

# Re: About Principle Components Analysis

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On Feb 17, 12:36 pm, dtian.ty...@xxxxxxxxxxxxxxxx wrote:

Hello,

I am a little confused about the projection operation of PCA. It is defined as  $E \cdot X$  where  $E$  is an eigenvector;  $X$  is a data point and  $\cdot$  is the matrix multiplication operator. In the linear algebra textbooks such as "Linear Algebra (Schaum's Outlines)" by Seymour Lipschutz, projection of a vector  $u$  on a vector  $v$  is

$$\left[ \frac{(u \cdot v)}{\|v\|^2} \right] v$$

If  $E$  is an eigenvector, then so is  $tE$  for any (nonzero) scalar  $t$ . It is customary to normalize  $E$ , although there are several ways this is done. If you use the  $L_2$  norm, you get the simplified formula. Other normalizations I have seen:  $L_1$  norm;  $L_\infty$  norm.

(By the way, you should spell it "Principal Component Analysis"...) .