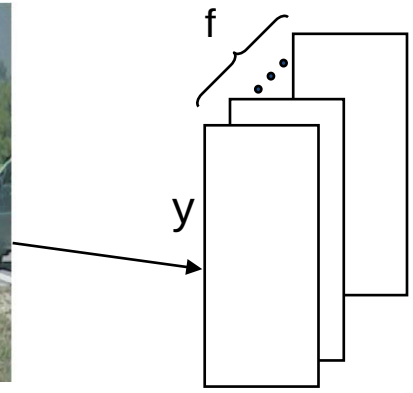
Bilinear Classifiers for Visual Recognition

Hamed Pirsiavash, Deva Ramanan, Charless Fowlkes. **UC Irvine**

Main Ideas:

- Treat image features and templates as matrices or tensors rather than simply “vectorizing” them
- Learn a low rank template by performing alternating minimization using standard linear SVM solver

A window on input image



Features

Advantages:

1. Rank constraint provides natural *regularization*
2. Learn shared subspaces across multiple classes or training sets to allow for *transfer learning*
3. 10x runtime *speedup* with no loss in performance

$$\frac{1}{2}Tr(W^T W) + C\sum_n \max(0, 1 - y_n \operatorname{Tr}(W^T X^n))$$

$$W = W_{xy} W_f^T$$

W26