Applying to d' - dimensional projection such that $d' \leq d$

$$\vec{x} = \vec{m} + \sum_{i=1}^{d'} a_i \vec{e_i} \tag{17}$$

$$J_{d'} = \sum_{k=1}^{n} ||(\sum_{i=1}^{d'} a_i \vec{e_i}) - \vec{x_k}||^2 \tag{18}$$

needs to be minimized when the vectors $e_1, ..., e_{d'}$ are the d' eigenvectors of the scatter matrix $\mathbf{S}$ with the largest eigenvalues. a_i are the principle components of $\vec{x}$ in that basis.