Subject: Efficiently multiplying an array by a vector
Posted by laura.hike on Wed, 28 Sep 2016 01:38:08 GMT
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The following text is a slightly edited version of a post by Mark Plonski several years ago that was never answered. Just saving typing time because my problem is the same. In fact, it seems like it must be a common problem when one tries to vectorize and speed up a program.

What is the most efficient way to multiply every col in a 2D array
(ncol x nrow) by a vector of length (ncol)?

Example:

input array vector output array

a11 a12 a13 b1 a11b1 a12b1 a13b1
a21 a22 a23 b2 a21b2 a22b2 a23b2

This could be done by looping over the cols:

```
FOR i=0,ncol-1 DO c[i,*] = a[i,*] * b
```

Is there a more efficient way (w.r.t. computational speed) to do this?

I know I could replicate the column vector into a matrix (b # identity row)
and then do a ptwise matrix multiply, but my matrices can
be very large (1M elements) and I occasionally run out of swap
space. I don't know if that would run any faster anyway.