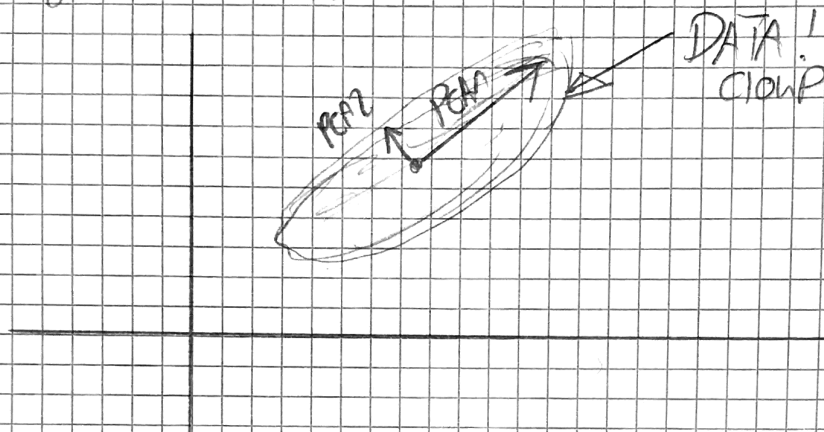## Question Principal Component Analysis (PCA)

PCA has been around for a long time. This algorithm simply looks at the direction with the most variance and then determines that as the first principal component. This is very similar to how regression works in that it determines the best direction to map data to. Imagine you have a noisy data set that looks like:

As you can see, the data has a definite direction: up and to the right. If we were to determine the principal component, it would be that direction because the data is in maximal variance that way. The second principal component would end up being orthogonal to that, and then over iterations we would reduce dimensions by transforming them into these principal directions.