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Sarah K. Weissberger* (weissbsk@dukes.jmu.edu), **Jacob J. Rhodes** and **Carla D. Martin**. *A Multilinear Algebra Approach to Facial Recognition*. Preliminary report.

Multilinear algebra techniques involving tensors have gained recent popularity due to an increase in computational power and required analyses of multidimensional data. In the field of imaging, it has been shown that better results are achieved when data is treated as a tensor, or multiway array, block of data as opposed to matrix slices. In this talk, we utilize a multilinear algebra factorization of tensors that is an extension of the matrix singular value decomposition (SVD) in the context of facial recognition. The tensor singular value decomposition (TSVD), developed in 2011 by Kilmer and Martin, is used to extend the well-known Eigenfaces algorithm to tensors. The advantage of our new method is that images are not vectorized and therefore we take advantage of the inherent structure within the image. We also include a possible application of 3D image recognition that can also be done using this TSVD. (Received June 20, 2012)