

We will use the simplest model, the average or naïve model for comparison: $\hat{y} = \frac{1}{n}\sum_i y_i$ is the worst possible model we can do that still makes sense.

Calculator

We will say that $\hat{y}_i = y_i$, is the best possible model, when the prediction is identical to the true value.

R-squared

We put that into a scale from 0 to 1 by creating a new quantity R-squared.

$$\hat{R}^2 = 1 - \frac{\sum_i (\hat{y}_i - y_i)^2}{\sum_i (\bar{y} - y_i)^2}$$

> **⚠ Watch Out!**
>
> Though it is called R-squared, it is not just the square of R. You *can* get negative R-squared values.

- If our model is as good as the mean value, $\bar{y}$, then R-squared=0
- If our model is perfect, then R-squared=1
- R^2 can be negative if the model is worse than the average. This can happen when we evaluate the model on the validation set.

> **Not What You Expected?**
>
> What happens if your R-squared value is low, but you expected there to be a connection between the variables you're measuring? Sometimes just looking at a single number isn't enough. Check out Angela's video below for an example.

Video

Video

Download video file

Transcripts

Download SubRip (.srt) file

Download Text (.txt) file

Duplicate of 'LTI Consumer' (External resource)

Click OK to have your username and e-mail address sent to a 3rd party application.

OK

‹ Previous Next ›

Calculator

edX

About
Affiliates
edX for Business
Open edX
Careers
News

Legal

Terms of Service & Honor Code
Privacy Policy
Accessibility Policy
Trademark Policy
Sitemap
Cookie Policy
Your Privacy Choices

Connect

Blog
Contact Us
Help Center
Security
Media Kit

GET IT ON Google play
Download on the App Store

Calculator